THE GRADUATE CATALOG
The Graduate Catalog represents the offerings and requirements in effect at the time of publication, but there is no guarantee that they will not be changed or revoked. The course offerings and requirements of the institution are continually under examination and revision. However, adequate and reasonable notice will be given to students affected by any change. This catalog is not intended to state contractual terms and should not be regarded as a contract between the student and the institution. The institution reserves the right to change any provision, offering, or requirement to be effective when determined by the institution. These changes will govern current and readmitted students. Enrollment of all students is subject to these conditions. The current catalog should be referred to during each year of study. The university further reserves the right to dismiss a student from the university for cause at any time.

STUDENT RESPONSIBILITY
Graduate students must assume full responsibility for knowledge of rules and regulations of the Graduate Council and departmental requirements for the chosen degree program. Any exceptions to the policies stated in the Graduate Catalog must be approved by the Dean of the Graduate School. Individual colleges and departments may have requirements beyond the minimum established by the Graduate Council. A calendar of deadlines and policies and procedures for graduate programs are found on the Graduate School Web page (http://gradschool.utk.edu). A statement of graduate students’ rights and responsibilities is included with the admission notification.

Current information about the university can be found at
The University of Tennessee Homepage http://www.tennessee.edu
The Graduate School http://www.gradschool.utk.edu
Graduate and International Admissions http://admissions.utk.edu/graduate/
Office of the University Registrar http://registrar.utk.edu
Office of the Bursar http://web.utk.edu/~bursar
Office of Financial Aid and Scholarships http://web.utk.edu/~finaid

EEO/TITLE IX/AA/SECTION 504 STATEMENT
The University of Tennessee does not discriminate on the basis of race, sex, color, religion, national origin, age, disability, or veteran status in provision of education programs and services or employment opportunities and benefits. This policy extends to both employment by and admission to the university.

The university does not discriminate on the basis of race, sex, or disability in the education programs and activities pursuant to the requirements of Title VI of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act (ADA) of 1990.
Inquiries and charges of violation concerning Title VI, Title IX, Section 504, ADA, the Age Discrimination in Employment Act (ADEA), or any of the other above referenced policies should be directed to the Office of Equity and Diversity (OED), 1840 Melrose Avenue, Knoxville, Tennessee 37996-3560, telephone (865) 974-2498 (V/TTY available) or 974-2440. Requests for accommodation of a disability should be directed to the ADA Coordinator at the UT Knoxville Office of Human Resources, 600 Henley Street, Knoxville, Tennessee 37996-4125.

The University of Tennessee, Knoxville, in its efforts to ensure a welcoming environment for all persons, does not discriminate on the basis of sexual orientation in its campus-based programs, services, and activities. Inquiries and complaints should be directed to the Office of Equity and Diversity.

In accordance with the Tennessee College and University Security Information Act of 1989 and the Student Right-to-Know and Campus Security Act, the University of Tennessee has prepared a report containing campus security policies and procedures, data on campus crimes, and other related information. A free copy of this report may be obtained by any student, employee, or applicant for admission or employment from the Office of the Dean of Students; The University of Tennessee; 413 Student Services Building; Knoxville, Tennessee 37996-0248.

A project of the Office of the University Registrar, 209 Student Services Building, Knoxville, Tennessee 37996-0200.
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Lieutenant Colonel Marshall N. Ramsey, BS, MS, U.S. Army, Professor of Military Science and Leadership, Army Reserve Officers Training Corps
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Mary E. Papke, BA, MA, PhD, Special Assistant to the Chancellor and Associate Dean
S. Kay Reed, BS, MS, MA, PhD, Assistant to the Dean
Jennifer Spirko, BA, MA, Thesis/Dissertation Consultant

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Dr. Thomas Handler, Chairman of the Research Council
Dr. George Hoemann, University Outreach and Continuing Education
Dr. Bruce Bomar, UT Space Institute
Dr. Yang Zhong, Center for International Education

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<td>Dr. James Godkin</td>
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<td>Prof. Barbara Klinkhammer</td>
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<td>Dr. George Dodds</td>
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<td>Dr. Marianne Breining</td>
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<td>Dr. Amy Elias</td>
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<td>Dr. Rosalind Hackett</td>
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<td>Dr. Michael Keene</td>
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<td>Dr. Thomas Burman</td>
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<td>Dr. David Anderson</td>
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<td>Dr. Karen Levy</td>
<td>July 31, 2008</td>
<td>Dr. Michael Handlesman</td>
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<td>Dr. Jan Rosinski</td>
<td>July 31, 2009</td>
<td>Dr. James E. Diamond</td>
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<td>Business Administration</td>
<td>Dr. James Foggin</td>
<td>July 31, 2008</td>
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<td>Dr. Michael Lane Morris</td>
<td>July 31, 2009</td>
<td>Dr. Frank Guess</td>
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<td>Dr. Rudy Santore</td>
<td>July 31, 2009</td>
<td>Dr. Bruce Fisher</td>
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<tr>
<td>Communication and Information</td>
<td>Dr. Ben Bates</td>
<td>July 31, 2008</td>
<td>Dr. Michelle Violanti</td>
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<td>Dr. Eric Haley</td>
<td>July 31, 2009</td>
<td>Dr. Suzanne Allard</td>
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<td>Education, Health, and Human Sciences</td>
<td>Dr. Vincent Anfara</td>
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<td>Dr. Ralph Brockett</td>
<td>July 31, 2008</td>
<td>Dr. Grady Bogue</td>
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<td>July 31, 2009</td>
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<td>Engineering</td>
<td>Dr. Paul D. Frymier</td>
<td>July 31, 2007</td>
<td>Dr. Jack Lawer</td>
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<td>Dr. Belle Upadhyaya</td>
<td>July 31, 2007</td>
<td>Dr. Dayakar Penumadu</td>
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<td>Dr. Richard Bennett</td>
<td>July 31, 2009</td>
<td>Dr. William Hamel</td>
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<td>Dr. Rupy Sawhney</td>
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<td>Yanfei Gao</td>
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<td>Graduate Student Senate</td>
<td>Mr. Eddie Woodruff</td>
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<td>Ms. Amy Colvin</td>
<td>July 31, 2007</td>
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<td>Mrs. Jelena Pjesiviac-Grbovic</td>
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<td>Prof. Sibyl Marshall</td>
<td>July 31, 2009</td>
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<td>Dr. Nan Gaylord</td>
<td>July 31, 2009</td>
<td>Dr. Sandra McGuire</td>
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<td>Dr. David Dupper</td>
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<td>Dr. John Wodarski</td>
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<td>UT Space Institute</td>
<td>Dr. Monty Smith</td>
<td>July 31, 2007</td>
<td>Dr. William Hofmeister</td>
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<tr>
<td>Veterinary Medicine</td>
<td>Dr. Stephen Kania</td>
<td>July 31, 2009</td>
<td>Dr. Melissa Kennedy</td>
</tr>
</tbody>
</table>
ACADEMIC CALENDAR FOR 2007-2008

**Fall 2007 Semester**
- Classes Begin: Wednesday, August 22
- Labor Day: Monday, September 3
- 1st Session Ends: Wednesday, October 10
- Fall Break: Thursday-Friday, October 11-12
- 2nd Session Begins: Monday, October 15
- Thanksgiving: Thursday-Friday, November 22-23
- Classes End: Tuesday, December 4
- Study Days: Wednesday (Saturday & Sunday), December 5 (8 & 9)
- Exams: Thursday, Friday (am) & Monday-Thursday December 6, 7, 10, 11, 12, 13
- Graduate Hooding: Friday, December 14
- Commencement: Saturday, December 15

**Spring 2008 Semester**
- Classes Begin: Wednesday, January 9
- MLK Holiday: Monday, January 21
- 1st Session Ends: Wednesday, February 27
- 2nd Session Begins: Thursday, February 28
- Spring Break: Friday-Thursday, March 14 & 17-20
- Spring Recess: Friday, March 21
- Classes End: Friday, April 25
- Study Days: Monday (Saturday & Sunday), April 28 (26 & 27)
- Exams: Tuesday – Tuesday, April 29, 30, May 1, 2, 5, 6
- Graduate Hooding: Thursday, May 8
- Commencement: Friday, May 9

**Summer 2008 Semester**
- Mini Session Begins: Wednesday, May 7
- Memorial Holiday: Monday, May 26
- Mini Session Ends: Wednesday, May 28
- Full and 1st Session Begins: Monday, June 2
- 1st Session Ends: Thursday, July 3
- Independence Day Holiday: Friday, July 4
- 2nd Session Begins: Monday, July 7
- Full and 2nd Sessions End: Thursday, August 7
- Summer Graduation Date*: Friday, August 15

*There is no commencement ceremony in the summer.
This date is the official graduation date that will appear on the transcript of graduating students.

The Academic Calendar is available on the Web at http://registrar.utk.edu/academic_calendar.shtml
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Below is a list of all graduate degree programs offered at the University of Tennessee, Knoxville. A degree or certificate is awarded upon completion of a specified program of study in a major field. Degree titles are posted on transcripts and diplomas. Major titles are posted on transcripts. A formally approved subcomponent of a degree program is a concentration.

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### Graduate Degrees, Majors, and Certificate Programs

**Listed by College and Department**

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<td>Acting, Costume Design, Dramaturgy, Lighting Design, Scene Design</td>
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### College of Business Administration

<p>| Accounting and Information Management | Accounting | MAcc | Audit and Controls, Taxation |
| Economics | Economics | MA | |
| Management | Human Resource Development | MS | |
| Interdepartmental | Business Administration | MBA | Finance, Logistics, Marketing, Operations Management, Secondary Concentration, Innovation and Entrepreneurship, MBA Programs for Working Professionals Track, Aerospace and Defense MBA, Physician Executive MBA, Professional MBA, Executive MBA |
| | | PhD | Accounting, Finance, Human Resource Development, Logistics, Marketing, Statistics |
| Statistics, Operations and Management Science | Management Science | MS | |
| | | PhD | |
| | Statistics | MS | Industrial Statistics |
| | | PhD | |
| | | Graduate Certificate | Applied Statistical Strategies |</p>
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### GRADUATE DEGREE PROGRAMS

- Master of Accountancy
- Master of Architecture
- Master of Arts
- Master of Business Administration
- Master of Fine Arts
- Master of Landscape Architecture
- Master of Mathematics
- Master of Music
- Master of Public Administration
- Master of Public Health
- Master of Science
- Master of Science in Nursing
- Master of Science in Planning
- Master of Science in Social Work
- Dual JD-MBA
- Dual JD-MPA
- Dual MS-MBA
- Dual MS-MPH
- Specialist in Education
- Doctor of Audiology
- Doctor of Jurisprudence
- Doctor of Philosophy
- Doctor of Veterinary Medicine

### DEFINITION OF GRADUATE TERMS

- **Cognate** – A limited block of courses or hours required outside the unit in which the major is offered.
- **Concentration** – A collection of courses within a major that focuses on a particular subject area. The term concentration describes the nature of the set of courses.
- **Major** – The principal educational interest of a student as represented by one of the curricula prescribed by the various units at the University of Tennessee, Knoxville. The major specifies the minimum requirements for a degree.
- **Minor** – An area of interest secondary to the major that is represented by a specified set of hours and/or courses. Diffs from concentration in that a minor is not a subdivision of the major.
- **Specialization** – A sub-collection of courses within a concentration that focuses on specific subject matter. The term “specialization” describes the nature of the set of courses.
- **Tool** – A limited block of courses or hours required to enhance research or methodological expertise.
- **Track** – A separate route leading to the same degree but with different requirements.
The University of Tennessee is the land-grant institution of the State of Tennessee with its main campus in Knoxville. UT is the state's largest and most comprehensive institution and is a Carnegie One Research Extensive Institution. The University of Tennessee is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools (1866 Southern Lane, Decatur, Georgia 30033-4097; telephone 404-679-4501) to award the bachelor’s, master’s and doctoral degrees.

A wide range of graduate programs leading to master’s and doctoral degrees is available. The university offers master’s programs in 79 fields, the Educational Specialist degree, doctoral work in 47 fields, two professional programs, and several graduate certificate programs. More than 6,000 graduate and professional students are enrolled on and off campus under the tuteledge of 1,500 faculty members.

Graduate programs bring together faculty and graduate students as a community of scholars with a common interest in creative work and advanced study. Programs are available to individuals desiring work toward the master’s and doctoral degrees or professional certification, those interested in continuing education for updating and broadening their knowledge, and those pursuing postdoctoral research. Serving the needs of students engaged full-time in intensive study and pursuit of a degree continues to be a major emphasis of the University of Tennessee, Knoxville’s, graduate effort. Increasingly the university employs a variety of modes, traditional and nontraditional, in offering quality programs designed to serve a diverse student clientele.

Graduate programs are administered by the Graduate Council; the Graduate School; administrators of the various graduate programs; the faculty; and the graduate student body.

The Graduate Council is composed of elected faculty representatives from each college, the Space Institute, and the Graduate Student Association. Ex-officio members include the Dean of the Graduate School, the Chair of the Research Council, the Dean of Libraries, the Dean of Continuing Education, the Director of the Center for International Education, and the administrative officer having primary responsibility for the graduate curriculum in each college or school.

The Graduate Council is responsible for standards of admission, retention and graduation, and for curricular matters in graduate programs; the development of interdisciplinary programs; approval of new graduate programs; approval of individuals to direct doctoral dissertation research; financial support of graduate students; and all other matters of educational policy pertaining to graduate programs. Standing committees include academic policy, appeals, credentials, curriculum, professional development, and the Graduate Deans Group.

The Graduate School, in conjunction with Enrollment Services, develops procedures to implement policies formulated by the council. Much of the day-to-day administration of graduate study is conducted by department heads or faculty advisors and committees responsible for particular programs. In addition to departmental units, numerous interdisciplinary programs, institutes and centers have been developed on campus and in locations throughout the state.

The graduate student body is composed of those persons admitted to graduate study upon recommendation of the academic unit, and who are currently enrolled in graduate programs. Graduate education has been conducted at the University of Tennessee, Knoxville, since 1821. The first master’s degree was awarded in 1827. Although a PhD degree was awarded in 1886 and in 1887, formal doctoral programs were not instituted until 1929 for biological sciences at Memphis and 1943 for chemistry on the Knoxville campus. A Committee on Graduate Study was appointed in 1904 and coordinated the graduate program until the Graduate Council was formed in 1949.

**ADMISSION REQUIREMENTS**

Admission to graduate study requires a bachelor’s degree with a satisfactory grade point average from a college or university accredited by the appropriate regional accrediting agency or foreign equivalent.

The Graduate Council requires a minimum grade point average of 2.70 out of a possible 4.00, or a 3.00 during the senior year of undergraduate study. Applicants with previous graduate work must have a grade point average of 3.00 on a 4.00 scale or equivalent on all graduate work. Many programs require a higher average. Applicants with work experience or who are entering graduate study after a number of years away from an educational institution, usually five years, will be given consideration with greater flexibility relative to GPA. An international student graduating from a United States institution must meet the same requirements as those for domestic students.
An applicant whose GPA falls between 2.50 and 2.70 may be admitted on probation, upon recommendation of an academic unit. The probationary status will be removed after completion of 9 or more hours of graduate credit with a minimum GPA of 3.00. Failure to maintain a 3.00 while in this status will result in dismissal. An international student may not be admitted on probation.

The stated criteria are the minimums. The actual averages required for admission may be higher, depending on the number and the qualifications of applicants.

When a student is admitted to graduate study prior to having received the baccalaureate degree, that degree must be awarded before the date of first registration in graduate courses.

The Office of Graduate and International Admissions must be notified of any change in the entering date after admission has been granted. Individual departments and colleges may have further restrictions on admission dates. For this information, students should contact the department they wish to enter. If a student does not enroll within one year after the requested admission, the application process must be repeated.

Enrollment in graduate programs is a privilege which may be withdrawn by the university, or any area of graduate study, if it is deemed necessary by the Dean of the Graduate School to safeguard the university’s standards.

Application Procedures
Anyone with a bachelor’s degree from a regionally accredited institution or foreign equivalent who wishes to take courses for graduate credit, whether or not the person desires to become a candidate for a degree, must submit a formal application for admission to graduate study or apply for transient status. No action is taken until a file is complete. The applicant will be notified by mail of the action taken.

To apply for admission, the following materials must be sent to Graduate and International Admissions.

- The completed Graduate Application for Admission (http://admissions.utk.edu/graduate).
- A $35 non-refundable application fee.
- One official transcript from all colleges and universities attended.
- Scores from Test of English as a Foreign Language (TOEFL) if native language is not English (refer to section on English Certification).

Additional departmental/program requirements may include
- Departmental application. Contact the program office for forms.
- Reference letters or rating forms. All departmental forms should be sent to the college or department.
- Scores from the Graduate Record Examination (GRE) or Graduate Management Admission Test (GMAT).

To register for the GRE, GMAT and TOEFL please contact
Educational Testing Service
Princeton, New Jersey 08450
http://www.ets.org

The UT code is 1843. Test results reach the university in approximately three weeks.

All documents submitted become the property of the university and will not be returned.

For international graduate student application procedures, see Admission of International Students.

Admission Classifications
Degree Admission
Admission to a degree program requires that a person meet the minimum admission requirements and any additional program requirements (see Admission Requirements). Refer to the appropriate department for specific requirements for admission to the degree program.

In addition to meeting the minimum requirements, applicants at the doctoral level must have demonstrated a potential for superior academic performance. Criteria considered are performance in prior undergraduate and/or graduate studies, achievement on graduate admission tests, letters of recommendation from professors familiar with the applicant’s capabilities, and other evidence of scholarly achievement.

A student must maintain a 3.00 grade point average to continue enrollment in a degree program (see Academic Standards).

Non-Degree Admission
Applicants may apply for non-degree status, who, for example
- Need additional time to fulfill application requirements for a degree program.
- Do not wish to pursue a degree program.

Minimum requirements (see Admission Requirements) must be met for admission to non-degree status. Some departments do not permit non-degree students to register for graduate courses.

A major must be declared if the intent is to seek an advanced degree. If no degree is desired, a major need not be declared.

Students anticipating long-term enrollment as non-degree students are advised to apply as undergraduate students in non-degree status. Students holding a degree who are taking additional work as undergraduate non-degree students may be allowed to take 600-level courses for undergraduate credit with the approval of the instructor.

Before accumulating 15 hours of coursework in graduate non-degree status, the student must apply and be admitted to a specific degree program (see Revision of Admission Classification for procedures).

A maximum of 15 graduate hours may be taken in graduate non-degree status. If admitted into a degree program, no more than 15 graduate hours may be applied toward a graduate degree, if approved by the student’s committee. Courses applied toward any graduate degree must fall within the time limit specified for the degree.

Every graduate student must meet with an academic advisor at least once each semester to discuss his/her program. For non-degree students with a declared major, the advisor must be from the appropriate academic unit. If no advisor has been assigned, the department head or designee is the advisor. For a non-degree student who has no declared major, the Dean of the Graduate School or designee is the advisor.

A student must maintain a 3.00 grade point average to continue enrollment in non-degree status (see Academic Standards).

Admission to non-degree status does not constitute admission to a degree program. The student who seeks to enter a degree program will be directed to the appropriate department.

An international student on a student visa may not enroll in the non-degree status.

Graduate Certificate
Admission to a graduate certificate program requires that a person meet the minimum admission requirements and any additional program requirements (see Admission Requirements). Refer to the appropriate department for specific requirements for admission to the certificate program.

Admission to a graduate certificate program does not constitute admission to a degree program. To receive a graduate certificate, students must be admitted to a certificate program or a degree program.

Transient Admission
A student who is enrolled in good standing in a graduate degree program at another institution and who wishes to take courses for transfer to that institution may be admitted after submitting a completed Graduate Application for Admission, the $35 application fee, and a Transient Student Certification form 10
days prior to registration. Only one semester, or a maximum of 12 hours, of coursework can be taken in transient status. Necessary forms may be obtained from the Office of Graduate and International Admissions.

Postdoctoral Admission

Persons who hold an earned doctoral degree and desire to take graduate courses may be admitted in the postdoctoral status. A completed Graduate Application for Admission, the application fee, and confirmation of the doctorate are required for admission. Admission in the postdoctoral status does not constitute admission to a degree program. The student who seeks to enter a degree program must meet all admission requirements and be recommended by the program.

Admission of International Students

For admission to a graduate program, an international student must have an equivalent 4-year bachelor’s degree with at least a B average on all previous coursework and a B+ on all previous graduate work. On various grading scales, this corresponds to:

- 14 on a 20-point scale.
- 80.0 from Taiwanese institutions.
- 1st Class or Division from Indian institutions.
- Upper 2nd Class Honors on various British systems.

If graduating from a U.S. institution, the minimum is the same as that for domestic students (see Admission Requirements). Other grading systems are evaluated, upon receipt of transcripts, in accordance with standard recommendations. Many departments require a higher average than the minimum.

International students may apply for admission any semester, but normally enter the fall semester. The deadlines for submission of applications to the Office of Graduate and International Admissions are:

- Fall: 1 February
- Spring: 15 June
- Summer: 15 October

The Office of Graduate and International Admissions must be notified of any change in entering date after admission has been granted.

Individuals applying online must pay the application fee by credit card.

The following items must be received before admission will be considered:

- A completed Graduate Application for Admission.
- A $35 non-refundable processing fee. Payment should be made in United States dollars by a cashier’s check, money order, or personal check payable to the University of Tennessee, Knoxville. If payment is by personal check, it must be drawn on a United States bank to be honored in United States currency. Checks drawn on overseas banks are not accepted. International money orders are suggested.
- Official or attested university records, with certified translations if the records are not in English (notarized copies are not accepted).
- Confirmation of degree(s). Confirmation must be received by the Office of Graduate and International Admissions at least 2 months prior to term of first enrollment.
- Certification of English proficiency. Refer to section on English Certification.
- Documented evidence of financial resources sufficient to support the student, as stated in the financial statement form supplied to the applicant. This form is available at the Graduate and International Admissions Web site: http://admissions.utk.edu/admissions/graduate.shtml or will be sent to the applicant after receipt of application.
- Additional departmental/program requirements.

- Departmental application. Contact the program for forms.
- Reference letters or rating forms. All program forms should be sent to the college or department.
- Scores from the Graduate Record Examination (GRE) or Graduate Management Admission Test (GMAT). Admission must be granted, and financial documentation and degree confirmation must be received prior to submission of an I-20 or DS-2019 form needed to obtain a visa. The university will not issue these forms after the following dates:
  - Fall: 15 May
  - Spring: 1 October
  - Summer: 15 February

An international student may not enroll as a non-degree student nor be on probation.

English Certification

Any person whose native language is not English must submit results of the Test of English as a Foreign Language (TOEFL). A minimum score of 213 on the computer-based test, 550 on the paper test, or 80 on the Internet-based test typically with a score of 20 on each of the sections of the test (reading, listening, writing, and speaking) is required for admission consideration. Some programs require higher scores. The score must be no more than two years old from the requested date of entry. Applicants who have received a degree from an accredited U.S. institution within the past two years are exempt from the TOEFL requirement.

All students whose native language is not English must take an English proficiency examination after arrival at the University of Tennessee, Knoxville. Refer to section on English Proficiency.

Fees for Sponsored International Students

An administrative management fee will be charged to sponsoring agencies of international students whose programs require special administrative or management services beyond those normally provided. Fees are $250 per semester and $100 per summer session.

Admission of Faculty and Staff Members

If admitted to graduate study, members of the faculty or staff located in Knoxville may take courses as graduate students. Faculty members of the University of Tennessee, Knoxville, or the Institute of Agriculture at the rank of assistant professor or above and members of the administrative staff at the university and the Institute of Agriculture will not normally be admitted to a PhD degree program at UT Knoxville. Exceptions may be granted on an individual basis upon petition to the Dean of the Graduate School. Petitioners must present their request in writing, providing adequate assurance that the residence requirement will be met and that there will be no conflict of academic or administrative interest. Written endorsements must be provided by the respective deans and department heads of the units in which members are employed and in which the doctoral degrees are to be pursued.

Readmission

A student who has not registered for graduate courses at the University of Tennessee, Knoxville, for three consecutive terms (including summer) must apply for readmission. A readmission application should be submitted to the Office of Graduate and International Admissions at least two weeks prior to the desired reentry date. A student who has attended another institution since enrollment at the University of Tennessee, Knoxville, must submit one official transcript showing all coursework and any degrees earned at that institution. The student will be notified when action has been taken by the department/program and the Office of Graduate and International Admissions. A student who is permitted to enroll and is subsequently denied readmission will not receive credit for courses completed successfully. Future registration will not be allowed until readmission is granted.
Revision of Admission Classification

A student who wishes to change a major program of study must complete a Request for Change of Graduate Program form, which can be obtained online or from the Office of Graduate and International Admissions. The form requires the signature of the head of the department in which admission was previously granted. No signature is needed if a student requests to change from non-degree status to a degree program or from one degree to another within the same department.

The student must be in good standing for a revision to be processed. Acceptance into a new degree program is contingent upon review and recommendation by that department. If the student is not accepted into the program requested, he/she remains in the former program. The results of each request for program change are communicated to the student by mail.

REGISTRATION AND ENROLLMENT REQUIREMENTS

Graduate Credit

To earn graduate credit, a student must be admitted by the Dean of the Graduate School and enrolled in an appropriate status as a graduate student. The registration must reflect the desire for graduate credit, and the course must have been approved by the Graduate Council. Coursework in any other status is unacceptable for graduate credit and cannot be changed retroactively to graduate credit. Special privileges are accorded University of Tennessee seniors and professional students, as stated in the section on Undergraduates and Professional Students.

Courses numbered at the 500 level, as well as those 400-level courses approved for graduate credit, must be taught by faculty members who (1) meet the criteria of an assistant professor or above as defined in the Faculty Handbook and (2) have been designated by the department head as being appropriate. Graduate teaching associates are ineligible to teach courses approved for graduate credit.

Consistent with the accreditation requirements of the Southern Association of Colleges and Schools (SACS) that graduate curricula must be substantially different from undergraduate curricula, classes at the 400 level in which both graduate and undergraduate students must be structured so as to reflect this distinction. That is, course requirements for graduate credit will be more rigorous and will exceed expectations for undergraduates. Graduate and undergraduate completion of the same course will not be considered equivalent. Petitions for retroactive changing of undergraduate to graduate credit will not be accepted.

Courses at the 600 level are taught by faculty who have been approved by the college or by departments, where the college has given them that responsibility. All departments/colleges have a statement of criteria used in eligibility to teach at the 600 level.

Undergraduate and Professional Students

University of Tennessee Seniors

Subject to approval by the Dean of the Graduate School, a senior at the University of Tennessee, Knoxville, who needs fewer than 30 semester hours to complete requirements for a bachelor’s degree and has at least a B average (3.00) may enroll in graduate courses for graduate credit, provided the combined total of undergraduate and graduate coursework does not exceed 15 credit hours per semester. Only students working toward a first bachelor’s degree are eligible. Students who have met all requirements for graduation are not eligible. Approval must be obtained each semester at the Graduate School. A maximum of 9 hours of graduate credit at the 400 and 500 level can be obtained in this status. Some departments do not permit seniors to register for graduate courses without prior permission.

Courses taken for graduate credit may not be used toward both the baccalaureate and a graduate degree.

University of Tennessee Veterinary Medicine Students

A student in good standing in the College of Veterinary Medicine may enroll in the University of Tennessee, Knoxville, graduate courses under the following conditions.

- The student’s advisor must approve in advance the student’s enrollment in each course.
- The student may take a maximum of 10 semester hours of graduate courses during the Doctor of Veterinary Medicine program.
- Approval must be obtained each semester at registration through the Graduate School. The student’s progress is subject to review and approval each semester by the Associate Dean, College of Veterinary Medicine.

Courses taken for graduate credit may not be used toward both the Doctor of Veterinary Medicine degree and a graduate degree.

University of Tennessee Law Students

Subject to approval by the Dean of the Graduate School and the College of Law, a law student at the University of Tennessee, Knoxville, may enroll in graduate courses for graduate credit. Approval must be obtained each semester from the Graduate School.

Courses taken for graduate credit may not be used toward both the Doctor of Jurisprudence degree and a graduate degree. Use of such courses toward the JD degree is subject to guidelines approved by the law faculty.

Law Courses

A graduate student may take up to 6 hours of law courses and apply them toward a graduate degree, upon approval of the College of Law and the student’s major professor. The graduate student must register for law courses during the registration period at the College of Law and request a Satisfactory/No Credit only grade. If the student earns a 2.00 or better, an S will be recorded on the transcript. Below 2.00, a No Credit will be recorded, and the course cannot be used toward meeting degree requirements. Grades for law courses will not be reflected in the cumulative grade point average, as law courses do not carry graduate credit.

Different rules apply to students enrolled in the Dual JD-MBA and JD-MPA programs. Grades must be earned according to the grading system of the respective colleges, e.g. numerical grades for law courses, letter grades for graduate courses. Refer to sections on business administration, political science, and law under Departments and Courses of Instruction for grades acceptable to meet degree requirements.

A student enrolled in the PhD in Business Administration program may use 8 semester hours or more of law courses for the supporting area via the arrangement described under Business Administration.

Graduate Certificate Programs

A graduate certificate may be earned by successful completion of a series of specific courses. A candidate for a graduate certificate program must be a fully admitted graduate student who has satisfactorily completed (minimum 3.00 grade point average) the minimum requirements for a certificate as described in the Graduate Catalog. The minimum requirements for the certificate programs are listed under the academic department offering the certificate. A candidate must be a graduate student in good standing and comply with all other applicable policies.

Graduate certificate programs require a minimum of 12 semester credit hours taken at the University of Tennessee, Knoxville. Use of credits to fulfill requirements for a graduate degree will be at the discretion of the academic department.

To receive the certificate, students must submit a Completion of Certificate Program Form endorsed by the academic department to the Office of the University Registrar. Only those certifi-
icate programs that are officially approved by the Graduate Council will be posted on student transcripts. To receive a graduate certificate, students must be admitted to a certificate program or a degree program.

Senior or Disabled Citizens

Legislation gives Tennessee citizens who are 60 years of age or older, 30-year state retirees, or those who are totally disabled, the opportunity to attend credit and non-credit courses at the university at no charge on an audit, space available basis. Legal verification of any of these conditions is required for enrollment. Students who are 65 or over, or who are totally disabled, and who desire to receive university credit for their courses, may pay a reduced rate.

Auditors and Audited Courses

Persons who wish to attend certain classes regularly, without taking examinations or receiving grades or credit, may do so by completing a graduate application as a non-degree student, paying the application fee, registering as an auditor, and paying regular fees. Graduate students paying regular fees also are entitled to audit courses. The names of all auditors properly registered will appear on the electronic grade rolls, but will be removed from the final grade report. No record of audited coursework will appear on the permanent record.

Persons may not attend class without being properly admitted to the university and registered in the class.

Courses in Non-Standard Format

The university offers a wide variety of short courses, workshops, and other courses in non-standard format for graduate credit. Minimum criteria acceptable for such credit are as follows.

- The number of contact hours should never be fewer than the equivalent of one hour per week during the term for each hour of credit awarded, i.e., 15 hours per semester hour.
- For every contact hour, there should be at least 2 hours of student preparation.
- For each hour of graduate credit under the semester system, there should be a minimum elapsed time of one week.

The workload in a short course of several weeks’ duration need not be distributed evenly. However, substantive and meaningful interaction between the faculty member and student should be maintained throughout. Graduate credit should not be awarded for courses considered inappropriate as part of a graduate degree program.

The Curriculum Committee of the Graduate Council monitors the policy. Each new course or change in a current course must be approved in both content and format.

Correspondence Study

No graduate credit is accepted at the University of Tennessee, Knoxville, for work done by correspondence study at any university.

Proficiency Examinations

A proficiency examination may be given in academic courses offered for graduate credit. Applications for proficiency examinations are available in the Office of the University Registrar, 209 Student Services Building. To be eligible, a student must be admitted to graduate study. The request for examination must be approved by the head of the department offering the course. A student applying for this privilege must present evidence to the department head that he/she has the knowledge and abilities expected of graduate students who have taken the same course. Upon passing the examination with a minimum grade of B, the student will receive graduate credit. A maximum of one-fourth of the total credit hours in a master’s degree program may be earned by this method, subject to approval by the student's graduate committee. A fee of $7 per credit hour must be paid before each examination. Proficiency examinations may not be used to raise the grade or change the credit in a course previously completed, nor may such an examination be repeated. Proficiency examinations taken at other institutions are not transferable.

English Proficiency

Applicants whose native language is not English must pass an English proficiency examination given by the university prior to initial registration. Students whose performance on the examination indicates a need for additional English study must enroll immediately for English 121 English Grammar Review for Non-Native Speakers or another course assigned by the English Department for undergraduate credit and pass with a grade of C or better. A student may not take more than 9 additional hours of coursework while enrolled in English 121. Students whose scores indicate that they are not prepared to enter English 121 will be referred to a program of intensive English study prior to enrolling in an academic program.

Applicants whose native language is not English must pass an oral test in English (the SPEAK Test) before they can be assigned to classroom duties in connection with their assistantships. The SPEAK Test is administered on campus as part of the programs offered by the Graduate School. Scores from the Test of Spoken English (TSE) may be accepted in place of the SPEAK Test.

Prerequisites

Graduate work in any program must be preceded by sufficient undergraduate work in the major and related areas to satisfy the department that the student can do graduate work successfully in the chosen field. Individual undergraduate records are examined and evaluated by the appropriate department before admission to a degree program is granted. Questions about program prerequisites should be addressed to the advisor.

Advisor/Major Professor

Every graduate student must have an advisor from the major department. This professor advises the student about courses, supervises the student’s research, and facilitates communication within the major department, to other departments and with the Dean of the Graduate School. The advisor must approve the student’s program each semester. Many departments assign a temporary advisor to direct the entering student’s work during the period in which the student is becoming acquainted with the institution and determining the focus of research interests, and in which the department is forming a judgment concerning the student’s promise as a scholar. As early as appropriate, the student requests a professor in the major department to serve as the advisor. This major professor and the student together select a graduate committee. The student is expected to maintain close consultation with the major professor and other members of the graduate committee with regard to progress in the program. Other responsibilities of the advisor/major professor are explained under individual programs.

Departmental Liaison

One faculty member in most academic departments has been designated as a liaison. The liaison acts as a contact to assist non-departmental students with course selection and other academic matters.

Registration

Registration is required of all graduate students when enrolling in an academic program. The minimum number of hours for registration is one. Registration allows use of services such as library checkout, laboratories, and recreation facilities not open to the public.

Information concerning registration is available at Circle Park Online (http://cpo.utk.edu) or in the Timetable of Classes each
Students may enroll in only one course during a mini-term session.

Course Loads

Students holding a one-half time assistantship normally should enroll for 6-11 hours. A one-fourth time graduate assistant normally should take 9-13 hours. A student on a one-half time assistantship who takes 6 hours will be considered full time. Refer to the Policy for the Administration of Graduate Assistantships for additional information.

Students receiving financial aid should consult with the department/program head concerning appropriate course loads. Courses audited do not count toward minimum graduate hours required for financial assistance.

Registration for more than 15 hours during any semester, or for more than 12 hours in the summer term, is not permissible without prior approval. The academic advisor may allow registration of up to 18 hours during a semester if the student has achieved a cumulative grade point average of 3.60 or better in at least 9 hours of graduate work with no outstanding incompletes. No more than 12 hours are permissible in the summer term without prior approval.

Grade Point Average and Grades

A cumulative grade point average of 3.00 is required on all graduate coursework taken at the University of Tennessee, Knoxville, to remain in good standing and to receive any graduate degree or certificate from the university. All coursework taken for graduate credit is computed into the GPA.

Grades in graduate study have the following meanings.

- **A** (4 quality points per semester hour) superior performance.
- **B+** (3.5 quality points per semester hour) better than satisfactory performance.
- **B** (3 quality points per semester hour) satisfactory performance.
- **C+** (2.5 quality points per semester hour) less than satisfactory performance.
- **C** (2 quality points per semester hour) performance well below the standard expected of graduate students.
- **D** (1 quality point per semester hour) clearly unsatisfactory performance and cannot be used to satisfy degree requirements.
- **F** (no quality points) extremely unsatisfactory performance and cannot be used to satisfy degree requirements.
- **I** (no quality points) a temporary grade indicating that the student has performed satisfactorily in the course but, due to unforeseen circumstances, has been unable to finish all requirements. An I is not given to enable a student to do additional work to raise a deficient grade. The instructor, in consultation with the student, decides the terms for the removal of the I, including the time limit for removal. If the I is not removed within one calendar year, the grade will be changed to an F. The course will not be counted in the cumulative grade point average until a final grade is assigned. No student may graduate with an I on the record.
- **S/NC** (carries credit hours, but no quality points) S is equivalent to a grade of B or better, and NC means no credit earned. A grade of Satisfactory/No Credit is allowed only where indicated in the course description in the Graduate Catalog. The number of Satisfactory/No Credit courses in a student’s program is limited to one-fourth of the total credit hours required.
- **P/NP** (carries credit hours, but no quality points) P indicates progress toward completion of a thesis or dissertation. NP indicates no progress or inadequate progress.
- **W** (carries no credit hours or quality points) indicates that the student officially withdrew from the course.

The grading system available for a course is based on the level of the course. Courses numbered 100-499 are graded letter grade or Satisfactory/No Credit, except where noted otherwise in the catalog. Courses numbered 500-699 are graded letter grade only, ex-
Academic Standards

Graduate education requires continuous evaluation of the student. This includes not only periodic objective evaluation, such as the cumulative grade point average (GPA) of at least 3.00 on all graduate courses taken for a letter grade of A-F. Grades of S/NC, P/NP, and I, which have no numerical equivalent, are excluded from this computation.

Departments and programs may have requirements for continuation or graduation in addition to the minimum requirements set forth in this catalog for all graduate programs. It is the student’s responsibility to be familiar with the special requirements of the department or program.

Academic Probation

Upon completion of 9 hours of graduate coursework, a graduate student will be placed on academic probation when his/her cumulative GPA falls below 3.00. A student will be allowed to continue graduate study in subsequent semesters if each semester’s grade point average is 3.00 or greater. Upon achieving a cumulative GPA of 3.00, the student will be removed from probationary status.

Dismissal

If a student is on academic probation, the degree or non-degree status will be terminated by the Dean of the Graduate School if the student’s semester GPA falls below 3.00 in a subsequent semester. When the particular circumstances are deemed to justify continuation, and upon recommendation of the appropriate academic unit and approval of the Dean of the Graduate School, a student on probation whose semester GPA is below 3.00 may be allowed to continue on a semester-by-semester basis.

Dismissal of a graduate student by a department or program is accomplished by written notice to the student, with a copy to the Graduate School. In those cases where the department’s requirements for continuation are more stringent than university requirements for graduate programs, the Dean of the Graduate School will evaluate the student’s record to determine whether the student is eligible to apply for a change of status and register in another area of study. Registration for courses in a department from which a student has been dismissed will not be permitted, except by written authorization from that department.

Academic Honesty

Academic integrity is a responsibility of all members of the academic community. An honor statement is included on the application for admission and readmission. The applicant’s signature acknowledges that adherence is confirmed. The honor statement declares

An essential feature of the University of Tennessee, Knoxville, is a commitment to maintaining an atmosphere of intellectual integrity and academic honesty. As a student of the university, I pledge that I will neither knowingly give nor receive any inappropriate assistance in academic work, thus affirming my own personal commitment to honor and integrity.

Plagiarism

Students shall not plagiarize. Plagiarism is using the intellectual property or product of someone else without giving proper credit. The undocumented use of someone else’s words or ideas in any medium of communication (unless such information is recognized as common knowledge) is a serious offense subject to disciplinary action that may include failure in a course and/or dismissal from the university. Some examples of plagiarism are

- Using without proper documentation (quotation marks and a citation) written or spoken words, phrases, or sentences from any source.
- Summarizing without proper documentation (usually a citation) ideas from another source (unless such information is recognized as common knowledge).
- Borrowing facts, statistics, graphs, pictorial representations, or phrases without acknowledging the source (unless such information is recognized as common knowledge).
- Submitting work, either in whole or in part, created by a professional service and used without attribution (e.g., paper, speech, bibliography, or photograph).

Extreme caution should be exercised by students involved in collaborative research to avoid questions of plagiarism. If in doubt, students should check with the major professor and the Dean of the Graduate School about the project. Plagiarism will be investigated when suspected and prosecuted if established.

Appeals Procedure

The Graduate Council Appeal Procedure can be obtained at the Graduate School or at http://gradschool.utk.edu/GraduateCouncil/AcadPoli/appealprocedure.pdf. Normally, grievances should be handled first at the department level through the student’s academic advisor, the graduate liaison, or the department or program head. Further appeal may be made to the dean of the respective college, the Graduate Council through the Associate Dean of the Graduate School, and ultimately to the Dean of the Graduate School.

Appeals may involve the interpretation of and adherence to university, college, and department policies and procedures as they apply to graduate education and the issuance of grades based on specific allowable reasons stipulated in the Graduate Council Appeal Procedure.

Appeal procedures in regard to allegations of misconduct or academic dishonesty are presented in Hilltopics under “Disciplinary Regulations and Procedures.” Students with grievances related to race, sex, color, religion, national origin, age, disability or veteran status should file a formal complaint with the Office of Equity and Diversity.

DEGREE PROGRAM REQUIREMENTS

A complete list of programs is found under the Graduate Degrees, Majors, and Certificate Programs Chart. For specific degree requirements, consult individual program descriptions. Department policies and procedures, which are specific to degree programs and exceed those in the Graduate Catalog, are provided in the Graduate Student Handbook available in each academic department.

The following are the Graduate Council’s minimum requirements for degree programs. Refer to the college and academic department for additional program requirements.
Minors

For the master’s degree at the University of Tennessee, Knoxville, a minor is defined as 6-12 semester hours in one field outside the major. Usually, the minor courses are within a single teaching discipline that also offers a major.

Four interdisciplinary minors are available: computational science, statistics, and gerontology at both the master’s and doctoral levels, and environmental policy at the master’s level only.

The minor area must be approved by the major and minor academic units and a member from the minor unit must serve on the graduate committee.

Transfer Credits

Courses taken at another institution may be considered for transfer into a master’s or EdS program as determined by the committee and approved by the Dean of the Graduate School. At the doctoral level, courses are not officially transferred although they may be used to meet degree requirements. Where a requirement has been met through coursework in another program, the student may petition the academic unit for a waiver of the requirement at the doctoral level. Official transcripts must be sent directly to the Office of the University Registrar from all institutions previously attended before any credit will be considered.

To be transferred into a master’s or EdS program at the University of Tennessee, Knoxville, a course must

- Be taken for graduate credit.
- Carry a grade of B or better.
- Be a part of a graduate program in which the student had a B average.
- Not have been used for a previous degree.
- Be approved by the student’s graduate committee and the Dean of the Graduate School on the Admission to Candidacy form.

Courses transferred to any graduate program will not affect the minimum residence requirements for the program, nor will they be counted in determining the student’s grade point average. Credits transferred from universities outside the University of Tennessee system cannot be used to meet the thesis or dissertation requirements or 600-level coursework requirements. Credit for extension courses taken from other institutions is not transferable, nor is credit for any course taken at an unaccredited institution.

Master’s Degree

A majority of the total hours required for a master’s degree must be taken at the University of Tennessee, Knoxville. Transferred courses must have been completed within the six-year period prior to receipt of the degree. The courses must be listed on the Admission to Candidacy form and will be placed on the student’s university transcript only after admission to candidacy.

Specialist in Education Degree

A maximum of 6 semester (9 quarter) hours of coursework beyond the master’s degree may be transferred to an EdS program. Transferred courses in the most recent 30 hours taken for the degree must have been completed within the six-year period prior to the receipt of the degree. The courses must be listed on the Admission to Candidacy form and will be placed on the student’s university transcript only after admission to candidacy.

Doctoral Degree

Coursework taken prior to admission to a doctoral program may be used toward the degree, as determined by the student’s doctoral committee. Although the courses are used as part of the requirements toward the degree and are listed on the admission to candidacy, they are not officially transfer courses and are not placed on the student’s university transcript.

Theses and Dissertations

All theses and dissertations are submitted in electronic format to the Thesis/Dissertation Consultant in the Graduate School for examination. The consultant will review the material and assure that it is appropriately presented, free of technical errors in format, and reflects credit upon graduate education at the University of Tennessee, Knoxville. If the thesis or dissertation is not accepted, the student must make corrections and resubmit the material.

The student, major professor and committee share responsibility for the accuracy and professionalism of the final product of the student’s research. The student should confer with the Thesis/Dissertation Consultant regarding problems and questions in advance of preparing the final copy. The Guide to the Preparation of Theses and Dissertations (available on the Graduate School Web site) provides the correct format for theses or dissertations. Workshops are held periodically throughout the academic year. The date for each workshop is announced on the Graduate School Web site.

Foreign Language

The thesis/dissertation normally should be written in English. Under exceptional circumstances, another language may be used if prior approval is obtained from the Dean of the Graduate School. A request to write in a language other than English should be submitted to the Dean of the Graduate School by the student’s thesis committee, with endorsement by the department head and dean of the college, prior to Admission to Candidacy for the degree sought. The request should include a proposal and justification for the exception. In all cases, one thesis/dissertation abstract must be written in English.

Classified Research

A basic principle in graduate education is that theses and dissertations produced by graduate students will be published and made available to other researchers in the field. When a graduate student is involved in classified or proprietary research, and such research is intended to lead toward a thesis or dissertation, prior approval should be secured from the department head and dean, and from the Dean of the Graduate School. Should the research become classified in the course of a project, these same persons should be notified immediately so that proper procedures can be assured. Failure to comply with these requirements may lead to rejection of a thesis or dissertation manuscript.

Dissemination of Final Copies

Copies approved for final submission will be sent to the University Libraries after conferral of the graduate degree. A student must, as a condition of a degree award, grant royalty-free permission to the university to reproduce and publicly distribute, including by electronic and digital technologies now known or developed in the future, on a non-commercial basis, copies of the thesis or dissertation. Copies approved for final submission will be catalogued and placed on the ETD Web site (http://etd.utk.edu). At this time, the electronic copies will be publicly distributed.

Graduation

A student planning to graduate must submit an application for graduation no later than the last day of classes of the term prior to the term he/she intends to graduate. The graduation application begins the final checking of degree requirements and is used to order the diploma. If the student does not graduate that term, a new graduation application must be submitted for the appropriate term. The form is submitted to the Office of the University Registrar. Deadlines and steps to graduation are available on the Graduate School Web site. Commencement and graduate hooding ceremonies are held in fall and spring terms. There is no ceremony in summer term. Summer graduates may participate in the fall graduate hooding ceremony. Students who need 12 hours or fewer to complete a non-thesis program may participate in the spring graduate hooding ceremony.

Master’s Degree

The master’s degree is evidence of successful completion of a body of coursework, advanced understanding, and the ability to apply knowledge within a major field. As part of a master’s degree, and in addition to a final comprehensive examination, a culminat-
ing (capstone) experience is expected. Examples of culminating experiences include an advanced seminar, exhibit, independent project, integrated case study or simulation, internship, practicum, recital or thesis. Through this experience, the student will demonstrate skills associated with the particular degree program, such as applied performance, critical analysis, organization and writing.

Master’s degree programs are available with thesis and non-thesis options. These programs require 30 or more graduate hours of coursework. In addition to the Master of Arts and Master of Science degrees, other degrees are offered, including the Master of Accountancy, Master of Architecture, Master of Business Administration, Master of Fine Arts, Master of Landscape Architecture, Master of Mathematics, Master of Music, Master of Public Administration, Master of Public Health, Master of Science in Nursing, Master of Science in Planning, and Master of Science in Social Work.

Course Requirements

A candidate for a master’s degree must complete a minimum of 30 hours of graduate credit in courses approved by the student’s master’s committee. In thesis programs, 6 semester hours of credit in the major (9-12 in some approved programs) must be earned in course 500 while the student is preparing the thesis. Hours applied to the master’s degree may be entirely from one major subject or may be distributed to include one or two minor areas. In a 30-hour program, the major subject must include at least 12 hours of graduate coursework, exclusive of course 500, and a minor must include not fewer than 6, nor more than 12 hours of graduate credit.

At least two-thirds of the minimum required hours in a master’s degree program must be taken in courses numbered at or above the 500 level. Only 6 thesis hours may be counted toward this requirement.

For coursework taken at other institutions, refer to section on Transfer Credits.

Second Master’s Degree

For a second master’s degree, the student must have fulfilled all major requirements applicable to the first master’s degree, including the thesis, if appropriate. Coursework applied to one master’s degree program may not be applied toward a second.

Master’s Committee

A committee composed of the major professor and at least two other faculty members, all at the rank of assistant professor or above, should be formed as early as possible in a student’s program, and must be formed by the time a student applies for admission to candidacy (refer to Advisor/Major Professor). The responsibility of this committee is to assist the student in planning a program of study and carrying out research, and to assure fulfillment of the degree requirements. If the student has a minor, one member of the committee must be from the minor department.

Admission to Candidacy

Admission to candidacy indicates agreement that the student has demonstrated ability to do acceptable graduate work and that satisfactory progress has been made toward a degree. This action usually connotes that all prerequisites to admission have been completed and a program of study has been approved. The application for the master’s degree is made as soon as possible after the student has completed any prerequisite courses and 9 hours of graduate coursework with a 3.00 average or higher in all graduate work. The Admission to Candidacy form must be signed by the student’s committee and all courses to be used for the degree must be listed, including transfer coursework. The student must submit this form to the Office of the University Registrar no later than the last day of classes of the semester preceding the semester in which he/she plans to graduate.

Thesis Registration

A student must be registered for course 500 each semester during work on the thesis, including a minimum of 3 hours the semester in which the thesis is accepted by the Graduate School. Six hours of 500 are required for the thesis option. After receiving the master’s degree, a student is no longer permitted to register for Thesis 500.

Thesis

The thesis represents the culmination of an original research project completed by the student. It must be prepared according to the most recent Guide to the Preparation of Theses and Dissertations, available at http://web.utk.edu/~thesis. An electronic copy of the thesis must be accompanied by one approval sheet, signed by the members of the master’s committee. The approval sheet reflects the final format for submission. The approval sheet certifies that the committee members have examined the final copy of the thesis and have found that its form and content are satisfactory.

Final Examination for Thesis and Problems in Lieu of Thesis

A candidate presenting a thesis or problems in lieu of thesis must pass a final comprehensive oral (or oral and written) examination on all work offered for the degree. The examination, which is concerned with coursework and the thesis or problems, measures the candidate’s ability to integrate material in the major and related fields, including the work presented in the thesis or problems. The final draft of the thesis must be distributed to all committee members at least two weeks prior to the date of the final examination. Except with prior approval from the Dean of the Graduate School, the examination must be given in university-approved facilities. This examination should be scheduled through the academic department at least two weeks prior to the examination. This examination must be held at least two weeks before the final date for acceptance and approval of thesis by the Graduate School on behalf of the Graduate Council. The major professor must submit the results of the defense by the thesis deadline. In case of failure, the candidate may not apply for reexamination until the following semester. The result of the second examination is final.

Final Examination for Non-Thesis Students

Each non-thesis student must pass a final comprehensive written examination. A department may require an additional oral examination. The examination is not merely a test over coursework, but a measure of the student’s ability to integrate material in the major and related fields. Except with prior approval from the Dean of the Graduate School, the examination must be given in university-approved facilities. It should be scheduled through the academic department at least two weeks prior to the examination. Students taking the final examination but not otherwise using university facilities may pay a fee equal to one hour of graduate credit instead of registering. In case of failure, the candidate may not apply for reexamination until the following semester. The result of the second examination is final.

Time Limit

Candidates have six calendar years to complete the degree, starting at the beginning of the semester of the first course counted toward the degree. Students who change degree programs during this six-year period may be granted an extension after review and approval by the Dean of the Graduate School. In any event, courses used toward a master’s degree must have been taken within six calendar years of graduation.

Specialist in Education Degree

The Specialist in Education (EdS) degree is offered with a major in educational administration, instructional technology and educational studies, school counseling, school psychology, and teacher education. Admission to the Specialist in Education program requires acceptance by the Office of Graduate and International Admissions and review and acceptance by the department or area in which the student is majoring. It is recommended that students who apply for the EdS have at least one year of related work experience. Additional information on admission requirements can be obtained from academic units offering the degree.

Course Requirements

The student’s program involves a minimum of four semesters of study totaling not fewer than 60 semester hours of graduate credit beyond the baccalaureate degree. A minimum of 6 hours is required outside the concentration.
A student admitted to the program with a master’s degree, or with acceptable work beyond the master’s degree, may have program requirements modified upon recommendation of the student’s committee. However, no modifications will be permitted in examination and research requirements, or in the minimum 6 graduate hours required outside the concentration.

All prior coursework accepted toward the degree must be related to the student’s program objectives. A maximum of 6 hours beyond the master’s degree may be transferred from another institution to a Specialist in Education program (refer to section on Transfer Credits).

Courses numbered at the 400 level required for certification through the University of Tennessee, Knoxville, may not be taken for graduate credit and used as coursework in the major. At least one-half of the last 30 semester hours of work, exclusive of thesis courses, must be in 500- or 600-level courses.

**Specialist in Education Committee**

A committee of at least three faculty members is assigned to each student. A minimum of two members of this committee must represent the unit or major area. Its responsibilities include formulating the student’s program of coursework, supervising progress, recommending admission to candidacy, directing research, and coordinating the qualifying and final examinations.

**Admission To Candidacy**

Admission to Candidacy indicates agreement that the student has demonstrated ability to do acceptable graduate work and that satisfactory progress has been made toward a degree. This action usually connotes that all prerequisites to admission have been completed and a program of study has been approved.

The Admission to Candidacy form must be signed by the student’s committee and all courses to be used for the degree must be listed, including transfer coursework. This form is submitted to the Office of the University Registrar before the student has completed 15 hours of coursework in the Specialist in Education program. A qualifying examination may be required for admission to candidacy if the student has a master’s degree earned six years or more prior to admission to the program. This examination may be written and/or oral.

**Research Requirements**

See the program descriptions of individual departments for list of thesis, problems in lieu of thesis, and non-thesis options. Some departments offer only a thesis program.

In the non-thesis program, a candidate will study research methods and findings and will demonstrate skill in adapting them to professional needs as defined by the major department.

In the thesis program, or problems in lieu of thesis, 6 hours of research credit (518 or 503) must be earned in preparation of an acceptable piece of work. The student must continue to register for thesis or problems while working on the project, including the semester it is accepted by the Graduate School on behalf of the Graduate Council. The thesis must be prepared according to the most recent Guide to the Preparation of Theses and Dissertations (http://web.utk.edu/~thesis), and approved by the student’s committee prior to submission to the Graduate School for final approval and acceptance.

**Final Examination**

A candidate presenting a thesis, or problems in lieu of thesis, must pass an oral examination covering the student’s research and program of study. A non-thesis student must pass a final written, or written and oral examination, on all work offered for the degree. The examination is not merely a test over coursework, but a demonstration of the candidate’s ability to integrate materials in the major and related fields. Each examination should be scheduled through the academic department at least two weeks prior to the examination and will be conducted in university-approved facilities by the student’s committee. In case of failure, the candidate may not be reexamined until the following semester. The result of the second examination is final.

**Time Limit**

Candidates have six calendar years from the time of entry into the last 30 hours of their degree programs to complete the Specialist in Education degree.

**Doctoral Degree**

Two doctoral degree programs are available – Doctor of Audiology (AuD), and Doctor of Philosophy (PhD). For a list of programs, see the Graduate Degrees, Majors, and Certificate Programs chart. For specific degree requirements, consult individual program descriptions listed in this catalog.

The doctoral degree is evidence of exceptional scholarly attainment and demonstrated capacity in original investigation. Requirements for the degree, therefore, include courses, examinations, and a period of resident study, as well as arrangements which guarantee sustained, systematic study and superior competency in a particular field.

**Program of Study**

The student’s program of study is subject to Graduate Council policies and individual program requirements. The program of study as listed by the student on the Admission to Candidacy form must be approved by the doctoral committee. Doctoral programs include a major field or area of concentration and, frequently, one or more cognate fields. Cognate fields are defined as a minimum of 6 semester hours of graduate coursework in a given area outside the student’s major field.

A candidate for a doctoral degree must complete a minimum of 24 hours of graduate coursework beyond the master’s degree, which is a prerequisite for entry into most doctoral programs. If the doctoral program does not require a master’s degree, the candidate must complete a minimum of 48 hours of graduate coursework beyond the baccalaureate degree. A minimum of 12 of the 24 hours, or 30 of the 48 hours, must be graded A-F. A minimum of 6 hours of the student’s coursework must be taken in University of Tennessee courses at the 600 level, exclusive of dissertation.

In addition, 24 hours of course 600 Doctoral Research and Dissertation are required (see Registration for Course 600 and Continuous Registration).

For coursework taken prior to admission to the doctoral program, refer to section on Transfer Credits.

**Doctoral Committee**

The major professor directs the student’s dissertation research and chairs the dissertation committee. The student and the major professor identify a doctoral committee composed of at least four faculty members holding the rank of assistant professor or above, three of whom, including the chair, must be approved by the Graduate Council to direct doctoral research. At least one member must be from an academic unit other than that of the student’s major field. Students are encouraged where appropriate to seek a fifth member in the field of specialization from outside the university to serve on their dissertation committee. This committee is nominated by the department head or college dean and approved by the Dean of the Graduate School.

A doctoral student should begin to form the committee during the first year of study. Subject to Graduate Council policies and individual program requirements, the committee must approve all coursework applied toward the degree, certify the student’s mastery of the major field and any cognate fields, assist the student in conducting research, and recommend the dissertation for approval and acceptance by the Graduate School.

**Doctoral Examinations**

Departments may, at their option, administer diagnostic and/or qualifying examinations in the early stages of the student’s doctoral program. Successful completion of a comprehensive examination and a defense of dissertation is required for all doctoral degrees. Registration is required the term in which examinations are taken.

**Diagnostic Examination**

A student on admission to a doctoral program may be given a written and/or oral diagnostic examination to help determine
the student’s level of preparation, areas of strengths and weaknesses, and general background. The diagnostic examination is designed to aid in the selection of courses and to determine the student’s preparation to continue doctoral studies at the University of Tennessee, Knoxville.

QUALIFYING EXAMINATION
A written and/or oral qualifying examination may be given near the end of the student’s first year in the doctoral program. Qualifying examinations are designed to test the student’s progress, general knowledge of fundamentals of the field, and fitness to continue with the more specialized aspects of the doctoral program.

COMPREHENSIVE EXAMINATION
The comprehensive examination (or the final part of this examination, when parts are given at different times) is normally taken when the doctoral student has completed all or nearly all prescribed courses. Thus, its successful completion indicates that, in the judgment of the faculty, the doctoral student can think analytically and creatively, has a comprehensive knowledge of the field and the specialty, knows how to use academic resources, and is deemed capable of completing the dissertation. The comprehensive examination must be passed prior to admission to candidacy. A written examination is required, and an oral examination is encouraged.

The faculty of the graduate program and/or the student’s doctoral committee will determine the content, nature, and timing of the comprehensive examination and certify its successful completion. The department or committee may at its discretion subdivide the examination, administering portions of the examination at several times during the student’s course of study. Students should review carefully the written statement from each doctoral degree program which details the timing, areas covered, grading procedures, and provisions for repeating a failed examination.

DEFENSE OF DISSERTATION EXAMINATION
A doctoral candidate must pass an oral examination on the dissertation. The dissertation, in the form approved by the major professor, must be distributed to the committee at least two weeks before the examination. The examination must be scheduled through the Office of the University Registrar at least one week prior to the examination and must be conducted in university-approved facilities. The examination is announced publicly and is open to all faculty members. The defense of dissertation will be administrated by all members of the doctoral committee after completion of the dissertation and all course requirements. This examination must be passed at least two weeks before the date of submission and acceptance of the dissertation by the Graduate School. The major professor must submit the results of the defense by the dissertation deadline.

Language Requirement
Candidates for the Doctor of Philosophy may be required to demonstrate a reading knowledge of at least one foreign language in which there exists a significant body of literature relevant to the major field of study. Please refer to the descriptions of individual programs. The doctoral committee will determine the specific language (or languages) required. When the student is prepared to take a language examination, he/she should complete an Application for Doctoral Language Examination at the Office of the University Registrar in accordance with the dates and times for the examinations published online.

Satisfactory completion (grade of B or better) of German 332 or French 302 may be substituted for a language examination.

Some programs may accept a computer language in lieu of a foreign language.

Residence Requirement
Residence is defined as full-time registration for a given semester on the campus where the program is located. The summer term is included in this period. During residence, it is expected that the student will be engaged in full-time on-campus study toward a graduate degree.

For the doctoral degree, a minimum of two consecutive semesters of residence is required. Individual doctoral programs may have additional residence requirements.

A statement as to how and during what period of time the residence requirement has been met will be presented with the Application for Admission to Candidacy along with signatures of approval from the major professor and the department head/program director. More information about the rationale for the residence requirement may be obtained from the Graduate Council report available on the Graduate School Web page.

Admission to Candidacy
Admission to candidacy indicates agreement that the student has demonstrated the ability to do acceptable graduate work and that satisfactory progress has been made toward a degree. This action usually connotes that all prerequisites to admission have been completed and a program of study has been approved.

A student may be admitted to candidacy for the doctoral degree after passing the comprehensive examination, fulfilling any language requirements (for Doctor of Philosophy), and maintaining at least a B average in all graduate coursework. Each student is responsible for filing the admission to candidacy form, which lists all courses to be used for the degree, including courses taken at the University of Tennessee, Knoxville, or at another institution prior to admission to the doctoral program, and is signed by the doctoral committee. Admission to candidacy must be applied for and approved by the Office of the University Registrar at least one full semester prior to the date the degree is to be conferred.

Registration for Course 600 and Continuous Registration
Course 600 is reserved for doctoral research and dissertation hours. Initial registration for 600 should be determined by each department and generally corresponds to the time at which a student begins work actively on dissertation research. From this time on, students are required to register continuously for at least 3 hours of 600 each semester, including summer term. A minimum total of 24 hours of course 600 is required.

A student who will not be using faculty services and/or university facilities for a period of time may request leaves of absence from dissertation research up to a maximum of six terms (including summer terms). The request, approved by the major professor, will be submitted by the student and filed in the Office of the University Registrar.

Dissertation
The dissertation represents the culmination of an original major research project completed by the student. The organization, method of presentation, and subject matter of the dissertation are important in conveying to others the results of such research.

A student should be registered for the number of dissertation hours representing the fraction of effort devoted to this phase of the candidate’s program. An electronic copy of the dissertation (prepared according to the regulations in the most recent Guide to the Preparation of Theses and Dissertations, available at http://web.utk.edu/~thesis) must be submitted to and accepted by the Graduate School on behalf of the Graduate Council. Each dissertation must be accompanied by one approval sheet, signed by all members of the doctoral committee. The approval sheet reflects the final format for submission. The approval sheet certifies to The Graduate School that the committee members have examined the final copy and found that its form and content demonstrate scholarly excellence. Doctoral Dissertation Agreement Form, Survey of Earned Doctorates, and Abstract form are also submitted at this time. The student should check with the department head concerning additional required copies of the dissertation.

Time Limit
Comprehensive examinations must be taken within five years, and all requirements must be completed within eight years, from the time of a student’s first enrollment in a doctoral degree program.
FEES AND FINANCIAL ASSISTANCE

Residency Classification for the Purpose of Paying University Fees and for Admission Purposes

Initial residency classification is determined by an admissions processor from information included on the University of Tennessee Graduate Application for Admission. Notice of classification is sent at the time the applicant is notified of admission. Students who would like their residency classification reconsidered may submit an appeal to the residency classifier listed at http://registrar.tennessee.edu/. The application for reclassification with supporting documentation must be filed no later than the last day of registration in order to have the reclassification effective for the upcoming semester. Classification will be determined and the applicant will be notified by mail. Additional information regarding the State of Tennessee regulations for classification may be found at the Office of the University Registrar Web site http://registrar.tennessee.edu/.

University Fees

For the most current listing of tuition and fees at the University of Tennessee, Knoxville, see http://www.utk.edu/bursar.

University fees and other charges are determined by the Board of Trustees and are subject to change without notice. All student fees are due in advance.

All charges and refunds will be made to the nearest even dollar. All charges are subject to subsequent audit and verification. The university reserves the right to correct any error by appropriate additional charges or refunds.

All students must confirm their attendance by making the minimum payment: signing a Confirmation of Attendance form; or setting their Confirmation of Attendance on the Web at cpo.utk.edu if no fees are due.

If the student does not owe fees due to a waiver (staff, GA, GTA, GRA, etc.), financial aid including scholarships, or if fees are paid by another source, a signed Confirmation of Attendance Form must be received by the Bursar’s Office or the student must set their confirmation on the Web at cpo.utk.edu on or before the due date published on the Bursar’s Office Web site each semester. The schedule will be canceled if one of the above is not accomplished each term on or before the published due date. This includes graduate assistants, teaching assistants, teaching associates, research assistants, staff and others whose fees may be billed, prepaid, or waived. Late registration fees are applicable to students who register during late registration.

The university is authorized by statute to withhold diplomas, grades, transcripts, and registration privileges from any students until their debts and obligations owed to the university are satisfied.

Part-time students may elect to pay fees computed by the semester hour credit (or audit) at the rates shown on the above Web site, with the total charge not to exceed the regular maintenance fee for in-state students or the maintenance fee plus tuition for out-of-state students.

All students both in and out-of-state are required to pay the established maintenance fee. In addition, tuition is required of all students who are classified as non-residents for fee assessment purposes.

Application Fee

Each graduate application for admission must be accompanied by a non-refundable fee of $35 before it will be processed [fee not required if (1) former University of Tennessee graduate student; (2) paid to the University of Tennessee Graduate Admissions within the previous 12 months; or (3) paid and attended graduate school within the University of Tennessee System].

If a student applies but does not enter graduate school within twelve months after date of requested admission, the file will be destroyed, and it will be necessary to resubmit the application fee and a new application. This fee is not refundable.

VOLXpress

VOLXpress is the University of Tennessee, Knoxville’s, centralized accounting system. Students may pay their fees via the mail, in person, or on the Web at cpo.utk.edu. Through VOLXpress, statements are mailed to each student’s billing address that include class schedules, current tuition and fees, fee waiver information, fines and past-due amounts, pending financial aid that can be credited toward fees, any excess funds from scholarships and/or loans, and choices about how to receive them.

VOLXpress is a convenient method for students to take care of business from home. Students who register and pay early will receive the greatest benefit if the payment deadlines are observed.

Each student must submit any change of address on the Web at cpo.utk.edu to ensure timely receipt of a VOLXpress Statement. Failure to receive a statement does not relieve the student of their obligation to pay on or before the due date.

University Program and Services Fee

http://www.utk.edu/bursar/volxfees.html

The purpose of the University Programs and Services Fee (UPSF) is to provide non-instructional facilities and programs of an educational, cultural, social, recreational, and service nature for the University of Tennessee, Knoxville, students. The fee has three components which include program, health, and capital. The health portion of the fee is included only with the payment of the full UPSF (refer to Student Health Insurance and Student Health Services for additional information).

Students enrolled in 9 or more hours are assessed the full-time University Programs and Services Fee. Students enrolled for less than 9 hours are assessed a pro-rated fee based on the highest number of hours for which the student is enrolled at any time during the semester. The fee is non-refundable.

Graduate, teaching, and research assistants, teaching associates, and fellowship students must pay the University Programs and Services Fee even if they have a waiver of fees (tuition and/or maintenance).

Any part-time student (minimum of 3 hours) may elect to pay the health portion of the UPSF in addition to the standard pro-rated assessment. Part-time students enrolled in 6 or more hours may elect to pay the full-time UPSF instead of the standard pro-rated assessment.

Technology Fee

The purpose of the Technology Fee is to provide all students with improved access to the technological infrastructure, resources, and services at the University of Tennessee, Knoxville. Graduate, teaching, and research assistants, teaching associates, and fellowship students, who may have a waiver of fees (tuition and/or maintenance), must pay the appropriate Technology Fee.

The Technology Fee is mandatory and may be refunded on the same percentage scale as maintenance and tuition charges.

Facilities Fee

The Facilities Fee is used to provide students with upgraded classroom facilities, expand information technology into the classroom, and assist in funding a backlog of campus and classroom projects that will enhance the university’s facilities.

Transportation Fee

The Transportation Fee is a mandatory fee assessed to all students enrolled in credit and audit courses. The fee is used to provide students with a convenient method of movement around campus. The fee will subsidize the costs associated with the new comprehensive campus transit system.

Special Course Fees

Academic areas, such as art, biology, chemistry, engineering, music, and physical education, charge fees for certain courses. Refunds on these fees are determined by the department or on the same percentage as maintenance and tuition.
Graduation Fee
Master’s Degree Candidates .......................... $30
Doctoral Degree Candidates .......................... $75

The graduation fee is non-refundable and is valid for two semesters after the semester in which it is paid. There are no additional charges for the diploma. Additional or duplicate diplomas may be ordered through the Office of the University Registrar, Graduation office. Contact the Office of the University Registrar for the application and cost of ordering an additional or duplicate diploma.

Fees for Courses Not Taken for Credit
Fees for courses audited are the same as for courses taken for credit. For fee purposes, courses listed for 0 credit hours are considered as 1-1 hr courses.

Late Registration Fee
Assessed to students who register during Late Registration (including those who were canceled during Priority Registration).
Payment of fees or a Confirmation of Attendance form must be turned in to one of the Bursar’s Office locations by the Late Registration payment due date. This due date will be published on the Bursar’s Office Web site. The Late Registration Fee is non-refundable.
See the Bursar’s Office Web site for the dates and fees to be assessed during Late Registration.

Late Fee
VOLXpress (fee) accounts which have a balance one month prior to the end of a term will be assessed a late fee. The account balance must be paid in order to access registration services, receive a transcript, grades, or a diploma.

Returned Check Fee
All checks are deposited the day they are received. A $30 service charge will be assessed when checks fail to clear the bank on which they are drawn. Returned checks will not be re-deposited. Cash or certified funds are required for payment of the returned check and service charges.

Any student who does not respond within two weeks from the date of the first notice may be assessed an additional $10 Service Charge.

Failure to clear returned checks will result in the forfeiture of all university services, including the receipt of grades, transcripts, schedule of classes and check cashing/writing services. Failure to pay may also result in additional late fees, collection costs and reasonable attorney fees.

Deferred Payment Fee
Students in good financial standing will be offered a deferment of up to 50% of the total charges on their VOLXpress statement. All financial aid must be applied toward fees before a deferment will be considered. A deferred payment service fee is assessed when any portion of tuition, fees, and other charges are deferred with the approval of the Bursar’s Office. An additional late payment fee will be assessed on each installment not paid on or before the due date. Failure to receive a statement does not relieve students of their obligation to pay on or before the due date. An additional late fee will be assessed if fees are not paid by one month prior to the end of the term.

Refunds
Refunds are defined as the portion of maintenance and/or tuition and university housing/meal charges due as a rebate when a student withdraws or drops a portion of class hours. Refunds are also processed as a rebate on some fines/penalties paid such as parking fines, library fines, etc. Once a refund is determined to be appropriate, all amounts will be applied toward any outstanding balances due on the Deferral Payment Plan. Any remaining refund balance will be refunded to the credit card charged or mailed to the student’s billing address.

Refund/Charge of Fees for Withdrawal (Drop All Classes)
After payment of fees and/or a Confirmation of Attendance Form has been submitted by the student, withdrawal for the semester must be by official notification to the Office of the University Registrar, 209 Student Services Building. Failure to attend class does not automatically withdraw or drop a student from college or class.

The effective date of the withdrawal is the date the appropriate withdrawal office is notified by completion of the official withdrawal request form. The appropriate percentage of fees (maintenance and tuition, facility, transportation, and technology fees only) will be charged unless this action is completed by the close of the day before the first official day of classes for the semester. Failure to notify the appropriate withdrawal office promptly when withdrawing could result in a larger fee assessment. Withdrawal does not cancel fees and charges already incurred. All charges and refunds will be made to the nearest even dollar.

The drop/add procedure cannot be used to withdraw from school for the semester. See the Bursar’s Office Web site for the dates and percentage charges for the semester in question.

Financial Aid Withdrawals (Repayments)
Repayments are defined as the portion of aid, received by a student after university direct charges have been paid by that aid, which must be repaid when a student withdraws or is dismissed. The amount of repayment is determined by the Refund/Charge percentages stated previously.

Refunds and repayment to the Title IV programs are determined according to the formula published in the current Federal Student Financial Aid Handbook. The Office of Financial Aid and Scholarships is responsible for calculating the amount of the refund and/or repayment and distributing the correct amount back to the financial aid program(s) according to the Refund/Repayment Allocation Policy.

Refund/Charge of Fees for Dropped Courses (Continue with a Reduced Course Load)
Students who drop courses and continue with a reduced load are eligible for a refund only if the sum of charges computed at the semester-hour rate for the hours continued, plus the percentage assessed for the hours dropped, results in an amount less than that paid. A course on a student’s schedule is officially dropped, and the drop becomes effective, on the date the change of registration form is processed or the date the drop was entered on the registration telephone system or on cpo.utk.edu. Any refund due for dropped courses will be made after the drop deadline. See the Bursar’s Office Web site for the drop charge/percentage refund for the semester in question.

Waiver of Fees
Graduate assistants, teaching assistants and associates, research assistants, staff and others whose fees are billed, prepaid, waived, or partially waived must confirm their attendance by making payment or signing a Confirmation of Attendance Form by the due date as published on the Bursar’s Office Web site or their schedule will be canceled. If an appointment terminates during the term, the student owes the appropriate fees from the termination date until the end of the term.

Graduate students are not eligible for the University of Tennessee employee spouse/dependent discounts.

Graduate Student Employee Insurance
All graduate assistants, graduate teaching assistants or associates, and/or graduate research assistants who are employed at least 25% FTE will automatically be enrolled in the Graduate Student Employee Insurance Program. These students will have 100% of the premium paid by the university. The health insurance benefit applies to nine-month and twelve-month appointments. These students may elect to add spouse or dependent coverage at their own expense. If students already have insurance coverage through another insurance carrier, this policy functions as additional coverage.
The Student Health Clinic will manage the Graduate Student Employee Health Insurance Program.

Student Health Insurance
The university makes available, by contract with an insurance company, group health insurance expressly for students who do not have a graduate assistantship. The program is designed to supplement the care provided by the campus Student Health Service and provide basic benefits at low group premium rates. Primary emphasis is placed on hospitalization benefits, since in-patient care is not provided on campus. Students not otherwise covered are urged to avail themselves of this or comparable insurance, since paying for hospital care is the student's responsibility.

Information about the insurance is mailed by the company to the student's home, and participation is solicited. Enrollment in the plan (or alternative coverage) is mandatory for international students. Students may obtain applications from the Student Health Service. Except for international students, enrollment for insurance is not part of registration for classes. NOTE: The family health insurance policy should be carefully reviewed, since most family policies do not cover a dependent child after a given age, some as early as nineteen.

VolCard
The VolCard is issued to a new student after admission at the appropriate university level or anytime during the year to all students. The VolCard is used in nearly all aspects of campus life to obtain services. Many students have established debit or charge accounts which are accessed through use of the VolCard ID.

These cards are non-transferable and may not be duplicated. The VolCard must be carried at all times for purposes of identification. Students are responsible for the safekeeping of this card and must immediately report it lost or stolen if the card is not in their possession. Failure to notify the VolCard office will make the student liable for any unauthorized charges to the debit on charge accounts the student may have.

To obtain a new VolCard or replace a lost or stolen card, report to the VolCard Office, Room 472, South Stadium Hall (between gates 12 and 13 at Neyland Stadium) on Stadium Drive or on the Web at http://web.utk.edu/~volcard/. There is a minimum charge of $30.00 for replacement of a VolCard.

Financial Assistance
The University of Tennessee offers several types of financial assistance for which graduate students may apply.

Assistantships
Graduate assistantships, scholarships, traineeships, and some fellowships are offered through many departments and colleges. Information concerning these types of assistance can be obtained from the department in which the student plans to study. All assistantships are governed by the Policy for the Administration of Graduate Assistantships.

Academic Common Market
The Academic Common Market is an agreement among Southern states for sharing unique programs. Participating states can make arrangements for their residents who are fully admitted to specific programs at the University of Tennessee to enroll on an in-state tuition basis if these programs are not available in the state of residence.

Cooperating states in the Academic Common Market are Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia.

Residents of member states who seek further information on approved programs should contact the Southern Regional Educational Board, 592 Tenth Street, N.W., Atlanta, GA 30318-5790, (404) 875-9211, FAX (404) 872-1477, http://www.sreb.org; or Norma Harrington, Office of Undergraduate Admissions, (865) 974-2184.

Fellowships
The Graduate School administers several fellowship programs, including the J. Wallace and Katie Dean Graduate Fellowships and the Herman E. Spivey Graduate Fellowships. These awards are for full-time study at the University of Tennessee and awardees are selected on the basis of high achievement, broad intellectual ability and potential for significant career contributions. Candidates from any field of study may be nominated by the academic program for the J. Wallace and Katie Dean Fellowships. Candidates for graduate study in the humanities may be nominated by the academic program for the Herman E. Spivey Fellowships. Information is available on the Graduate School Web site.

Employment
The Office of Financial Aid and Scholarships coordinates the Federal Work Study Program which provides part-time off- and on-campus jobs for U.S. citizens or permanent residents who have demonstrated financial need by completing the Free Application for Federal Student Aid (FAFSA). A wide range of jobs is available in academic units, administrative offices, and non-profit agencies.

Graduate Student Travel Award
The University Program and Services Fee (UPSF) Graduate Student Travel Award is administered by the Office of the Dean of Students in cooperation with the Graduate Student Senate and the Dean of the Graduate School. Allocations from this fund are utilized to provide travel awards for University of Tennessee graduate students attending professional meetings. The awards are made on the basis of merit, not need, and allow for partial reimbursement of transportation, lodging and registration expenses.

Travel award requests must be filed using the current UPSF Graduate Student Travel Fund application. Applications can be picked up at the Office of the Dean of Students (413 Student Services Building) or downloaded from the GSS Web site at http://web.utk.edu/~gss. Applications must be submitted to the Office of the Dean of Students by the following deadlines.

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<tr>
<td>Summer Term</td>
<td>April 15</td>
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<td>Fall Semester</td>
<td>September 1</td>
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<td>Spring Semester</td>
<td>January 15</td>
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Loans
Students must apply through the Office of Financial Aid and Scholarships for all loan programs. Loans are limited to U.S. citizens and certain permanent residents. Additional paperwork is required on subsidized/unsubsidized Stafford Loans, including the Free Application for Federal Student Aid (FAFSA). Students must be admitted into a degree program and be enrolled for a minimum of 6 credit hours each semester to receive student loans.

Four types of loan programs are administered by the Financial Aid office.

- Federal Perkins Loan (FAFSA must be on file).
- Subsidized Federal Stafford Loan (FAFSA must be on file).
- Unsubsidized Federal Stafford Loan (FAFSA must be on file).
- Graduate PLUS Loan (FAFSA must be on file).
- The University of Tennessee Loan.

Processing time varies from one loan program to another. All students receiving financial aid are expected to maintain satisfactory academic progress standards to remain eligible to receive aid. In addition, all students receiving federal financial aid must have a social security number. Information on these standards, applications, and additional information are available from the Office of Financial Aid and Scholarships, 115 Student Services Building.

Veteran’s Benefits
Veterans, reservists and widows or children of certain deceased or disabled veterans, who have been admitted to a degree program, may apply for benefits by contacting the Veterans Affairs Office in Room 209, Student Services Building. Maximum benefits are paid by the Department of Veterans Affairs for course loads of 12 or more graduate hours each semester.
SPECIAL FEDERAL AND STATE LAWS AND UNIVERSITY POLICIES

Family Educational Rights and Privacy Act
This act, also known as the Buckley Amendment, gives four basic rights to students.

• The right to review their education records.
• The right to seek to amend their education records.
• The right to limit disclosure of personally identifiable information (directory information).
• The right to notify the Department of Education concerning an academic institution's failure to comply with FERPA regulations.

FERPA provides for confidentiality of student records; however, it also provides for basic identification of people at the University of Tennessee without the consent of the individual. Release of information to third parties includes directory information, such as contained in the campus telephone book, in the online web-based people directory, and in sports brochures. Directory information includes, but is not limited to, student name, address, telephone number, dates of attendance, degrees and awards, and the most recent previously attended education institution, participation in school activities and sports, and height and weight (for special activities).

Students are notified of their FERPA rights and the procedures for limiting disclosure of directory information in Hittings, at Orientation for new students, and on the Web site of the University Registrar http://registrar.tennessee.edu/records/privacy.shtml.

Social Security Number Use
The University of Tennessee, Knoxville, requires the assignment of a unique student number for internal identification of each student’s record. In December 2004, the university began assigning individual student identification numbers to newly admitted students; new students will no longer use their SSNs to conduct business or access their records. The university is in the process of converting all currently enrolled student records to generated student identification numbers.

Student identification numbers are used for university business only. The university complies with FERPA guidelines when releasing student identification numbers.

Students requiring a correction or change to their student identification numbers should contact Student Data Resources at (865) 974-2108.

EEO/Title IX/AA/Section 504 Statement
The University of Tennessee, Knoxville, does not discriminate on the basis of race, sex, color, religion, national origin, age, disability, or veteran status in provision of education programs and services or employment opportunities and benefits. This policy extends to both employment by and admission to the university.

The university does not discriminate on the basis of race, sex, or disability in the education programs and activities pursuant to the requirements of Title VI of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act (ADA) of 1990.

Inquiries and charges of violation concerning Title VI, Title IX, Section 504, ADA, the Age Discrimination in Employment Act (ADEA), or any of the other above referenced policies should be directed to the Office of Equity and Diversity (OED); 1840 Melissa Avenue; Knoxville, Tennessee 37996-3560; telephone (865) 974-2498 (TTY available). Requests for accommodation of a disability should be directed to the ADA Coordinator at the Office of Human Resources; 600 Henley Street; Knoxville, Tennessee 37996-4125.

The University of Tennessee, Knoxville, in its efforts to ensure a welcoming environment for all persons, does not discriminate on the basis of sexual orientation in its campus-based programs, services, and activities. Inquiries and complaints should be directed to the Office of Equity and Diversity.

Security Information
In accordance with the Tennessee College and University Security Information Act of 1989 and the Student Right-To-Know and Campus Security Act (1999 Clery Act), the University of Tennessee has prepared a report containing campus security policies and procedures, data on campus crimes and other related information. The UT Security Brochure for the Knoxville campus is available on the Office of the Dean of Students Web page at http://web.utk.edu/~homepage, where you may print the entire document for your use. In addition, a free printed copy of this report may be obtained by any student, employee, or applicant for admission or employment from the Office of the Dean of Students, 413 Student Services Building.

Drug-Free Campus and Workplace
In support of the Drug-Free Workplace Act of 1988 (Public Law 100-690) and the Drug-Free Schools and Communities Act of 1989, the University of Tennessee is notifying all students, faculty, and staff of the following university policy approved by the University of Tennessee Board of Trustees on 21 June 1990.

It is the policy of the University of Tennessee to maintain a safe and healthful environment for its students and employees. Therefore, university policy prohibits the unlawful use, manufacture, possession, distribution, or dispensing of drugs (controlled substances as defined in the Controlled Substances Act, 21 U.S.C. 812 et seq.) and alcohol on university property or during university activities.

Violation of this policy is grounds for disciplinary action – up to and including immediate discharge for an employee and permanent dismissal for a student. Federal and state laws provide additional penalties for such unlawful activities, including fines and imprisonment (21 U.S. C.841 et seq.; T.C.A. 39-6-401 et seq.). Local ordinances also provide various penalties for drug and alcohol-related offenses. The university is bound to take all appropriate actions against violators, which may include referral for legal prosecution or requiring the individual to participate satisfactorily in an approved drug use/alcohol abuse assistance or rehabilitation program.

Aside from any university policy considerations, the use of illicit drugs and/or the abuse of alcohol may be harmful to your health. Some of the health risks associated with such use/abuse are described below.

Individuals who are paid by the University of Tennessee from federal grants or contracts must notify the university of any criminal drug statute conviction for a violation occurring in the workplace within five days after such conviction. The university is, in turn, required to inform the granting or contracting agency of such violation within ten days of the university’s receipt of notification.

Employees and their families needing treatment information should contact their local Personnel Office, Employee Assistance Program, or the State of Tennessee Employee Assistance Program (800-867-6811). Students needing treatment information should contact their campus Student Affairs Office, student health center or counseling center.

Alcohol Abuse Health Risks

• Liver damage – cirrhosis, alcoholic hepatitis.
• Heart disease – enlarged heart, congestive heart failure.
• Ulcers and gastritis.
• Malnutrition.
• Cancer – of the mouth, esophagus, stomach, liver.
• Brain damage – memory loss, hallucinations, psychosis.
• Damage to fetus if pregnant mother drinks.
• Death – 50% of fatal auto accidents involve alcohol; 31% of suicides are alcoholics.
Drug Use Health Risks

• Overdosing – psychosis, convulsions, coma, death.
• Long-term use – organ damage, mental illness, malnutrition, death.
• Casual use – heart attack, stroke, brain damage, death.
• Needles – infections, hepatitis, AIDS, death.
• If a pregnant mother uses drugs, her baby can be born addicted or dead.

POLICY FOR THE ADMINISTRATION OF GRADUATE ASSISTANTSHIPS

Preamble

Programs of graduate study are designed to transform the individual from student to knowledgeable practitioner or professional scholar. When a graduate assistantship is well conceived and executed, it serves as an ideal instrument to facilitate the desired transformation. The primary goal of an assistantship, then, is to facilitate progress toward the graduate degree. While the student assistant makes progress toward an advanced degree, he or she also receives work experience in a profession under the supervision of a faculty mentor.

The graduate assistant is both student and employee. As a student, the graduate assistant is expected to perform well academically to retain the assistantship. He or she is to be counseled and evaluated regularly by a faculty mentor so as to develop professional skills. As an employee, the graduate assistant is expected to meet teaching, research, and/or administrative obligations. He or she is to work under the supervision of experienced faculty and receive in-service training. In sum, the graduate assistant receives financial support for graduate study by contributing to the teaching and/or research mission of the university. The totality of responsibility may be greater than that required of other students or staff members, but the opportunities for professional development also are greater for the graduate assistant.

—Tennessee Conference of Graduate Schools

Definition

An assistantship is a financial award to a graduate student for part-time work in teaching, administration or research while pursuing study toward an advanced degree. Appointments are normally on a one-fourth to one-half time basis, and the annual stipend is payable in either nine or twelve monthly installments. In addition to the stipend, Graduate Teaching Assistants, Graduate Teaching Associates, Graduate Assistants, and Graduate Research Assistants are entitled to a waiver of fees for the period of appointment in accordance with university policy. University fees include a maintenance fee (required of all students), tuition (additional for out-of-state students), a program and services fee, and a technology fee. The waiver of fees for assistantships applies to maintenance and tuition fees only; it does not include the program and services fee, the technology fee, the facilities fee, or the transportation fee. For Graduate Research Assistants, the maintenance fee is paid by the granting agency and is in addition to the stipend paid.

Maintenance fees and tuition waivers apply to appointments at a one-fourth time basis or higher.

In this document when graduate assistant is not capitalized (except in headings), reference is to all four types of assistantships at the University of Tennessee, Knoxville.

Types of Assistantships

It is imperative that each department adheres to the University of Tennessee, Knoxville, Faculty Handbook’s four categories of assistantships. All departmental guidelines should reflect the descriptions provided in the Handbook.

Graduate Teaching Assistant

Graduate teaching assistants work under the direct supervision of regular faculty members and may be assigned only to duties related directly to instruction. These include such activities as assisting in the preparation of lectures, leading discussion sections, conducting laboratory exercises, grading papers and keeping class records. Assistants may not be given primary teaching and/or evaluation responsibilities nor should they be given duties to support faculty research or those basically clerical in nature.

In consultation with the supervisor, the teaching assistant works to gain teaching skills and an increased understanding of the discipline.

Graduate Teaching Associate

Graduate Teaching Associates are advanced graduate students who have been given primary responsibility for teaching undergraduate courses, including the assignment of final grades. No other category of graduate assistant may be so charged. Associates may not be assigned primary responsibilities for teaching and student assessment in courses approved for graduate credit. Associates must have met the Southern Association of Colleges and Schools (SACS) 18-hour requirement.

Graduate Assistant

Graduate Assistants are appointed to perform various types of duties other than those related directly to teaching or research. Most commonly, these duties relate to supervisory or administrative functions of the university.

Graduate Research Assistant

Graduate Research Assistants perform duties in support of university research, which may or may not relate directly to the students’ thesis/dissertation. A student appointed as a GRA works under the direct supervision of his/her major professor. Research assistantships may be financed through funds from gifts, grants, contracts, state appropriations designated for research, or the university’s internally sponsored programs. Department heads are responsible for assuring that GRAs receive ample opportunities to make continuing progress toward their degrees.

Work Assignments and Related Factors

To utilize the four categories of assistantships, the following provisions should be observed.

1. Work assignments for each type of assistantship should be as specific as possible and should be developed to reflect both the needs of the department and each graduate assistant’s obligation to make satisfactory progress in his/her program. Therefore, to the extent possible an assignment should appropriately reflect teaching hours, office hours, hours to be spent performing research or other specified tasks. Such specifications should be provided in writing at the time the offer is made.

In situations where the work assignment cannot be specifically described or must be changed from an initial assignment, the graduate assistant should clearly be informed before agreeing to, or continuing in, the assignment.

An important part of each graduate assistant’s work assignment is the fostering of professional development. Such development plus variations in departmental needs may result in differences in number of hours per week for carrying out assignments. Thus, weekly work assignments, when specified, are done so in terms of averages. For a one-fourth time appointment, the graduate assistant’s normal work time should not exceed 10 hours per week. For a one-half time appointment, the average number of hours should not exceed 20 hours per week. Appointments exceeding 50% must have prior approval of the Dean of the Graduate School, excluding summer term. The normal number of hours for conducting an assignment should be mutually understood by the graduate assistant and immediate supervisor. For percentage efforts not covered by those appointments above, the normal work time per week will be prorated.

2. A one-half time graduate assistant in each of the four categories of assistantships normally should enroll for 6-11 semester hours of coursework. A one-fourth time graduate assistant in each of the four categories of assistantships normally should take 9-13 semester hours. Exceptions to the above
must have prior approval of the Head of the student's academic home unit. A student on a one-half time assistantship who takes at least six semester hours will be considered full-time. The student's academic home unit is responsible for implementing these policies, regardless of the assignment or responsible account. It is therefore essential that the home unit be notified by any other unit employing the student of any assistantship awarded at the time of its initiation or renewal.

The maximum number of years that a graduate student can be appointed to a 25% or more assistantship is three years as a master’s student, five years as a doctoral student, or eight years in doctoral programs in which students enter with a baccalaureate degree only. Departments or programs may impose stricter limits. Requests for an extension beyond the maximum terms here specified must be made in writing by the academic unit to the Dean of the Graduate School. Established time limits for completion of graduate programs – six years for a master’s program and eight years for a doctoral program – also apply to all graduate assistants.

Qualifications of Graduate Assistants

Graduate assistants must be currently enrolled in graduate study (as fully-admitted degree-seeking students, non-degree students, or transient graduate students). The Southern Association of Colleges and Schools (SACS) 18-hour requirement must also be met.

SACS Requirement

Regulations specifically addressing the 18-hour requirement are excerpted from Section 4.8.4 of the SACS publication, Criteria for Accreditation. (Atlanta, 1996, p. 50) and read as follows: [Graduate teaching associates] who have primary responsibility for teaching a course for credit and/or for assigning final grades for such a course, and whose professional and scholarly preparation does not satisfy the provisions of Section 4.8.2 [which relate to exceptions] must have earned at least 18 graduate semester hours in their teaching discipline, be under the direct supervision of a faculty member experienced in the teaching discipline, receive regular in-service training, and be evaluated regularly.

The above requirements do not apply to graduate teaching assistants engaged in assignments such as assisting in laboratory sessions, teaching physical education activities, attending or helping prepare lectures, grading papers, keeping class records, and conducting discussion groups.

Implementation of the SACS 18-Hour Requirement at the University of Tennessee, Knoxville

The appropriate department head has responsibility for certifying that the 18-hour requirement is met either through coursework or by documentation that the graduate assistant meets the requirement as an exception (e.g., experience in the performing arts). The dean and department head must sign the appropriate form (APR FORM 1-89) that is attached to the PIF form. This is forwarded to the Office of Human Resource Management. Exceptions should be noted on this form, but a memo and appropriate documentation should be forwarded to the Graduate School, P105 Andy Holt Tower.

Competency in English

The University of Tennessee, Knoxville, requires all who teach to be competent in spoken English. The specific policy, as it relates to graduate students who teach, is as follows: Since a certain level of competency with English as a spoken language is necessary for effective communication and teaching, all Graduate Teaching Assistants and Graduate Teaching Associates whose first language is not English are required to demonstrate an appropriate level of comprehensibility for classroom teaching by taking the SPEAK Test administered through the Graduate School. The Test of Spoken English (TSE) may be taken in lieu of the SPEAK Test. The results of this test will be communicated to the appropriate department to be used in determining the nature and extent of instructional or other duties assigned the Graduate Teaching Assistants or Graduate Teaching Associates. Suggested modes of remediation will be given to the department and graduate student when appropriate.

New international students who have been offered an appointment as Graduate Teaching Assistant or Graduate Teaching Associate will take the SPEAK test after their arrival at the University of Tennessee, Knoxville, and the results of the test will be used to determine the nature of their assignment. The student who has already taken the TSE and received acceptable scores may be excused from the requirement of taking the SPEAK test. Validation of competence in communicating with students in English is required for all who are responsible for working with students. Deans, department heads, and directors are responsible for validating such competence, using the appropriate university form (APR FORM 1-89).

Rights/Responsibilities of Graduate Assistants

As specified in the Personnel Policies and Procedures Manual (Section 100 105-Pr3, p. 2), “A student employee is one whose primary function is that of enrollment in an academic program.” Thus, first priority of all graduate assistants must be satisfactory progress in their scholastic program. At the same time, acceptance of an assistantship is predicated on the belief that satisfactory progress can be concurrently achieved in work assignments and scholastic programs. Collaborative efforts between graduate assistants and their supervisors should be focused on the goal of satisfactory performance in both these areas.

In cases where graduate assistants feel that they have a legitimate complaint about any aspect of carrying out their assignments (work hours, duties assigned, pay, work conditions, etc.), they have a right to pursue all established channels to resolve the conflict. In the order that follows, the student should speak to his/her immediate supervisor, the appropriate department head, the appeals committees in the home unit or college, and the dean of the college/school involved. If the student feels that a resolution should be sought beyond the department/college level, the Dean of the Graduate School should be contacted. Established procedures outlined in the Graduate Council Appeals Procedure and/or Hillocks will be followed.

Graduate assistants’ benefits as employees of the University of Tennessee, Knoxville, in addition to fee waivers as explained elsewhere, include workers’ compensation as defined in the Personnel Policies and Procedures Manual under employees’ status. The specific wording reads, “Employees so designated [as student employees] receive no benefits other than statutorily required payments which include Workers’ Compensation” (Section 100 105-Pr2-3).

Graduate student assistantship appointments (Graduate Assistants, Graduate Teaching Assistants, Graduate Teaching Associates and Graduate Research Assistants) are of two types: academic year appointments for the fall and spring terms receive 12 equal monthly payments for the nine months of service and a waiver of fees for three terms (including the summer). Students appointed to an academic year appointment beginning in the spring term have the option of receiving seven equal monthly payments for the January-July period or six equal payments for the February-July period. In both cases a fee waiver is provided for spring and summer terms. Graduate students on academic year appointments have no assistantship responsibilities in the summer term. Students appointed to 12 month or other appointments receive equal monthly payments for the months of the appointments and have assistantship responsibilities for the full period of the appointment. For these appointments a waiver of fees is provided only for those terms included within the appointments (i.e., a waiver of fees for the summer term requires an appointment which encompasses the summer term in its entirety.) In some situations, a graduate assistant may be appointed for a period shorter than a year (e.g., a semester).

Graduate assistants who are performing satisfactorily are normally reappointed up to the maximum time limit as stated below. In situations where the demands of the department do not call for a job to be continued, reappointment may not be made. In cases where a department has a rotational plan for assistantships, graduate assistants likewise may not be reappointed.
In all cases of appointment and reappointment, the supervisor is responsible for notifying the graduate assistant as early as possible. When an assistantship is not to be renewed, the graduate student should be notified in advance. In most cases, this notice must be given no later than one month prior to the end of the appointment. Specific reasons for not renewing the contract should be given (e.g., discontinuation of the program or grant, significant neglect of duty, unsatisfactory academic performance or progress toward a degree, non-compliance with university policies, etc.). In cases where an assistantship is for one year only, the student should be told this at the time of appointment. In some circumstances, graduate assistants may be given a conditional appointment such as an appointment in which funding of a grant is pending.

As students, graduate assistants’ rights and responsibilities are defined in the Faculty Handbook section on Student Rights and Responsibilities and the Student Rights and Responsibilities section of Hilltopics. Additional rights and responsibilities of graduate students are found on the student’s copy of the admission status form.

Evaluation/Supervision of Graduate Assistants
Departments employing graduate assistants will conduct an annual evaluation of each assistant. The results of the evaluation are made available to the assistant and placed in the student’s academic file. Appropriate follow-up also should occur. The evaluation, review with the assistant, and follow-up should focus not only on assistant-related work being done but should be preparatory for future employment, thus providing professional growth. In most cases, a graduate assistant’s supervisor shares results of the evaluation with the assistant and takes appropriate follow-up action.

In cases where corrective measures must be taken to remediate deficiencies, the graduate assistant should be notified in writing of recommended action to solve the problem(s). Situations leading to dismissal for cause must be described in writing to the assistant and the supervisor. The letter should be signed by the supervisor with a copy to the department head. In cases where the assistant feels that university-related factors (facilities, working conditions, improper supervision, etc.) have had negative effects on specific aspects of job performance, a letter to the supervisor would be appropriate.

The immediate supervisor for each graduate assistant is to be identified as early as possible, usually no later than four weeks prior to the commencement of the assistantship. If there will be more than one supervisor per graduate assistant, the specific tasks to be performed for each and the role each supervisor will play (e.g., which one will initiate the evaluation process) should be identified.

The chain of command within each department should be clearly indicated to graduate assistants. Thus, each graduate assistant should know that the immediate supervisor is the person to whom first contact is to be made in job-related questions/directions; followed in turn by a general departmental/school/college supervisor of graduate assistants (where one exists), the appropriate project director, department head, dean of the college, and the Dean of the Graduate School.

Orientation/Training of Graduate Assistants and Graduate Teaching Associates
There must be a thorough, systematic plan of orientation and training of all graduate teaching assistants and graduate teaching associates. Such orientation and training may be done at either the department, college, or university level. It is the responsibility of each supervisor to see that his/her graduate assistant is provided appropriate orientation/training.

There are several kinds of training that should occur beyond the initial orientation/training. Such training is usually specific to a particular job function. The Graduate School provides a seminar for Graduate Teaching Assistants and Graduate Teaching Associates who will be teaching at the University of Tennessee, Knoxville. Special programs are offered for international GTAs.

Supervisors of GTAs are responsible for notifying them about departmental and college policies on attendance at these programs. Orientation/Training of Graduate Assistants and Graduate Research Assistants
Graduate Assistants and Graduate Research Assistants must also participate in a thorough, systematic orientation and training program. This training is usually at the department or college level, but the Office of Research at the university level is available to assist with programs designed to help train the Graduate Research Assistant in various aspects of the job to be done.

One type of specialized training is on-the-job. Graduate Assistants who work in laboratories may receive initial orientation, followed by work experiences which constitute training. In such instances, the on-the-job training period should be clearly known by the student assistant.

Accepting/Declining An Assistantship
The University of Tennessee adheres to the following Resolution by the Council of Graduate Schools. Acceptance of an offer of financial support (such as a graduate scholarship, fellowship, traineeship, or assistantship) for the next academic year by a prospective or enrolled graduate student completes an agreement that both student and graduate school expect to honor. In that context, the conditions affecting such offers and their acceptance must be defined carefully and understood by all parties.

Students are under no obligation to respond to offers of financial support prior to April 15; earlier deadlines for acceptance of such offers violate the intent of this Resolution. In those instances in which a student accepts an offer before April 15, and subsequently desires to withdraw that acceptance, the student may submit in writing a resignation of the appointment at any time through April 15. However, an acceptance given or left in force after April 15 commits the student not to accept another offer without first obtaining a written release from the institution to which a commitment has been made. Similarly, an offer by an institution after April 15 is conditional on presentation by the student of the written release from any previously accepted offer. It is further agreed by the institutions and organizations subscribing to the above Resolution that a copy of this Resolution should accompany every scholarship, fellowship, traineeship, and assistantship offer.

STUDENT SERVICES
The Black Cultural Center
Minority Student Affairs
http://web.utk.edu/~omsa/
Minority Student Affairs and Black Cultural Center are an integral part of the University of Tennessee, Knoxville. Minority Student Affairs provides academic, cultural and social outlets through programs and services as an on-going part of the university’s retention efforts. The Tutorial, Book Loan and Early Alert Programs, along with library, computer lab, student lounge, and multi-purpose area, serve as an extension to services provided across campus. The center houses several student organizations that plan activities ranging from success skills workshops, Black History Month events, Hispanic Heritage Month events, Welcome Week activities, and festivals to renown speakers such as Maya Angelou, Dr. Kweisi Mfume, Cornel West, John Singleton, and Alice Walker.

The Black Cultural Center opened in June 2002 and is located at 1800 Melrose Avenue. It is a testament to the university’s commitment to the entire student population and is a unique, landmark structure. The center continues to receive local, regional and national attention that most recently earned the university the honor of hosting the 13th Annual Conference for the Association for Black Culture Centers. The university community is encouraged to visit the facility and take advantage of the opportunities. The Black Cultural Center is truly a place for all students.
opportunities available to them.

The Programs Abroad Office (PAO) can help students find opportunities that meet their needs. Study programs are available in many countries, vary in length from 10 days to a full academic year, and sometimes cost only a little more than it would cost to remain on campus. Financial Aid can be used and credits can often transfer back to fulfill university requirements. Advanced planning helps assure that study abroad does not delay graduation.

Throughout the academic year, information sessions are held every weekday at 2:00 PM at the PAO.

In addition to formal study abroad, the PAO has information about other types of opportunities for graduate students to enjoy significant international experiences. These include volunteer programs and such work-based experiences as teaching English abroad, internships, and experiential learning. Students are encouraged to visit the PAO to learn more about the international opportunities available to them.

International Scholarships. CIE coordinates campus administration of such international grants and scholarships for students as the Fulbright, Rhodes, Marshall, David L. Boren NSEP, W.K. McClure, and provides information about other sources of funding for overseas study and research, including the Rotary Foundation and German Academic Exchange Service (DAAD) grants. CIE also administers the University of Tennessee, Knoxville, portion of the University of Bonn’s Transatlantic Summer Academy (TASA) for graduate students and upper-division undergraduates. Within its library on study, work and travel abroad, CIE has information on student summer job programs in seven countries.

International Students and Scholars. CIE provides information and assistance in matters relating to United States visa issues and U.S. Department of Homeland Security regulations. It produces The Link, an on-line newsletter for the University of Tennessee, Knoxville’s, international students and scholars, and administers the insurance policy required of all international students at the university. International student advisors are available to discuss academic and personal concerns. Student orientation programs conducted at the beginning of each semester facilitate adjustment to the campus and community and provide essential information related to U.S. laws for international students. For visiting J-1 and H-1B scholars there are extensive advising, assistance and weekly orientation sessions.

The International House. The "I-House," 1623 Melrose Avenue, is CIE's on-campus social, recreational and programming center and serves as a meeting place for international and U.S. students, faculty and staff. Culture Nights, formal discussions on global topics, language tables and cooking classes are regular features on the I-House calendar.

Contacts. Contacts for general inquiries to CIE are cie@utk.edu, phone (865) 974-3177, Web site http://www.UTInternational.org. The I-House Web address is http://www.UTI-house.org and the phone (865) 974-4453.

Counseling Center
http://www.tennessee.edu/counselingcenter

The Counseling Center provides services designed to help students with educational, vocational, personal, and social problems. Professional counselors work with students in a setting that allows for confidential discussion of concerns. Services include crisis intervention, group therapy, individual therapy, couples counseling, academic classes, consultation with faculty/staff/students, and various workshops and presentations.

To access services, students may come to the center during walk-in hours Monday-Friday from 10:00-11:30 a.m. and 1:00-3:30 p.m. If schedules will not accommodate these times, students can call the center to schedule an appointment. Anyone experiencing a crisis during the week is seen immediately between 8:00 a.m. and 5:00 p.m. After these hours, students are encouraged to go to the University of Tennessee Medical Center emergency room.

The center is located at 900 Volunteer Boulevard and can be reached at (865) 974-2196.

Disability Services
http://ods.utk.edu/

The University of Tennessee is committed to ensuring equal access to all programs for people with disabilities. All students with disabilities are encouraged to identify themselves to our office, regardless of whether or not they use our services.

The Office of Disability Services provides appropriate accommodations to all students with documented disabilities. We are here to assist in arranging for accommodations, as well as working with faculty and staff to ensure that needs are met throughout a student’s college career. Students are encouraged to register with the office as early as possible.
Eligibility must be established before services can be provided. No services can be provided until registration occurs and it is confirmed that the documentation meets required standards. Accommodations are not retroactive.

The Office of Disability Services is located at 2227 Dunford Hall, Knoxville, TN 37996-4020. Phone (865) 974-6087 V/T. Fax (865) 974-9552. E-mail ods@tennessee.edu.

Graduate Student Senate
http://web.utk.edu/~gss

The Graduate Student Senate is the official campus-wide organization that represents graduate and professional students at the University of Tennessee. Each graduate and professional department of study has a representative elected/selected by his or her fellow students and/or program director in the respective program. The GSS President and Vice-President are elected in the annual SGA elections. GSS has representation on various university-wide and Faculty Senate committees.

For more information on the Graduate Student Senate, call (865) 974-2377, e-mail gss@utk.edu, or check the Web site.

Hearing and Speech Center

The Hearing and Speech Center, located at 1600 Peyton Manning Pass, offers complete diagnostic and treatment services to all university students with speech and language disorders/differences and/or hearing disorders.

The center serves as a community hearing and speech center providing diagnostic and treatment services for persons of all ages exhibiting communication disorders/differences.

For speech-language services (865) 974-5451, fax (865) 974-4639.

For audiology services (865) 974-5453, fax (865) 974-1792.

Office of Information Technology
http://oit.utk.edu

Student Health Service
http://web.utk.edu/~kgivens/

Health services provided by the university are available to any student who has paid the health fee (either through paying the full University Programs and Services Fee or, if taking fewer than 9 but at least 3 hours, paying the optional health fee). These out-patient services are available continually throughout every term. The health clinic located at 1818 Andy Holt Avenue is open from 8:00 am to 4:30 pm, Monday through Friday. While urgent-care needs may be handled on a walk-in basis, appointments should be made in most instances. The Student Health Service will cooperate with students and family physicians in ensuring the continuity of quality health care during the university career.

The State of Tennessee has three immunization requirements for students attending state colleges and universities.

- Measles, mumps and rubella – all students born after January 1, 1957, must provide proof of immunization with two doses of measles, mumps, and rubella vaccine.
- Hepatitis – New incoming students must be vaccinated against Hepatitis B or complete a waiver form acknowledging that they have elected not to be vaccinated.
- Meningitis – New incoming students, who live in on-campus housing, must be vaccinated against meningococcal disease or complete a waiver form acknowledging that they have elected not to be vaccinated.

This documentation must be provided to the Student Health Service. In addition, Student Health Service recommends that entering college students assure immunity to tetanus/diphtheria, polio, and chicken pox.

Veteran’s Education Benefits
http://registrar.tennessee.edu/veterans_affairs.shtml

Basic military placement credit may be given on the basis of previous honorable active duty to students who are eligible for the Montgomery G.I. Bill Education Benefits. For more information, please contact the Veterans Administration Assistant in 209 Student Services Building, Monday through Friday, or visit our Web site for more information.

Service members, veterans, and dependents of veterans who are eligible beneficiaries of United States Department of Veterans Affairs education benefits or other governmental education assistance, subject to the conditions and guidelines set forth in Tennessee Code Annotated 49-7-104 as amended, may elect, upon formal application, to defer payment of required tuition and fees until the final day of the term for which the deferment has been requested. Application for the deferment must be made no later than fourteen days after the beginning of the term, and the amount of the deferment shall not exceed the total monetary benefits to be received for the term. Students who have been granted deferments are expected to make timely payments on their outstanding tuition and fees balance once education benefits are being delivered, and eligibility for such deferment shall terminate if the student fails to abide by any applicable rule or regulation, or to act in good faith in making timely payments.

This notice is published pursuant to Public Chapter 279, Acts of 2003, effective July 1, 2003.

Women’s Center

The Women’s Center provides essential informational and referral services to University of Tennessee, Knoxville, students and faculty. The library’s specialized collection provides books, journals, and brochures about issues and concerns of women from both a current and historical perspective. Information is available on a variety of topics including racism, violence against women, spirituality, and sex roles. The Women’s Coordinating Council is the programming branch of the Center responsible for educational, social, and cultural events pertaining to women’s issues. The Women’s Center is located in 301 University Center. If you need more information or are interested in volunteering, please call 974-1029 or e-mail wcc@utk.edu.
The College of Agricultural Sciences and Natural Resources began in 1869 when the university was designated as Tennessee’s Federal Land-Grant Institution. As such, the university was enabled for the first time to offer instruction in agriculture. Graduate instruction began as early as 1889. The college is not only an academic unit of the University of Tennessee, Knoxville, but is (with the Agricultural Experiment Station, UT Extension and the College of Veterinary Medicine) one of the four units of the University of Tennessee’s Institute of Agriculture. There are many shared resources and positive interactions between various units of the Institute. Most of the faculty in the College of Agricultural Sciences and Natural Resources hold joint appointments in the Agricultural Experiment Station and are actively involved in significant basic and applied research in agriculture and the associated natural resources. On campus and field research laboratories are utilized in the instructional programs of the college; extension and research activities provide many students excellent opportunities. The Agricultural Experiment Station provides graduate research assistantships to support graduate students.

The unique association the college has with the University of Tennessee and the other units of the Institute of Agriculture makes it possible for the college to offer comprehensive, high-quality graduate programs. The graduate student is expected to demonstrate a thorough knowledge of the subject matter in his/her specialized field of study and its relationship to the sociological, economic, and environmental impact on society. The student must demonstrate the ability to plan, conduct, analyze, and report original research. Emphasis is given to intellectual growth and the development of scholarly habits of study, reasoning and analysis so that the graduate will continue to grow and develop professionally throughout his/her career.

Master of Science Programs

Programs of graduate study leading to the Master of Science degree are offered through all departments in the College of Agricultural Sciences and Natural Resources. The graduate program may be entirely in one major subject or may include subject matter areas related to the major.

Both majors and minors are available in agricultural economics, agricultural and extension education, animal science, biosystems engineering, biosystems engineering technology, entomology and plant pathology, environmental and soil sciences, food science and technology, and plant sciences. Majors only are available in forestry and wildlife and fisheries science, and minors are available in general agriculture. The minor in general agriculture requires 12 hours of coursework. A complete listing of majors is shown on the Graduate Degrees, Majors, and Certificate Programs Chart.

Doctoral Programs

Graduate study leading to the Doctor of Philosophy degree with majors in animal science; biosystems engineering; food science and technology; natural resources; and plants, soils, and insects is offered in the college.

AGRICULTURAL AND EXTENSION EDUCATION PROGRAM

http://aee.tennessee.edu

Randol G. Waters, Graduate Liaison

**Professor**
Waters, R.G., PhD .................................................. Penn State

**Assistant Professor**
Fritz, C.A., PhD ..................................................... Iowa State

**Emeriti Faculty**
Lessly, R.R., EdD ..................................................... Oklahoma State
Todd, J.D., EdD ....................................................... Illinois (Champaign)

**MAJOR**

**DEGREE**

Agricultural and Extension Education

- Agricultural education concentration
- Agricultural extension education concentration

The agricultural and extension education program is designed primarily for teachers of agricultural education and staff employed by UT Extension. However, due to the flexibility of the program, it would be of value to any student interested in agriculture or adult and continuing education. The program may be completed under a thesis or non-thesis option. Candidates for the master’s degree must meet the general requirements of the Graduate Council and those stipulated by the department.
MASTER OF SCIENCE
AGRICULTURAL AND EXTENSION
EDUCATION MAJOR

Requirements

Thesis Option

A candidate for the master’s degree who elects the thesis option must successfully complete the following requirements.

- A minimum of 30 hours of graduate credit in courses approved by the student’s advisory committee. Six hours of thesis may be counted toward this requirement.
- A minimum of 20 hours of graduate credit in courses numbered at or above the 500 level.
- A minimum of 12 hours of graduate credit in courses appropriate to the area of concentration taught in the department and a minimum of 6 hours taught from outside the department.
- A minimum of 3 hours of graduate credit in coursework in either research methodology or statistics.
- A final oral examination.

Non-Thesis Option

A candidate for the master’s degree who elects the non-thesis option must successfully complete the following requirements.

- A minimum of 36 hours of graduate credit in courses approved by the student’s advisory committee.
- A minimum of 24 hours of graduate credit in courses numbered at or above the 500 level.
- A minimum of 12 hours of graduate credit in courses appropriate to the area of concentration taught in the department and a minimum of 6 hours taught from outside the department.
- A minimum of 3 hours of graduate credit in coursework in either research methodology or statistics.
- A creative component designed by the student and approved by the student’s advisory committee for 3 hours of graduate credit.
- A written and oral comprehensive examination.

DEPARTMENT OF AGRICULTURAL ECONOMICS

http://economics.ag.utk.edu

Dan L. McLemore, Head
John R. Brooker, Graduate Liaison

Professors

Cross, T.L. (Associate Dean), PhD ........................ Oregon State
English, B.C., PhD ........................... Iowa State
Garland, C.D., PhD ........................ Tennessee
Gerloff, D.G., PhD ........................ Texas A&M
Hall, C.R., PhD ............................. Mississippi State
Jensen, K.L., PhD ........................... Oklahoma State
Klindt, T.H. (Interim Dean), PhD ........................... Kentucky
McLemore, D.L., PhD ........................ Clemson
Orr, R.H., PhD ............................... Illinois
Park, W.M., PhD .............................. Virginia Tech
Rawls, E.L., PhD .............................. Virginia Tech
Ray, D.E., PhD ............................... Iowa State
Riley, J.B., PhD .............................. Oklahoma State
Roberts, R.K., PhD ........................... Iowa State
Smith, G.F., PhD ............................. Tennessee

Associate Professors

De La Torre Ugarte, D.G., PhD ........................ Oklahoma State
Larson, J.A., PhD .............................. Oklahoma State
Yen, S.T., PhD ............................... Minnesota

Assistant Professors

Bazen, E.F., PhD .............................. Kentucky
Cho, S.H., PhD ............................... Oregon State
Clark, C.D., PhD ............................... Vanderbilt

Lambert, D.M, PhD ............................... Purdue
Tiller, K.H., PhD .............................. Tennessee
Wilcox, M.D., PhD .............................. Purdue

Emeriti Faculty

Broker, J.R., PhD .............................. Florida
Eastwood, D.B., PhD ........................ Tufts
Leuthold, F.O., PhD ............................. Wisconsin
Mundy, S.D., PhD .............................. Tennessee

MAJOR DEGREE

Agricultural Economics ............................. MS
Agribusiness concentration
Agricultural economics concentration

MASTER OF SCIENCE
AGRICULTURAL ECONOMICS MAJOR

Requirements

The master’s program may be completed under a thesis option with a concentration in agricultural economics. A non-thesis option is available with concentrations in agribusiness or agricultural economics. For specific information, contact the department head.

AGRIBUSINESS CONCENTRATION

The agribusiness concentration is designed to prepare students to succeed in the public or private sectors of agriculture, including product manufacturing and marketing, natural resource management, farm management, and financial analysis. A candidate must complete a minimum of 31 hours of graduate credit in courses approved by the student’s master’s committee. At least 28 hours must be earned in courses numbered at or above the 500 level. Sixteen hours of agricultural economics; 3 hours of economic theory; 6 hours of quantitative methods; 6 hours of business, statistics, or communications electives; and 3 hours of internship are required. Each student must pass both written and oral comprehensive examinations.

AGRICULTURAL ECONOMICS CONCENTRATION

Thesis Option

The thesis option in agricultural economics is designed to prepare students for analytical and research careers in the public and private sectors and to prepare students interested in entering a PhD program. A candidate must complete a minimum of 31 hours of graduate credit in courses approved by the student’s master’s committee. At least 28 hours must be earned in courses numbered at or above the 500 level. In the thesis option, 16 hours of agricultural economics, 6 hours of economic theory, 6 hours of quantitative methods, and 6 hours of thesis are required. Each student must pass a final oral examination.

Non-Thesis Option

The non-thesis option in agricultural economics is designed to prepare students for analytical and research careers in the public and private sectors. A candidate must complete a minimum of 36 hours of graduate credit in courses approved by the student’s master’s committee. At least 33 hours must be earned in courses numbered at or above the 500 level. In the non-thesis option, 27 hours of agricultural economics courses and 9 hours of directed electives are required. Each student must pass both written and oral comprehensive examinations.

Agricultural Economics Minor

A minor requires 6 hours of coursework in the department with at least 3 hours in 500-level courses. The student’s committee must include a member of the faculty from the department who will be responsible for designating courses required for the minor.
Environmental Policy Minor
The department participates in a program designed to give graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. See Department of Political Science for program description.

DOCTOR OF PHILOSOPHY
NATURAL RESOURCES MAJOR
Students interested in pursuing doctoral studies in the area of natural resource economics and policy may do so under the PhD major in natural resources located administratively within the Department of Forestry, Wildlife and Fisheries (see Department of Forestry, Wildlife and Fisheries catalog entry for detailed information). The student's doctoral committee will assist the student in developing a program of graduate coursework that will meet the requirements for the PhD with a major in natural resources while drawing heavily from the Department of Agricultural Economics and the Department of Economics.

DEPARTMENT OF ANIMAL SCIENCE
http://animalscience.ag.utk.edu
Alan G Mathew, Head
J. Lannett Edwards, Graduate Director

Professors
Conatser, G.E., MS ........................................... Kentucky
Gill, W.W., PhD .................................................. Kentucky
Godkin, J.D., PhD .............................................. Massachusetts
Heitmann, R.N., PhD ........................................... Maine
Hopkins, F.M., DVM ............................................ Georgia
Kattesh, H.G., PhD ............................................. Virginia Tech
Kirkpatrick, F.D., PhD ........................................ Tennessee
Lane, C.D., PhD .................................................. Tennessee
Mathew, A.G., PhD ............................................ Purdue
Meadows, D.G., PhD ........................................... Texas A&M
Neel, J.B., PhD ................................................... Tennessee
Oliver, S.P., PhD ................................................... Ohio State
Robbins, K.R., PhD ............................................. Illinois
Robers, G.W., PhD .............................................. North Carolina State
Saxton, A.M., PhD ................................................ North Carolina State
Schrick, F.N., PhD ............................................... Clemson
Smith, M.O., PhD ............................................... Oklahoma State

Associate Professors
Edwards, J.L., PhD ........................................... Florida
Grizzle, J.M., PhD ................................................ Florida
Waller, J.C., PhD ............................................... Nebraska

Assistant Professors
Kojima, C.J., PhD ............................................... Missouri
Lin, J., PhD ....................................................... Ohio State
Pighetti, G.M., PhD ........................................... Penn State
Prado, M.E., DVM, PhD ....................................... Oklahoma State

Instructors
Fisher, A.E., MS ................................................ Tennessee

Lecturers
Hill-Campbell, K., MS ...................................... Auburn
Mitchell, J.W., BS ............................................. Tennessee
Ross, T., MS ..................................................... Texas A&M

MAJOR DEGREES
Animal Science
MS, PhD

The Department of Animal Science offers graduate programs leading to the Master of Science and Doctor of Philosophy with a major in animal science. Areas of emphasis are animal physiologic (ruminant and monogastric nutrition, reproduction and stress) and animal health and well-being (immunology, genetics, microbiology, and pre-harvest food safety) with orientation towards agriculturally-important species. See the department’s Web site for specific research programs. For additional information contact the graduate director.

Admission
For admission to the program, a student must have obtained a 3.00 grade point average on a 4.00 scale (or a 3.00 each term during the junior and senior years) in a completed undergraduate degree program in animal science or in a related area. Applicants to the PhD program normally should have completed a master’s degree prior to beginning the doctoral program. In addition, applicants must submit

- Scores from the general section of the Graduate Record Exam.
- A completed animal science academic and personal information form highlighting educational and career goals and relevant work experience.
- Completed animal science rating forms submitted by at least three individuals familiar with the applicant’s scholastic ability and professional potential.

Admission to the program will be contingent upon faculty evaluation of the applicant’s undergraduate or graduate grade point average, Graduate Record Examination scores, rating forms, educational and career goals, relevant work experience, and scores from the Test of English as a Foreign Language (TOEFL), if applicable. PhD students must be accepted by a major professor, chosen by consulting with the department head and faculty, before being admitted. Prerequisite courses may be required if the student has insufficient undergraduate background. If the student has an unsatisfactory grade point average, acceptance may be on a probationary (non-degree) basis and a minimum of 9 hours of graduate coursework must be completed the first term with a minimum grade point average of 3.00 for admission to the program.

MASTER OF SCIENCE
ANIMAL SCIENCE MAJOR
Requirements
The program requires the writing of a thesis based on original research, at least 24 hours of graduate coursework, plus at least 6 hours of thesis research. Coursework must include

- At least 14 hours in courses numbered at or above the 500 level.
- 1 hour of Agriculture and Natural Resources 512.
- At least 3 hours in statistics chosen from courses approved for use in the intercollegiate graduate statistics program (IGSP).
- All first- and second-year Master of Science students are required to enroll in Animal Science 596 each spring term.

The remainder of coursework will be selected jointly by the student and the major professor depending on the student’s area of emphasis and professional objectives. Student’s graduate committee will approve the student’s coursework and research proposal, as well as conduct the final oral examination, which consists of a comprehensive oral examination and a defense of the thesis.

DOCTOR OF PHILOSOPHY
ANIMAL SCIENCE MAJOR
Requirements
The program requires a written dissertation based on original research, at least 48 hours of graduate coursework beyond the Bachelor of Science degree, plus at least 24 hours of doctoral research. Coursework must include the following

- At least 24 hours credit at the 500 and 600 level, of which a minimum of 6 hours must be at the 600 level.
- A minimum of 16 hours in related fields outside of animal science.
A minimum of 1 hour of Agriculture and Natural Resources 512 in addition to that required at the Master of Science level.  
Animal Science 696 each spring term for first- and second-year doctoral students

The student and major professor select the program of study depending on the student's area of emphasis and professional goals. The student's graduate committee approves the program of study and dissertation research proposal, as well as conducts the comprehensive written and oral examination and the dissertation defense examination.

DEPARTMENT OF BIOSYSTEMS ENGINEERING AND SOIL SCIENCE

http://bioengr.ag.utk.edu
George F. Grandle, Interim Head
Paul D. Ayers, Graduate Liaison

Professors
Ammons, J.T., PhD .................................................. West Virginia
Ayers, P.D., PhD, PE ........................................ North Carolina State
Buschermohle, M.J., PhD ........................................ Pennsylvania State
Essington, M.E., PhD ........................................... California (Riverside)
Freeland, R.S., PhD, PE ........................................ Tennessee
Mote, C.R. (Assistant Dean, Tennessee Agricultural Experiment Station), PhD, PE .... Ohio State
Tomkins, F.D. (Associate Vice President for Research), PhD, PE .... Tennessee
Tyler, D.D., PhD .................................................. Kentucky
Wilkerson, J.B., PhD ............................................ Purdue
Wills, J.B., MS ...................................................... Tennessee
Womac, A.R., PhD, PE ........................................ Tennessee
Yoder, D.C., PhD, PE ........................................... Purdue

Associate Professors
BUCHANAN, J.R., PhD, PE .................................. Tennessee
Eash, N.S., PhD .................................................. Iowa State
Grandle, G.F., PhD ................................................ Tennessee
Hart, W.E., PhD .................................................. Purdue
Hayes, D.G., PhD ................................................ Michigan
Leib, B.C., PhD .................................................. Penn State
Logan, J., PhD .................................................... Nebraska
Radosevich, M., PhD .......................................... Ohio State
Savoy, H.J., PhD ................................................ Louisiana State
Walker, F.R., PhD ............................................. North Carolina State

Assistant Professors
Hawkins, S.A., PhD, PE ....................................... Tennessee
Johnson, A.M., PhD .......................................... North Carolina State
Lee, J., PhD ...................................................... Iowa State
Tyner, J.S., PhD ................................................ Oklahoma State
Ye, X., PhD ..................................................... Minnesota

MAJORS DEGREES

- Biosystems Engineering MS
- Biosystems Engineering PhD
- Biosystems Engineering Technology MS
- Environmental and Soil Sciences MS
- Plants, Soils, and Insects PhD

Environmental and soil sciences concentration in the plant, soils, and insects PhD program. The master's and doctoral programs are broad-based, emphasizing the application of chemical, biological, and physical principles to understand, manage, and manipulate the terrestrial environment. Within the concentration, students may select an agricultural or non-agricultural focus area in soil and water chemistry; nutrient and elemental cycling; land management and reclamation; pedology; climatology; soil biology and biochemistry; contaminant transport; and soil physical processes.

The Master of Science degree, biosystems engineering major, has both thesis and non-thesis options. Students are required to choose between these options in their first semester of study, in consultation with their major professor. Once an option is selected, it may only be changed with written approval of both the major professor and department head.

Requirements

Thesis Option

Applicants accepted into the program must complete at least 30 hours to earn a degree. Of these 30 hours, 20 must be in courses numbered 500 or above (6 hours of thesis plus 14 hours of other courses). Biosystems Engineering 503 must be taken three times during the course of the program, the last of which must be in the student's final semester before graduation. Other specific requirements for the 30 hours are...
In addition to completing the 30 hours, master's students must pass a final oral examination covering the thesis, related areas, and graduate coursework.

**Non-Thesis Option**

A non-thesis option in biosystems engineering is available to qualified students. Applicants accepted into the program must complete at least 33 hours to earn a degree. Of these 33 hours, 22 must be in courses numbered above 500. Biosystems Engineering 503 must be taken three times during the course of the program, the last of which must be in the student's final semester before graduation. Other specific requirements for the 33 hours are listed below.

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<tr>
<th>Course</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biosystems Engineering 503</td>
<td>3</td>
</tr>
<tr>
<td>and other major coursework</td>
<td>12</td>
</tr>
<tr>
<td>Coursework in computational</td>
<td>6</td>
</tr>
<tr>
<td>methods</td>
<td></td>
</tr>
<tr>
<td>Program Electives</td>
<td>6</td>
</tr>
<tr>
<td>Thesis</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total 33</strong></td>
<td></td>
</tr>
</tbody>
</table>

1 Mathematics, computer science, statistics, or any course containing appropriate computational components that may be approved by the department.

In addition to completing the 33 hours, non-thesis students must pass a comprehensive written final examination covering the graduate program, including the capstone experience. At the discretion of the candidate's committee, an oral examination may also be required.

**Masters of Science: Environmental and Soil Sciences Major**

Students seeking the Master of Science degree with a major in environmental and soil sciences will generally concentrate their studies in one of the environmental and soil sciences focus areas. The focus areas include soil and water chemistry; nutrient and elemental cycling; land management and reclamation; pedology, genesis, and classification; environmental climatology; soil biology and biochemistry; and soil physical processes. Both thesis and non-thesis options are available. For additional information, see the environmental and soil sciences master's concentration homepage http://bioengr.ag.utk.edu/graduate/ or contact the environmental and soil sciences program's graduate liaison.

**Admission**

Applicants having a bachelor's degree in fields that are related or unrelated to environmental and soil sciences may apply although acceptance may be contingent upon the completion of prerequisite coursework. Submit application, official transcripts, and scores from the general portion of the Graduate Record Examination, and fee to the Office of Graduate and International Admissions. Submit curriculum vitae, three letters of reference (or three Graduate Rating Forms), and a short statement of professional goals and reasons for applying to Environmental and Soil Sciences Master's Program Coordinator, Biosystems Engineering and Soil Science Department, The University of Tennessee, 2506 E.J. Chapman Drive, Knoxville, Tennessee 37996-4531.

**Requirements**

To obtain a Master of Science degree, the student must meet the following requirements in addition to those of the Graduate Council (as specified in the Master's Degree section at the front of this catalog).
**Thesis Option**

Upon consultation with the department head, the student will be assigned a major professor who acts as chair of the student's advisory committee. The student and the major professor will assemble a graduate advisory committee consisting of the major professor and a minimum of two additional faculty, each holding the rank of assistant professor or above. At least one-half of the committee members must hold teaching appointments. The advisory committee must be formalized by the end of the second semester of graduate study.

An approved program of study must be developed and submitted by the end of the second semester of graduate study. A minimum of 24 hours of graduate coursework is required in the program of study, exclusive of 6 hours of 500 Thesis. The program of study is subject to the approval of the student's advisory committee, and must meet the following requirements.

**Hours Credit**

<table>
<thead>
<tr>
<th>Courses</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Courses numbered above 503</td>
<td>12</td>
</tr>
<tr>
<td>Courses within the major (excluding 500-level courses numbered 500, 502, and 503)</td>
<td>9</td>
</tr>
<tr>
<td>500 Thesis</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total 30</strong></td>
<td></td>
</tr>
</tbody>
</table>

1. Must be taken three times during the course of the program, the last of which must be in the student's final semester before graduation.
2. Courses that are in the major include those in environmental and soil sciences, Geology 510, and Environmental Engineering 535. The student's committee may require additional coursework beyond the 24 hours if the student's progress or background indicates a need or deficiency.

During the first two semesters of graduate study, the student must develop a research problem and present the written proposal to his/her committee. This must be done prior to enrollment in 500.

The student must pass a final oral exam (administered by the advisory committee) that integrates the student's thesis and coursework. The student is expected to be conversant in the soil and environmental sciences, particularly in the thesis and allied areas.

A student who has started a degree program under the thesis option is not eligible to transfer to the non-thesis option after the end of the first semester of graduate study or after receiving a graduate assistantship stipend for more than one semester.

**Non-Thesis Option**

A student desiring the non-thesis option must declare his/her intention before the beginning of the second semester of study. The student must meet the following requirements, in addition to those of the Graduate Council (as specified in the Master's Degree section at the front of this catalog).

Upon consultation with the department head, the student will be assigned a major professor who acts as chair of the student's advisory committee. The student and the major professor will assemble a graduate advisory committee consisting of the major professor and a minimum of two additional faculty, each holding the rank of assistant professor or above. At least one-half of the committee members must hold teaching appointments. The advisory committee must be formalized by the end of the second semester of graduate study.

An approved program of study must be developed and submitted by the end of the second semester of graduate study. A minimum of 33 hours of graduate coursework is required. The program of study is subject to the approval of the student's advisory committee and must meet the following requirements.

**Hours Credit**

<table>
<thead>
<tr>
<th>Courses</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental and Soil Sciences 503 (3 times-1 hour)</td>
<td>3</td>
</tr>
<tr>
<td>593 Special Problems in Environmental and Soil Sciences</td>
<td>3</td>
</tr>
<tr>
<td>Courses numbered above 503 (exclusive of 593)</td>
<td>18</td>
</tr>
<tr>
<td>Courses within the major (excluding 500 and 502)</td>
<td>12</td>
</tr>
</tbody>
</table>

1. Must be taken three times during the course of the program, the last of which must be in the student's final semester before graduation.

2. Courses that are in the major include those in environmental and soil sciences, Geology 510, and Environmental Engineering 535. The student's committee may require additional coursework beyond the 33 hours if the student's progress or background indicates a need or deficiency.

In lieu of a thesis, students are required to complete 3 hours of 593 by participating in a single research program for a period of twelve weeks. The advisory committee approves the research problem. Satisfactory completion of this requirement requires a written, original research report that is acceptable to the student's committee.

A comprehensive written examination that integrates the student's coursework and research problem must be passed. The exam is developed and administered by the advisory committee.

A student who has started a degree program under the non-thesis option may transfer to the thesis option upon approval of a potential major professor and the department head.

**DOCTOR OF PHILOSOPHY**

**PLANTS, SOILS, AND INSECTS MAJOR**

**ENVIRONMENTAL AND SOIL SCIENCES CONCENTRATION**

A doctorate with a major in plants, soils, and insects and a concentration in environmental and soil sciences is offered under a multi-departmental doctoral program. Three departments participate—Plant Sciences, Entomology and Plant Pathology, and the soils faculty in Biosystems Engineering and Soil Science. Other concentrations within the plants, soils, and insects doctoral program include bioactive natural products, crop sciences, entomology, horticulture, integrated pest management, plant improvement, plant pathology, and weed biology. Focus areas in the environmental and soil sciences concentration include soil and water chemistry; nutrient management; pedology, genesis and classification; environmental climatology; soil biology and biochemistry; and soil physical processes. See the environmental and soil sciences doctoral concentration home page for additional information, http://bioengr.ag.utk.edu/graduate/, or contact a faculty member in the area of interest.

**Admission**

Submit application, fee, official transcripts, and scores from the general portion of the Graduate Record Examination to the Office of Graduate and International Admissions. Submit résumé, three letters of reference (or three Graduate Rating Forms), photostat of Graduate Record Examination scores, and a short statement of professional goals and reasons for applying to Environmental and Soil Sciences Doctor of Philosophy Program Coordinator, Biosystems Engineering and Soil Science Department, The University of Tennessee, Knoxville, 2506 E.J. Chapman Drive, Knoxville, Tennessee 37996-4531. In the statement letter and application, interest in the environmental and soil sciences concentration should be indicated.

**Requirements**

The student and the major professor will select a minimum of three additional faculty, holding the rank of assistant professor or above, to serve on the student's doctoral committee. The major professor and two committee members must be approved to direct doctoral research by the Graduate Council. At least one member of the committee must be from outside the department. The doctoral committee must be formalized by the end of the second semester of graduate study.

An approved program of study must be submitted by the end of the second semester of graduate study. A candidate for the doctoral degree must complete a minimum of 24 hours of graduate coursework beyond the master's degree. Candidates not having a master's degree must complete a minimum of 48 hours of graduate coursework beyond the baccalaureate degree, 24
hours of which must be numbered 503 or higher. A minimum of 12 of the 24 hours, or 30 of the 48 hours, must be graded A-F. At least 9 hours of the student’s coursework must be from outside the plants, soils, and insects major and a minimum of 6 hours of courses numbered 601 or higher must be taken at University of Tennessee, Knoxville. In addition, 24 hours of course 600 Doctoral Research and Dissertation are required.

Satisfactory preparation of a written dissertation proposal and an oral defense to the student’s committee are required. These must be completed during the first two semesters of graduate study and before enrollment in 600.

Both written and oral sections of the comprehensive examination must be passed. The candidate will be tested on his/her knowledge of the proposed dissertation and related fields. The student is expected to be conversant in the wide area of soil and environmental sciences.

Environmental and Soil Sciences 603 must be taken three times during the course of the program, the last of which must be in the student’s final semester before graduation.

Preparation of a written dissertation and its oral defense to the student’s doctoral committee are required. Please see the Degree Program Requirements/Doctoral Degree section at the front of this catalog for additional information.

DOCTOR OF PHILOSOPHY
BIOSYSTEMS ENGINEERING MAJOR

Admission

Students applying for admission into the doctoral program must submit evidence of ability to perform and report independent research to the satisfaction of the faculty of the department. An approved master’s thesis will usually be acceptable for this purpose.

Requirements

To earn a degree, each doctoral student must complete at least 75 hours of approved graduate credit (beyond the baccalaureate degree) in biosystems engineering and supporting areas (engineering, computational methods, agricultural and biological sciences, and other related areas). Of the 75 hours, 48 must be in courses numbered greater than 500 (including 24 hours of course 600) and 6 hours of courses at the University of Tennessee, Knoxville, numbered greater than 600. Other specific requirements for the minimum 75 hours are listed below.

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biosystems Engineering 619 and other major subject courses</td>
</tr>
<tr>
<td>Coursework in computational methods</td>
</tr>
<tr>
<td>Program electives</td>
</tr>
<tr>
<td>2Biosystems Engineering 603 Seminar (1)</td>
</tr>
<tr>
<td>600 Dissertation</td>
</tr>
<tr>
<td><strong>Total 75</strong></td>
</tr>
</tbody>
</table>

1 Mathematics, computer science, statistics, or any course containing appropriate computational components that may be approved by the department.

2 Must be taken three times during the course of the program, the last of which must be in the student’s final semester before graduation.

In addition to completing the minimum 75 hours of graduate credit required for a degree, each doctoral student must also pass a comprehensive examination as required by the Graduate Council.
DOCTOR OF PHILOSOPHY
PLANTS, SOILS, AND INSECTS MAJOR

BIOACTIVE NATURAL PRODUCTS
CONCENTRATION

ENTOMOLOGY CONCENTRATION

INTEGRATED PEST MANAGEMENT
CONCENTRATION

PLANT PATHOLOGY CONCENTRATION

A Doctor of Philosophy degree with a major in plants, soils, and insects and concentrations in bioactive natural products, entomology, integrated pest management, and plant pathology is offered under a multi-departmental doctoral program. Three departments participate – Plant Sciences, Entomology and Plant Pathology, and the soils faculty in Biosystems Engineering and Soil Science. Other concentrations within the plants, soils, and insects major include crop sciences, environmental and soil sciences, horticulture, plant improvement, and weed biology. Please see the doctoral program links on the homepage of the Department of Entomology and Plant Pathology for additional information, http://eppserver.ag.utk.edu/, or contact a faculty member in the area of interest.

Admission

Submit application, fee, official transcripts, and scores from the general portion of the Graduate Record Examination to the Office of Graduate and International Admissions. Submit résumé, three letters of reference (or three Graduate Rating Forms), photocopy of Graduate Record Examination scores, and a short statement of professional goals and reasons for applying to Entomology and Plant Pathology Doctor of Philosophy Program Coordinator, Department of Entomology and Plant Pathology, 2431 Joe Johnson Drive, 205 Plant Sciences Building, The University of Tennessee, Knoxville, Tennessee, 37996-4560. In the statement letter and application, the concentration of interest and intended major professor should be indicated.

Requirements

The student and the major professor will select a minimum of three additional faculty, holding the rank of assistant professor or above, to serve on the student’s doctoral committee. The major professor and two committee members must be approved to direct doctoral research by the Graduate Council. At least one member of the committee must be from outside the department. The doctoral committee must be formalized by the end of the second semester of graduate study.

Submission of an approved program of study by the end of the second semester of graduate study is required. A candidate for the doctoral degree must complete a minimum of 24 hours of graduate coursework numbered 503 or higher beyond the master’s degree. Candidates not having a master’s degree must complete a minimum of 48 hours of graduate coursework beyond the baccalaureate degree, 24 hours of which must be numbered 503 or higher. A minimum of 12 of the 24 hours, or 30 of the 48 hours, must be graded A-F. At least 9 hours of the student’s coursework must be from outside the plants, soils, and insects major, and a minimum of 6 hours of courses numbered 601 or higher must be taken at the University of Tennessee. In addition, 24 hours of course 600 Doctoral Research and Dissertation are required.

Satisfactory preparation of a written dissertation proposal and an oral defense to the student’s committee are required. These must be completed during the first two semesters of graduate study and before enrollment in 600.

Both written and oral sections of the comprehensive examination must be passed. The candidate will be tested on his/her knowledge of the proposed dissertation and related fields.

Presentation of at least two departmental seminars (2 hours of Entomology and Plant Pathology 640) and an exit seminar (no credit) are required.

Satisfactory preparation of a written dissertation and an oral defense to the student’s doctoral committee are required.

See the Degree Program Requirements/Doctoral Degree section at the front of this catalog for additional information.

DEPARTMENT OF FOOD
SCIENCE AND TECHNOLOGY

http://foodscience.utk.edu

P.M. Davidson, Interim Head
David A. Golden, Graduate Liaison

Professors
Davidson, P.M., PhD ........................................... Washington State
Draughon, F.A., PhD ............................................ .Georgia
Goan, H.C., PhD .................................................... .Michigan State
Morris, W.C., PhD ................................................ Iowa State

Associate Professors
Golden, D.A., PhD .................................................. Georgia
Loveday, H.D., PhD ................................................ Kansas State
Mount, J.R., PhD ..................................................... Ohio State
Zivanovic, S., PhD .................................................... Arkansas

Assistant Professors
D’Souza, D., PhD ..................................................... Georgia
Harte, F.M., PhD ..................................................... Washington State
Zhong, Q., PhD ....................................................... North Carolina State

Emeriti Faculty
Brekke, C.J., PhD .................................................. Wisconsin
Penfield, M.P., PhD .................................................... Tennessee

MAJOR DEGREES
Food Science and Technology MS
Food Science and Technology PhD

Food chemistry concentration
Food microbiology concentration
Food processing concentration
Sensory evaluation of foods concentration

Students in the doctoral program may choose research in the concentration areas of food chemistry, food microbiology, food processing, or sensory evaluation of foods. Commodity interests (meats, dairy, fruits, vegetables, bakery products) can be emphasized in any of the areas by careful selection of courses and the research topic. Minors are available in cognate fields. For detailed information, contact the department head.

Admission

Admission requirements of the Graduate Council of the University of Tennessee, Knoxville, apply. In addition, applicants must submit scores from the general section of the Graduate Record Exam, a written statement of educational and career goals, and Graduate Rating Forms or letters of recommendation from at least three people familiar with the applicant’s scholastic ability and professional potential. Admission to the program is contingent upon faculty evaluation of the applicant’s undergraduate/graduate grade point average, Graduate Record Examination scores, rat-
ig forms, relevant work experience, and scores from the Test of English as a Foreign Language (TOEFL), if applicable.

**MASTER OF SCIENCE**

**FOOD SCIENCE AND TECHNOLOGY MAJOR**

Applicants must have a Bachelor of Science in food technology, food science, or a related scientific field.

**Requirements**

**Thesis Option**

- Prior to research for the thesis, the student must develop a detailed written research plan. Registration for 6 hours of 500 Thesis is required.
- In addition to the thesis requirement, a minimum of 24 hours of graduate coursework is required. This work must be approved by the student's committee and a minimum of 14 hours must be courses numbered above 500. The committee may require additional coursework if the student’s progress or background indicates such need.
- All students are required to take 2 hours of 501 Seminar in their program and are expected to attend this course and participate in discussions during their master’s program.
- An oral final examination covering the thesis and coursework is required.

**Non-Thesis Option**

- In lieu of a thesis, students are required to complete a problem in cooperation with their employer (company or governmental agency) and their faculty committee. Students working on a problem must register for 6 hours of 503.
- In addition to the requirement for 6 hours of 503, a minimum of 24 hours of graduate coursework is required. This work must be approved by the student’s committee and a minimum of 14 hours must be courses numbered above 500. The committee may require additional coursework if the student’s progress or background indicates such need.
- All students are required to take 2 hours of 501 Seminar in their program and are expected to attend this course and participate in discussions during their master’s program. Completion of 510 or equivalent is also required.
- Students will be required to take a written comprehensive examination covering their coursework. In addition, an oral final examination covering the problem and coursework is required. The oral examination will be held on the Knoxville campus.

**DOCTOR OF PHILOSOPHY**

**FOOD SCIENCE AND TECHNOLOGY MAJOR**

**Requirements**

- Completion of a master’s degree in the field, or a closely related field, or passing a special qualifying examination is required for admission.
- A dissertation is required for the Doctor of Philosophy degree. Each student must develop a detailed written plan for the dissertation research.
- A minimum of 72 hours beyond the bachelor’s degree, excluding credit for the master’s thesis, is required. Of this, 24 hours must be 600 Doctoral Research and Dissertation.
- At least 24 hours of coursework numbered above 500, exclusive of doctoral research and dissertation, are required. At least 6 of the 24 hours must be courses numbered above 600.
- A minimum of 6 hours of courses for graduate credit must be taken outside the Department of Food Science and Technology.
- All candidates must complete 601 (2 hours) and are expected to attend 601 during their PhD program.
- Each candidate must pass both written and oral comprehensive examinations prior to admission to candidacy. Major professors will advise candidates on competencies expected. A final oral examination is required that includes a defense of the dissertation and subject matter that the student’s committee considers appropriate.

**DEPARTMENT OF FORESTRY, WILDLIFE AND FISHERIES**

http://fwf.ag.utk.edu/

Keith L. Belli, Head

D.G. Hodges, Graduate Liaison

**Professors**

- Belli, K.L., PhD .......................... Minnesota
- Buehler, D.A., PhD .......................... Virginia Tech
- Dearder, B.L., PhD .......................... Colorado State
- Fly, J.M., PhD .......................... Michigan
- Hodges, D.G., PhD .......................... Georgia
- Houston, A.T., PhD .......................... Tennessee
- Ostermeier, D.M., PhD .......................... Syracuse
- Rials, T.G., PhD .......................... Virginia Tech
- Schlarbaum, S.E., PhD .......................... Colorado State
- Speer, C.A., PhD .......................... Utah State
- Strange, R.J., PhD .......................... Oregon State
- Wilson, J.L., PhD .......................... Tennessee

**Associate Professors**

- Buckley, D.S., PhD .......................... Michigan Tech
- Bozell, J.J., PhD .......................... Colorado State
- Clatterbuck, W.W., PhD .......................... Mississippi State
- Harter, M.A., PhD .......................... Clemson
- Hickling, G.J., PhD .......................... Western Ontario (Canada)
- Keyser, P.D., PhD .......................... Virginia Tech
- Muller, L.I., PhD .......................... Georgia
- Wang, S., PhD .......................... Nanjing Forestry (China)
- Young, T.M., MS .......................... Tennessee

**Assistant Professors**

- Eda, S., PhD .......................... Japan
- Franklin, J.A., PhD .......................... Alberta (Canada)
- Gray, M.J., PhD .......................... Texas Tech
- Harper, D.P., PhD .......................... Washington State
- Henning, J.G., PhD .......................... Virginia Tech
- Henry, T.B., PhD .......................... Auburn
- Labbe, N., PhD .......................... Bordeaux (France)
- Minser, W.G., MS .......................... Tennessee
- Muller, L.I., PhD .......................... Georgia
- Moschler, W., MS .......................... Virginia Tech

**Adjunct Faculty**

- Albright, R., PhD .......................... Southern Illinois
- Clark, J.D., PhD .......................... Arkansas
- Franzreb, K., PhD .......................... Arizona State
- Hannom, K.O., PhD .......................... Michigan Tech
- Peine, J., PhD .......................... Arizona
- Reams, G.A., PhD .......................... Maine
- Van Manen, F., PhD .......................... Tennessee

**Emeriti Faculty**

- Dimnick, R.W., PhD .......................... Wyoming
- Hill, S., T.K., PhD .......................... Auburn
- Rennie, J.C., PhD .......................... North Carolina State
- Schneider, G., PhD .......................... Michigan State
- Stumbo, D.A., PhD .......................... Minnesota

**MAJORS**

<table>
<thead>
<tr>
<th>DEGREES</th>
<th>Forestry</th>
<th>MS</th>
<th>Natural Resources</th>
<th>PhD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wildlife and Fisheries Science</td>
<td>MS</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
The mission of the Department of Forestry, Wildlife and Fisheries is to advance the management, utilization, and appreciation of natural resources in Tennessee, the region, and beyond through programs in teaching, research, and extension.

MASTER OF SCIENCE
FORESTRY MAJOR
WILDLIFE AND FISHERIES SCIENCE MAJOR

Admission
For admission, the student must have a bachelor’s degree from an accredited institution in forestry, wildlife, fisheries, or another natural resource area. Applicants must take the general Graduate Record Examination with minimum scores required. Graduate Rating Forms or letters of recommendation from three individuals familiar with the applicant’s academic ability are required. The department also has an application that must be submitted at the time of application to the Office of Graduate and International Admissions.

Requirements
Both thesis and non-thesis options are available for the major in forestry; a thesis is required in the wildlife and fisheries science major.

Thesis Option
• Prior to research for the thesis, the student is required to develop a detailed written research proposal. Registration for 6 hours of thesis (Forestry 500 or Wildlife and Fisheries Science 500) is required.
• A graduate committee of no fewer than three faculty members must be selected by the second semester of residence. At least one member must be from outside the department. In addition to the thesis requirement, a minimum of 24 hours of graduate coursework is required. This work must be approved by the student's committee and no more than 10 hours of the minimum 30 can be below the 500 level. The committee may require additional coursework if the student's progress or background indicates such need.
• All students are required to include Forestry 512 or Wildlife and Fisheries Science 512 Seminar, in their programs. This is required of each graduate student in residence fall semester.
• An oral examination covering the thesis and coursework is required.

Non-Thesis Option (Forestry major only)
• 35 hours of graduate coursework of which 23 must be at the 500 level or above is required.
• A graduate committee of no fewer than three faculty members will be selected. At least one member shall be from outside the department. The committee will meet and schedule the student’s program during the first semester in residence.
• Three hours of Forestry 511 are required.
• Nine hours of coursework in the department must be at the 500 level or above, exclusive of Forestry 511.
• Final comprehensive written and oral examinations shall be taken upon completion of no fewer than 28 hours of approved study.

DOCTOR OF PHILOSOPHY
NATURAL RESOURCES MAJOR

The doctoral program with a major in natural resources emphasizes interdisciplinary research approaches toward the understanding and management of natural resources in a broad context. Areas of study include forest, wildlife, and fisheries biology; ecosystem function and structure; natural resource economics and policy; human dimensions of natural resource management; natural resource organization administration and management; wood sciences; and multidisciplinary natural resources management.

Admission
Applicants to the PhD program should normally should have completed a master’s degree prior to beginning the doctoral program. Specific admission requirements include
• A minimum grade point average of 3.00 on a 4.00 scale.
• A minimum composite score from the general Graduate Record Examination on the verbal, quantitative, and analytical sections of 1650, with a minimum of 1100 on the verbal and quantitative sections.
• A statement of professional goals, natural resource management philosophy, and reasons for applying to the program.
• Three letters of reference from individuals capable of evaluating the applicant’s potential for graduate work in interdisciplinary natural resource management.

Requirements
A candidate for the doctoral degree must complete 72 hours of coursework beyond the bachelor’s degree. Forty-eight hours must be in graduate coursework approved by the student's doctoral committee. Up to 24 hours of master's-level coursework may be applied to the 48-hour requirement. A minimum of 6 hours must be taken in university courses at the 600 level, exclusive of dissertation hours. Specific requirements are listed below.

Research Methods and Analysis (9 hours in at least two of the subject areas)
• Research/Experimental Design.
• Statistics/Econometrics/Biometrics.
• GIS/Remote Sensing.

Core Subject areas (33 hours to be determined by doctoral committee)

Professional Development (7 hours)
• Teaching – All students will be expected to complete Forestry, Wildlife and Fisheries 601 and assist in teaching a course during their tenure in the program.
• Problem Solving – Forestry, Wildlife and Fisheries 610 will be required of all doctoral students. This course will include participation in an interdisciplinary team to address a significant national or regional natural resource issue.
• Professional Communication – All students will be required to complete Forestry, Wildlife and Fisheries 612 two times as part of their program of study. Part of the seminar requirement will consist of assisting in the development and conduct of Forestry 512 and Wildlife and Fisheries 512.

Forestry, Wildlife and Fisheries 600 Doctoral Research and Dissertation (24 hours)
A doctoral committee consisting of at least four faculty members must be identified by the student and major professor. At least two of the committee members must be from the Department of Forestry, Wildlife and Fisheries and one member must be from an academic unit other than Forestry, Wildlife and Fisheries. Three of the committee members, including the major professor, must be approved by the Graduate Council to direct doctoral research. The committee should be formed during the first year of the student’s program.
All students are required to successfully complete an oral and written examination on all coursework completed as part of the Doctor of Philosophy requirements. The exam is scheduled when the student has completed all or nearly all of the coursework. The doctoral committee will determine the content, nature, and schedule of the comprehensive exam and will certify the results.
During the first year, the student should develop a research prospectus that outlines the research problem to be addressed as part of his/her doctoral research. The prospectus is presented to the student’s committee and the committee will approve the research topic and approach.

All students are required to complete, present, and defend a dissertation. The student should provide each member of the committee with a copy of the dissertation at least two weeks prior to the scheduled defense. All students are required to present a seminar on their dissertation as part of the degree requirements. The seminar can be part of the dissertation defense or presented before the formal defense.

Environmental Policy Minor

The department participates in a program designed to give graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. See Department of Political Science for program description.

DEPARTMENT OF PLANT SCIENCES

http://plantsciences.utk.edu/

G. Neil Rhodes, Head
Dennis R. West, Graduate Liaison

Professors
Albrecht, M.L. (Associate Dean), PhD ........................................... Ohio State
Allen, F.L., PhD ................................................................. Minnesota
Augé, R.M., PhD ................................................................. Washington State
Bates, G.E., PhD ................................................................. Georgia
Denton, H.P., PhD ................................................................. North Carolina State
Deyton, D.E., PhD ................................................................. North Carolina State
Hayes, R.M., PhD ................................................................. Illinois
Lockwood, D.W., PhD .......................................................... Purdue
Miller, R.D., PhD ................................................................. Kentucky
Mueller, T.C., PhD ................................................................. Georgia
Rhodes, G.N., PhD ................................................................. North Carolina State
Samples, T.J., PhD ................................................................. Oklahoma State
Wszelaki, A.L., PhD ............................................................... California (Davis)
Menendez, G.L., MS ............................................................... Tennessee
Sams, C.E. (Austin Distinguished Professor), PhD ......................... Michigan State
Stewart, C.N. (Racheff Chair), PhD ............................................. Virginia Tech
West, D.R., PhD ................................................................. Nebraska

Associate Professors
Chen, F., PhD ................................................................. California (Davis)
Cheng, Z.M., PhD ................................................................. Cornell
Gwathmey, C.O., PhD .......................................................... California (Riverside)
Hamilton, S.L., EdD ............................................................... Tennessee
Kligerman, M.E., PhD ............................................................. Georgia
Menendez, G.L., MS .............................................................. Tennessee
Pantalone, V.R., PhD ........................................................... North Carolina State
Rogers, S.M., MLA ............................................................... Georgia
Stewart, C.E., MLA ............................................................... Georgia

Assistant Professors
Bailey, W.A., PhD ............................................................... Virginia Tech
Belz, S.M., PhD ................................................................. North Carolina State
Kopsell, D.A., PhD ............................................................... Georgia
Main, C., PhD ................................................................. Tennessee
McElroy, J.S., PhD ............................................................... North Carolina State
Reidel, E., PhD ................................................................. Cornell
Smith, B.R., PhD ................................................................. Cornell
Shroger, J.C., PhD ................................................................. Michigan State
Steckel, L.E., PhD ................................................................. Illinois
Thompson, M.A., PhD .......................................................... Tennessee
Wszelaki, A.L., PhD ............................................................. California (Davis)
Zale, J.M., PhD ................................................................. Saskatchewan (Canada)

Instructors
Flanagan, P.C., MS ............................................................... Tennessee
Osburn, L.D., MS ............................................................... Tennessee

Adjunct Faculty
Airhart, D.L., PhD ............................................................... Georgia
Ott, R.J., MBA ................................................................. Tennessee
Pepin, T. MS ................................................................. Tennessee

Emeritus Faculty
Coffey, D.L., PhD ............................................................... Purdue
McDaniel, G.L., PhD ............................................................ Iowa State

MAJORS DEGREES

Plant Sciences
MS Plants, Soils, and Insects
PhD Crop sciences concentration
Horticulture concentration
Plant improvement concentration
Weed biology concentration

The Department of Plant Sciences offers two graduate degrees – the Master of Science with a major in plant sciences and the Doctor of Philosophy with a major in plants, soils, and insects. For additional information, please visit the department homepage. Inquiries may be directed to the Chair, Graduate Committee, Department of Plant Sciences, The University of Tennessee, Knoxville, Tennessee 37996-4561, or plantsciences@utk.edu.

MASTER OF LANDSCAPE ARCHITECTURE

LANDSCAPE ARCHITECTURE MAJOR

This program is pending approval from the Tennessee Higher Education Commission. Students will be admitted to the major should the program be approved.

The Master of Landscape Architecture is an intercollegiate program composed of faculty from the College of Architecture and Design, the College of Agricultural Sciences and Natural Resources, and related colleges and disciplines. Faculty in the College of Architecture and Design and the College of Agricultural Science and Natural Resources are responsible for the core curriculum. The first professional degree (MLA Track I) is largely designed to prepare students as critically engaged and well-trained practitioners. The post-professional degree (MLA Track II) provides opportunities for research-oriented studies located in subdisciplines as well as self-directed research in alternative areas of interest. (For a full program description, see Landscape Architecture in the College of Architecture and Design section of this catalog.)

MASTER OF SCIENCE PLANT SCIENCES MAJOR

Both thesis and non-thesis options are available for the major in plant sciences, each guided by a graduate committee consisting of the major professor and two or more other faculty members. Studies are possible in a wide variety of commodities and subject areas, including fruits, vegetables, grains, turfgrass, woody ornamentals, and public horticulture. Students may specialize in one or more disciplines, including plant protection, molecular biology, breeding, genetics, biotechnology, physiology, ecology, culture and management.

Admission

Students should have a bachelor’s degree from an accredited college or university with evidence of ability to do work of graduate quality. Applicants are expected to have a minimum cumulative grade point average of 2.70 on a 4.00 scale.

Application must be made to both the Office of Graduate and International Admissions and the Department of Plant Sciences. The departmental application requires three letters of reference (or three Graduate Rating Forms) from persons capable of assessing the applicant’s suitability for graduate work in plant science, resume, and a statement of professional goals and reasons for applying to the program. Applicants are also required to submit scores from the general Graduate Record Examination to Graduate and International Admissions (send photocopy to department). Successful applicants will usually score above the 50th percentile on the verbal, quantitative and analytical writing sections of the Graduate Record Examination. Prior undergraduate coursework in mathematics, biology and chemistry is recommended.
Requirements

- Approval of the academic program by the master’s committee.
- Successful completion of 12 hours of coursework in the major at the graduate level (400 or above), exclusive of Plant Sciences 502 and 503. Two of these hours must be Plant Sciences 504. Six of these hours may be satisfied by Biochemistry and Cellular and Molecular Biology 404, 522, 523; Animal Science 571; Environmental and Soil Sciences 434, 444, 516; Ecology and Evolutionary Biology 414, 433, 560; Information Sciences 560; Art 481; or Geography 439.
- Presentation of at least two departmental seminars.

Please see the Degree Program Requirements/Master’s Degree section at the front of this catalog for additional information.

Thesis Option

- Satisfactory preparation of a written thesis proposal and its oral defense to the student’s committee.
- Successful completion of 30 hours of graduate credit, which must include 6 hours of 500. At least 14 of these hours must be numbered 501 or above.
- Preparation of a written thesis and its oral defense.

Non-Thesis Option

- Successful completion of 34 hours of graduate credit, which must include 2-4 hours of Plant Science 503. At least 22 of these hours must be at the 500 level or above.
- Completion of a project and preparation of a written report summarizing the project.
- Passing written and oral examinations covering the project and coursework.

DOCTOR OF PHILOSOPHY

PLANTS, SOILS, AND INSECTS MAJOR

CROP SCIENCES CONCENTRATION

HORTICULTURE CONCENTRATION

PLANT IMPROVEMENT CONCENTRATION

WEED BIOLOGY CONCENTRATION

The Doctor of Philosophy with a major in plants, soils, and insects, and concentrations in crop sciences, horticulture, plant improvement, and weed biology is offered under a multi-departmental doctoral program. Three departments participate – Plant Sciences, Entomology and Plant Pathology, and the soils faculty in Biosystems Engineering and Soil Science. Other concentrations within the plants, soils, and insects major include bioactive natural products, entomology, environmental and soil sciences, integrated pest management, and plant pathology. Please see the Plant Sciences homepage for additional information, http://plantsciences.utk.edu, or contact a faculty member in the area of interest.

Students may select a formal concentration as a focus of study but this is not a requirement. We recognize that modern research approaches in plant sciences often overlap. Students may specialize in one or more approaches, including plant biotechnology, molecular biology, breeding, genetics, physiology, ecology, culture and management. Research may feature fruits, vegetables, turfgrass, weeds, woody ornamentals, cereals, grains, fiber, public horticulture or model plant systems.

Admission

Submit application, fee, official transcripts, and scores from the general portion of the Graduate Record Examination to the Office of Graduate and International Admissions. Submit resume, three letters of reference (or three Graduate Rating Forms), photocopy of Graduate Record Examination scores, and a short statement of professional goals and reasons for applying to Plant Sciences Doctor of Philosophy Program Coordinator, Department of Plant Sciences, 2431 Joe Johnson Drive, 252 Plant Sciences Building, The University of Tennessee, Knoxville, Tennessee 37996-4561. In the statement letter and application, the concentration of interest and the intended major professor should be indicated.

Requirements

The student and the major professor will select a minimum of three additional faculty, holding the rank of assistant professor or above, to serve on the student’s doctoral committee. The major professor and two committee members must be approved to direct doctoral research by the Graduate Council. At least one member of the committee must be from outside the department. The doctoral committee must be formalized by the end of the second semester of graduate study.

An approved program of study must be submitted by the end of the second semester of graduate study. A candidate for the doctoral degree must complete a minimum of 24 hours of graduate coursework beyond the master’s degree. Candidates not having a master’s degree must complete a minimum of 48 hours of graduate coursework beyond the baccalaureate degree. A minimum of 12 of the 24 hours, or 30 of the 48 hours, must be graded A-F. At least 9 hours of the student’s coursework must be from outside the plants, soils, and insects major, and a minimum of 6 hours must be taken in courses numbered 601 or higher at the University of Tennessee. In addition, 24 hours of course 600 Doctoral Research and Dissertation are required.

Satisfactory preparation of a written dissertation proposal and an oral defense to the student’s committee are required. This must be completed during the first two semesters of graduate study and before enrollment in 600.

Both written and oral sections of the comprehensive examination must be passed. The candidate will be tested on his/her knowledge of the proposed dissertation and related fields.

Presentation of at least two departmental seminars (2 hours of Plant Sciences 504), in addition to an exit seminar (no credit) are required.

Satisfactory preparation of a written dissertation and an oral defense to the student’s doctoral committee are required.
The College of Architecture and Design offers, along with professional undergraduate programs in architecture and interior design, a professional graduate program in architecture and a new intercollegiate graduate program in landscape architecture, the latter anticipating students beginning in 2008. All programs in architecture and interior design are fully accredited enabling graduates to pursue licensure throughout the United States. With the only professionally accredited architecture program in the state, the College of Architecture and Design has a strong commitment to the integration of teaching, research, creative activity and service.

Once fully approved by the University of Tennessee and the Tennessee Higher Education Commission, the college will seek accreditation for the new intercollegiate landscape architecture program. Once fully approved by the University of Tennessee and the Tennessee Higher Education Commission, the college will apply for candidacy status with the Landscape Architectural Accreditation Board. Candidacy status signifies that the program is demonstrating reasonable progress toward the attainment of accreditation. The LAAB does consider that graduates of a program that achieves accreditation from candidacy status have graduated from an accredited program.

The college offers graduate degrees in architecture and landscape architecture. Each degree program offers a first professional degree (required for licensure), and post-professional, research-focused options drawing upon the expertise of faculty across the college and the larger university community. The first professional degree programs are designed to accommodate students who come from a variety of academic backgrounds and interests. This includes students who have had little or no previous formal study in either field as well as students holding undergraduate non-professional (4+2) degrees in the disciplines. These students may receive advanced standing in the programs.

All programs in the College of Architecture and Design provide a design-focused education centered on the mission of the college to educate future design professionals. In addition to a high-quality, on campus education, the college offers a wide array of study abroad and off-campus opportunities.

The School of Architecture is proud of its long history and accomplishments and celebrated its 40th birthday in 2005. The college resides in an award-winning facility, providing studio space for every student, a fully equipped woodshop, and state-of-the-art digital technology including laser cutters, 3-D digital modeling equipment, computer pools and an image center for printing and digital reproduction needs. The college has a long-standing tradition to use the state as a laboratory for applied research with a direct benefit for the citizens of Tennessee. Facilities for research, creative activity and service include the Nashville Civic Design Center in collaboration with Vanderbilt University, the Urban Program for Sustainable Design Education (UPSIDE), the Knoxville Downtown Studio and the Green Vision Studio.

The offices of the graduate programs and college administration are located at 224 Art and Architecture Building.

MASTER OF LANDSCAPE ARCHITECTURE
LANDSCAPE ARCHITECTURE MAJOR

(This program is pending approval from the Tennessee Higher Education Commission. Students will be admitted to the major should the program be approved.)

Landscape Architecture is an intercollegiate program composed of faculty from the College of Architecture and Design, the College of Agricultural Sciences and Natural Resources, and related colleges and disciplines. Faculty in the College of Architecture and Design and the College of Agricultural Science and Natural Resources are responsible for the core curriculum.

The landscape architecture major offers two tracks. Track 1 (first professional degree track) is largely designed to prepare students as critically engaged and well-trained practitioners. This track is for students seeking the first-professional degree who already hold a bachelor’s degree or an advanced degree in another field. Track 1 offers two programs of study.

1. A 3-year program for students who come from a variety of academic backgrounds and interests, including those with little or no previous formal study in landscape architecture.
2. A 2-year program for applicants holding four-year degrees from pre-professional landscape architecture or landscape design programs.

Track 2 (post-professional degree track) is for students with an accredited first-professional degree who seek to develop an area of specialization. This track provides opportunities for research-oriented studies in subdisciplines, as well as self-directed research in alternative areas of interest.
Retention in the program is contingent upon evidence of satisfactory progress toward the degree. Individual student progress will be reviewed each semester by the program coordinator. Any questions regarding progress will be reviewed by the Program Coordination Committee.

Mission Statement
The core values of the Master of Landscape Architecture Program are based on a design-centered curriculum that promotes ethical imperatives, critical thinking, and sustainable practices. These values are expressed in the cultural, political, and regional realities of designed and naturally occurring landscapes and the responsibility of landscape stewardship. The program is committed to preparing students for leadership roles in the professional practice of landscape architecture, and in related career paths.

Admission
In addition to meeting the Graduate School’s minimum requirements, the following specific admission requirements to the landscape architecture major must be met.

For MLA Track 1 applicants, a bachelor’s degree with a 3.00 GPA from an accredited college or university is required. International applicants must have an equivalent four-year degree and 3.00 GPA. Candidates with a GPA less than 3.00 may be considered for conditional admission when evidence of exceptional promise is identified. The program requires an essay, three letters of recommendation, and a portfolio illustrating evidence of visual creativity and/or graphic capabilities. A personal onsite interview is desirable but not mandatory. For applicants to the 2-year program with a bachelor’s degree from a 4-year pre-professional landscape architecture or landscape design programs a portfolio showing prior design work is required.

For MLA Track 2 applicants, a Bachelor of Landscape Architecture degree from an LAAB accredited program or foreign equivalent is required. Candidates with a GPA less than 3.00 may be considered for conditional admission when evidence of exceptional promise is identified. Submission of a portfolio, essay, and three letters of recommendation are required. A personal onsite interview is desirable but not mandatory.

The general portion of the Graduate Record Examination is required of all applicants. Applicants should take the GRE at least one semester in advance of application for admission.

Requirements
Track 1 (3-year program)
Requires a minimum of 19 hours of undergraduate preparation and 84 hours of graduate coursework, taking approximately 3 years of full-time study.

Track 1 (2-year program)
Requires a minimum of 60 hours of graduate-level coursework.

Both programs require 6 hours of Landscape Architecture 570 or 500, the latter with a public presentation and oral defense of the thesis. Five directed electives must be chosen from an approved list of courses in the following categories – materials, techniques and technologies; history and theory/criticism; visualization/representation; and environmental stewardship.

No more than 3 directed electives may be in a single category. A minimum of 12 hours of directed electives in the discipline or open electives must be taken at the 500 level.

Track 2
Requires a minimum of 30 semester hours of graduate coursework and requires 6 hours of Thesis 500 with a public presentation and oral defense of the thesis.

SCHOOL OF ARCHITECTURE

Professors
Davis, M.K., MArch .............................................. Harvard
Keioso, R.M., PhD .............................................. Loughborough
Kinzy, S.A., PsyD .............................................. State University of New York (Buffalo)
McRae, J.M. (Dean), MArch ...................................... Rice
Rabun, J.S., PhD .............................................. York
Robinson, M.A., MArch ....................................... Pennsylvania
Schimmenti, M., MArch ......................................... Florida
Shell, W.S., MArch .............................................. Columbia

Associate Professors
Davis, T.K., MArch .............................................. Cornell
DeKay, M., MArch .............................................. Oregon
Debelius, C.A., MArch ......................................... Harvard
Dodds, G., PhD .................................................. Pennsylvania
Fox, D., MArch .................................................. Cranbrook Academy of Art
Klinkhammer, B., Dipl-Ing ...................................... RWTH (Aachen)
Martella, W.E., BArch .......................................... California (Berkeley)
Moir-McClean, T., MArch ...................................... Michigan
Stach, E., Dipl-Ing ................................................ RWTH (Aachen)

Assistant Professors
Ambroziak, B., MArch ........................................... Princeton
Ambroziak, K., MArch .......................................... Princeton
Shelton, T., MPhil ................................................ Cambridge
Stuth, T., MArch ................................................. Wisconsin

Major: Architecture

DEGREE

MAJOR

SCHOOL OF ARCHITECTURE
ARCHITECTURE MAJOR

The graduate program in architecture defines architecture broadly as the creation of human habitats. Architecture at Tennessee is more than the design of individual buildings. Rather, it is dedicated to the shaping of community in the fullest sense of the word. The curriculum reflects the program’s recognition that architecture is fundamentally shaped by environmental and cultural forces. As such, the humanities, social sciences, arts, and applied sciences are all brought to bear on the discipline of architecture. It is through design that such issues can be thoughtfully explored and given physical form. Thus, design plays a central role in this comprehensive and creative process. The college is committed to helping students obtain the requisite knowledge and skills needed to enter and fully participate in the profession of architecture. At the same time, it attempts to maintain a wide vision and critically reach beyond the profession without losing contact with the realities of everyday architectural practice. Designed to be challenging and provocative, the program allows students the opportunity to develop discernment and judgment, enabling them to find their own voices as designers who are accountable contributors to the built environment.

In the United States, most state registration boards require a degree from an accredited professional degree program as a prerequisite for licensure. The National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit U.S. professional degree programs 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. Master’s 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 preprofessional degree is not, by itself, recognized as an accredited degree.

The Master of Architecture program at the University of Tennessee received a full 6-year accreditation as a result of its last NAAB accreditation review.

The School of Architecture offers two tracks leading to the Master of Architecture degree. Track 1 is for students seeking the
first-professional degree who already hold a bachelor's degree or an advanced degree in another field. Track 2 is for students with an accredited first-professional degree who seek to develop an area of specialization. Contact the school for additional information.

Admission
In addition to meeting the Graduate Council's minimum requirements, the following specific admission requirements to the Master of Architecture program must be met.

For Track 1 applicants, a bachelor’s degree with a 3.00 GPA from an accredited college or university is required. International applicants must have an equivalent four-year degree and 3.00 GPA. Candidates with a GPA less than 3.00 may be considered for conditional admission when evidence of exceptional promise is identified. Undergraduate work must include at least 12 semester hours of humanities, a basic understanding of physical principles, systems and analytical procedures and an understanding of mathematical principles and analytical procedures, as well as a general understanding of the use of computers. The school requires an essay and three letters of recommendation. Submission of a portfolio illustrating evidence of visual creativity and/or graphic capabilities is highly recommended. A personal onsite interview is desirable but not mandatory. For those applicants from accredited 4+2 architecture programs, a portfolio is required in addition to the above requirements.

For Track 2 applicants, a Bachelor of Architecture degree from an NAAB accredited program or foreign equivalent is required. Candidates with a GPA less than 3.00 may be considered for conditional admission when evidence of exceptional promise is identified. Submission of a portfolio, an essay, and three letters of recommendation are also required. A personal onsite interview is desirable but not mandatory.

The general portion of the Graduate Record Examination is required of all applicants. Applicants should take the GRE at least one semester in advance of application for admission.

Requirements
Track 1 requires a minimum of 48 semester hours of undergraduate preparation and 60 semester hours of graduate coursework, taking approximately three and a half years of full-time study. A minimum of 4 hours of architectural electives or approved electives from another discipline must be taken at the 500 level or above.

Track 2 requires a minimum of 30 semester hours of graduate coursework.

Both tracks require 6 hours of Thesis 500 with a public presentation and oral defense of the thesis.

Retention in the program is contingent upon evidence of satisfactory progress toward the degree. Student’s progress will be reviewed each semester by the graduate program head. Any questions regarding progress will be reviewed by the Graduate Program Advisory Committee.
The University of Tennessee began as a liberal arts institution. Before the turn of the century, less emphasis was placed on the liberal education. However, the liberal arts continued to thrive, emerging as a college in 1904. Thus, the College of Liberal Arts (now known as the College of Arts and Sciences) is one of the oldest established colleges in the university.

The College of Arts and Sciences consists of a wide array of academic disciplines and interdisciplinary programs. The central purposes of a liberal education include the encouragement of intellectual tolerance, a dedication to the quest for knowledge as a worthwhile goal in and of itself, and the cultivation of a responsible, creative individual mind. These qualities enable one to develop an ability to reason and to express oneself clearly, an incentive to absorb emerging knowledge, and a competence to confront the uncertainties of human experience. Faculty research and creative activity is the foundation on which education in this college is built. As a result of that endeavor, the lives of students are enriched and the world’s body of knowledge grows.

The College of Arts and Sciences offers programs in twenty-seven academic disciplines leading to nine advanced degrees: Doctor of Audiology, Doctor of Philosophy, Master of Arts, Master of Fine Arts, Master of Mathematics, Master of Music, Master of Public Administration, Master of Science, Master of Science in Planning.

Facilities for research and service include the Center for Applied and Professional Ethics, the Center for Environmental Biotechnology, the Center for Psychoanalysis and the Humanities, the Center for Quaternary Studies of the Southeastern United States, the Center for the Study of War and Society, the Child Behavior Institute, the Forensic Anthropology Center, the Hearing and Speech Center, the Institute for Applied Microbiology, the Institute for Resonance Ionization Spectroscopy, the Joint Institute for Heavy Ion Research, the Psychological Clinic, the Science Alliance, and the Social Science Research Institute.

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These materials should be sent directly to the Graduate Secretarial Admissions and all others to the Department of Anthropology. A letter of intent from the applicant indicating career goals, research plans and reasons for selecting the University of Tennessee, Knoxville, Office of Graduate Admissions should also be sent directly to the Department of Anthropology at the same time. In addition, all others must be received in the department by January 15 for admission for the following fall. Because of the structure of first-year studies, MA students should plan to begin their studies in the fall semester.

Requirements

The program leading to the MA is a general curriculum that allows for concentration after completion of a core course sequence. Formal requirements include the following:

- Selection of an MA advisor. This should be done as soon as possible in the student’s program but no later than the end of the first semester in residence. The department graduate secretary must be informed in writing of each student’s advisor.
- A minimum of 30 hours in graduate courses. Twenty-four hours must be in coursework graded A-F. Additional coursework must include three core classes taken in the first year.
- Successful completion of the thesis and final oral examination.
- A graduate-level introductory statistics course, usually Statistics 537.
- All MA students must attend the graduate section of the Anthropology, History, or Classics departments.
- During the first year, comprehensive graduate evaluation examinations are required of all MA students and are based on the content of the core courses. These examinations are given during regularly-scheduled final periods in each core class and are graded by all faculty within the appropriate sub-discipline for each course. At the end of the first year, all MA students are evaluated by the entire faculty and will either be retained or dropped from the program based on their first-year’s performance and scores from the department’s Graduate Evaluation Examination.
- All MA students must attend the graduate section of the visiting lecturer program. To ensure compliance with this requirement, each student is required to register for 1 hour of Anthropology 550 in the fall semester of each year and fulfill all requirements for the course as defined by the instructor. Materials covered by visiting lecturers may appear on the Graduate Evaluation Examination.
- A graduate-level introductory statistics course, usually Statistics 537.
- In the second year of the program, students pursue their concentration area and undertake thesis research. Coursework will be determined through consultation with the student’s advisor and committee (composed of the advisor, at least one other member of the anthropology faculty, and other mutually-agreed upon members).
- Successful completion of the thesis and final oral examination. Normally, students will complete and defend their theses during the spring semester of their second year.
- Electronic submission of the thesis is required by the Graduate School. In addition, bound copies of the thesis are to be provided to the department and to all members of the student’s MA committee.

In addition to the requirements listed above, MA students who have the option of completing a minor in statistics. The statistics minor requires 9 hours of coursework, normally Statistics 537 and 538 plus one additional course from an approved list.
DOCTOR OF PHILOSOPHY
ANTHROPOLOGY MAJOR

In addition to the Graduate Council requirements, requirements for the PhD with a major in anthropology, in the appropriate sequence of completion, are as follows.

Admission

Admission to the PhD program is contingent upon completion of all requirements prior to that level. Master’s thesis candidates at the University of Tennessee, Knoxville, who are conditionally accepted into the PhD program can enroll as doctoral students for the semester following conferral of the MA. Students holding master’s degrees from other institutions must apply by January 15 for admission the following fall and must begin their studies in the fall semester.

Admission to the PhD program is based upon the applicant’s academic record and credentials and also on the fit between an individual’s interest and faculty areas of research. Applicants will not be admitted to the PhD program unless appropriate faculty members are available to chair and serve on the doctoral committee.

Doctoral program applicants should communicate directly with the potential chairperson and two additional members of the anthropology faculty who will be asked to serve on the committee.

Applicants to the PhD program should meet the same academic standards as MA program applicants and furnish the same materials (see Admission under Master of Arts). Admission to the program requires either

- Acceptance of a master’s in anthropology.
- Acceptance of a master’s in another discipline with the provision that the student will follow the first-year program with entering MA students, i.e., complete the core courses (510, 560, 590) and pass the graduate evaluation examinations.

Requirements

Doctoral Committee

A doctoral committee is appointed following admission to the program. In consultation with this committee, the student defines the future program of studies. When the student and committee have agreed upon the specific fields of specialized competence over which the student will be examined, a brief delineation of the fields by the student, approved by the members of the committee, is presented to the department head and the student’s major professor. As early as possible, but no later than a full semester after admission to candidacy, the student must formally present a written dissertation proposal to the department head and advisor.

Residence and Coursework

Every potential PhD candidate must complete two consecutive semesters of full-time residence prior to taking the doctoral comprehensive examination. The student must complete the minimum coursework requirements of the Graduate Council, including at least 9 hours of 500- or 600-level courses outside of anthropology, chosen in consultation with the doctoral committee, particularly the outside member who represents the cognate area. Outside coursework may be taken in a single discipline or be distributed across two or more disciplines as appropriate to the individual’s program of study.

Statistics

Demonstration of competence in statistics by completing Statistics 537 and 538 with a grade of B or better is required.

Language

Students must demonstrate knowledge of one foreign language. This language should normally be French, German, Russian, or Spanish, but another language may be substituted at the committee’s discretion. This requirement may be met by either

- Successful performance on a language examination administered by the appropriate language department. A student electing this alternative should consult with the advisor.
- Completion of the second semester of specialized reading courses for graduate students with a grade of B or better.

The department does not accept completion of the intermediate (200 level) sequence of a language as a formal option for fulfilling the language requirement.

Doctoral Comprehensive Examination

Students must successfully complete a written and oral comprehensive exam.

- Comprehensive Written Examination – When the PhD aspirant has completed all of the foregoing requirements and is judged by the committee to be prepared in the field(s) of concentration, the student will be required to take a comprehensive written examination. The exam will consist of three sections and be given by the student’s committee. All three sections must be taken within seven consecutive days.
- Comprehensive Oral Examination – This examination follows shortly after successful completion of the comprehensive written exam. The major professor acts as chairperson of the committee.

Admission to Candidacy

Upon successful completion of the comprehensive exam and with the formal approval of the Dean of the Graduate School, the student is admitted to candidacy for the PhD degree. The formal dissertation prospectus must be filed no later than one full semester after advancement to candidacy.

Dissertation Research

This period of research and writing will be under the direct guidance of the candidate’s major professor. The major professor will act as chairperson of the candidate’s committee. The candidate must earn a minimum of 24 hours in Anthropology 600 and maintain continuous registration until the dissertation is accepted. The option of presenting publishable papers as a dissertation is not a formal option for the Anthropology Department.

Defense of Dissertation Examination

When the dissertation has been tentatively accepted by the committee, a final oral examination will be held. The committee conducts the exam, which is ordinarily held as a colloquium in which the candidate will expound on the nature and significance of his/her contribution to anthropological knowledge as set forth in the dissertation.

SCHOOL OF ART

http://web.utk.edu/~art

Paul Lee, Director
Suzanne Wright, Associate Director
Tom Riesing, Graduate Liaison

Professors

Brakke, M., MFA .............................................. Yale
Goldenstein, M.B., MFA ................................. Nebraska
Habel, M., PhD ................................................. Michigan
Lee, B., MFA ................................................. Yale
Lee, P., MFA .................................................. Cranbrook
Leland, W.E., MFA ......................................... Tennessee
Lyons, B., MFA ................................................. Arizona State
Magden, N., PhD ......................................... Case Western Reserve
Riesing, T.J., MFA ................................. Nebraska
Staples, C., MFA ................................................. Michigan State
Wilson, D., MFA ................................................. Wisconsin
Yates, S.A., MFA .............................................. North Carolina (Greensboro)

Associate Professors

Brogden, S., MFA ....................... New York State College of Ceramics at Alfred
Dewey, W., PhD ................................. Indiana
Hiles, T.W., PhD ................................. Penn State
Neff, A., PhD ..................................... Pennsylvania
Shmerler, D., MFA ................................. Virginia Commonwealth
Wright, S., PhD ................................. Stanford
work, must satisfactorily complete an oral examination.

dent must produce an exhibition and, in the presence of that

concentration area. The inclusion of an art history faculty mem-

prior to registration for 599. The committee must consist of one

members and a maximum of six members and will be appointed

facilities so that students are available for discussion and criticism.

First 20 hours, with the permission of the faculty, on a part-time

made for working professional designers who may complete their

years courses.

to be evaluated by the faculty.

Further information is available by writing to the School of Art.

Requirements

A minimum of 60 hours to include the following.

• Successful completion of 20 hours of studio in a concen-
tration area. An inter-area program must be approved by
the graduate faculty only after the second semester in res-
dence. Ten hours of concentration must be in second-
year courses.

• A minimum of 9 hours of graduate-level academic (non-stu-
dio) courses of which at least 6 hours are to be in art history.

• 11 hours of electives consisting of any combination of

courses offered by the university for graduate credit.

• Project in Lieu of Thesis (20 hours). A third year of semi-
independent study. Student must have completed all other
 coursework prior to registration.

Four semesters (normally the first 40 hours) beyond the
bachelor's degree are required in residence. An exception is
made for working professional designers who may complete their
first 20 hours, with the permission of the faculty, on a part-time
basis. Residence is defined by the School of Art as a minimum
enrollment of 6 hours per semester and use of School of Art fa-
cilities so that students are available for discussion and criticism.

The candidate's committee will consist of a minimum of three
members and a maximum of six members and will be appointed
prior to registration for 599. The committee must consist of one
faculty member from the candidate's concentration area (design-
nated as chairperson) and a faculty member from outside the
concentration area. The inclusion of an art history faculty mem-
ber on each committee is encouraged.

With the completion of all requirements for the MFA, the stu-
dent must produce an exhibition and, in the presence of that
work, must satisfactorily complete an oral examination.

Academic Standards

• First-year evaluation. At the end of the first two semes-
ters in residence, the student must present a portfolio for
evaluation by the faculty and receive permission to contin-
ue in the program.

• Second-year evaluation. With completion of all course-
work, the student must present work for evaluation by the
faculty and receive permission to register for Project in
Lieu of Thesis.

• If, in a review by the student's major area faculty, the student's
progress is deemed insufficient, the faculty may recommend
a work period without advancement toward the degree, pro-
bation with specific goals set for a specific time, or dismissal.

Art History Minor

A graduate minor in art history may be arranged during the
student's first semester of study with the consent of the student's
area instructors and the art history faculty. Students must com-
plete a minimum of 12 hours in art history that is agreed upon by
the art history faculty after review of previous undergraduate
coursework. A reading knowledge of French, German, or Italian
is a prerequisite, unless waived by the art history faculty. Gradu-
ate Council policy stipulates that a member from the minor unit
must serve on the thesis committee.

DEPARTMENT OF AUDILOGY AND SPEECH PATHOLOGY

http://web.utk.edu/~aspweb/

Lisa Schwarz, Head

Professor

Schwarz, I., PhD ....................................................... Oregon

Associate Professors

Erickson, M., PhD .................................................... Southern California

Flanagan, P., PhD .................................................... Wisconsin

Harkrider, A., PhD ................................................... Texas

Hedrick, M., PhD .................................................... Vanderbilt

Karow, C., PhD .................................................... Texas

Swanson, L., PhD ................................................... Purdue

Thehn, J., PhD ....................................................... Iowa

Assistant Professors

Ha, S., PhD ......................................................... Illinois

Horton-Ikard, R., PhD ................................................. Wisconsin

Johnstone, P., PhD .................................................... Vanderbilt

Pyle, P., PhD ......................................................... Tennessee

Saltuklaroglu, T., PhD ............................................. East Carolina

Von Hapsburg, D., PhD ............................................. Texas

Instructor

Singletary, T., MS .................................................. Colorado State

Clinical Director

Michael, A., PhD ................................................... Vanderbilt

Clinical Faculty

Baker, S., MA ....................................................... Tennessee

Barnes, V., MA ....................................................... Tennessee

Beason, H., AuD ..................................................... Tennessee

Beeler, J., MA ......................................................... Tennessee

Buehler, V., MA ....................................................... Tennessee

Cutler, M., PhD ...................................................... Georgia

Donels, E., MA ....................................................... Tennessee

Humphrey, E., AuD .................................................. Tennessee

Hume, S., PhD ....................................................... Tennessee

Jenkins, K., MA ....................................................... Tennessee

Noss, E., MA ......................................................... Arizona School of Health Sciences

Schay, N., AuD ....................................................... Tennessee

Searfoss, M., AuD ..................................................... Tennessee

Sheridan, C., MA ..................................................... Tennessee

Valentine, D., PhD .................................................. Tennessee

Vaughn, T., MS ....................................................... Eastern Kentucky

Webb, P., MEd ...................................................... Florida

Yeager, K., AuD ....................................................... Tennessee
MAJORS DEGREES
Audiology MA
Aural habilitation concentration
Audiology AuD
Speech Pathology MA
Aural habilitation concentration
Speech and Hearing Science PhD
Audiology concentration
Hearing science concentration
Speech and language pathology concentration
Speech-language science concentration

MASTER OF ARTS

AURAL HABILITATION CONCENTRATION

Requirements
- A full-time externship in the practice of clinical audiology.
- Formal coursework being devoted primarily to.
- Three years of study beyond the baccalaureate degree.

SPEECH PATHOLOGY MAJOR

Requirements
- A minimum of 112 hours, including a minimum of
  - 67 hours of academic coursework at the 500- and 600-levels.
  - 3 hours of directed research in auditory, vestibular, or related communication disorders.
  - 24 hours of clinical practice in audiology.
  - 18 hours of externship in audiology.
  - A qualifying examination.
  - A comprehensive examination.

AURAL HABILITATION CONCENTRATION

(see section below)

DOCTOR OF AUDIOLOGY

AUDIOLOGY MAJOR

The Doctor of Audiology (AuD) program is designed to prepare individuals for professional careers in audiology. The degree program is clinically oriented, with primary emphasis on processes involved in hearing, vestibular function, and communication. The program is designed to meet the entry-level requirements for the practice of audiology established by the Council on Academic Accreditation of the American Speech-Language-Hearing Association. Students will be expected to demonstrate competencies in the following areas:

- Prerequisite knowledge and skills for the practice of audiology.
- Prevention and identification of auditory, vestibular, and related communication disorders.
- Evaluation of auditory, vestibular, and related communication disorders.
- Treatment of auditory, vestibular, and related communication disorders.

The program will normally consist of four calendar years of study beyond the baccalaureate degree with the first three years being devoted primarily to formal coursework, and the last year to a full-time externship in the practice of clinical audiology.

Requirements
- A minimum of 112 hours, including a minimum of
  - 67 hours of academic coursework at the 500- and 600-levels.
  - 3 hours of directed research in auditory, vestibular, or related communication disorders.
  - 24 hours of clinical practice in audiology.
  - 18 hours of externship in audiology.
  - A qualifying examination.
  - A comprehensive examination.

SPEECH AND HEARING SCIENCE MAJOR

Requirements
- A minimum of 112 hours, including a minimum of
  - 67 hours of academic coursework at the 500- and 600-levels.
  - 3 hours of directed research in auditory, vestibular, or related communication disorders.
  - 24 hours of clinical practice in audiology.
  - 18 hours of externship in audiology.
  - A qualifying examination.
  - A comprehensive examination.

AURAL HABILITATION CONCENTRATION

(see section below)

DOCTOR OF PHILOSOPHY

SPEECH AND HEARING SCIENCE MAJOR

The PhD program with a major in speech and hearing science seeks to develop individuals for professional careers in a variety of positions including research and college teaching in the concentration areas of audiology, hearing science, speech and language pathology, or speech-language science. The degree program is research oriented with primary emphasis on processes involved in normal, or disordered speech, language and hearing. Students will be expected to demonstrate their knowledge in areas related to the concentrated field of study. These areas include

- Basic speech, hearing, or language processes.
- Basic speech, hearing, or language disorders or differences.
- Related disciplines providing insight into human communication processes.
- Technical skills in instrumentation and experimental design which enable the student to investigate problems pertaining to speech and hearing processes.

Requirements
- The doctoral program requires successful completion of coursework, research projects, a comprehensive examination and dissertation. The total program includes a minimum of 60 hours with a minimum of
  - 6 hours in a research tool.
  - 6 hours in a cognate field outside the department.
• 24 hours in the major area of study (6 hours must be at the 600 level within the department). These will include:
  a. A minimum of 6 hours on the topic of major interest.
  b. A minimum of 6 hours earned through participation in two different research projects.
  c. 3 hours of Audiology and Speech Pathology 611 (Experimental Design) course (or equivalent).
  d. 3 hours of Audiology and Speech Pathology 655 supervised teaching experience.
• 24 hours in dissertation, course 600, enrollment.

To complete the doctoral program, students must prepare a dissertation and defend it successfully. Students must pass a comprehensive examination with both a written and an oral component before being advanced to candidacy. The doctoral program should be developed in the first year of study and is the responsibility of the student and the doctoral committee.

DEPARTMENT OF BIOCHEMISTRY AND CELLULAR AND MOLECULAR BIOLOGY

http://web.bio.utk.edu/bcmmb/

Bruce D. McKee, Head and Graduate Liaison

Professors
Ganguly, R., PhD ............................... Nebraska
Howell, E., PhD ............................... Lehigh
Joy, D. (Distinguished Scientist), DPhil .... Oxford (UK)
Koontz, J., PhD ............................... Kentucky
McKee, B., PhD ............................... Michigan State
Millhorn, D., PhD ............................ Ohio State
Mullin, B., PhD ............................... North Carolina State
Peterson, C., PhD ............................. Louisiana State
Roberts, D., PhD ............................... California (Davis)
Serperu, E., PhD .............................. Hacettepe
Smith, J., PhD ............................... London (UK)

Associate Professors
Bruce, B., PhD ............................... California (Berkeley)
Dealwis, C., PhD ............................. London
Hall, J., PhD ................................. Illinois
Park, J., PhD ................................. Texas
Prosger, R., PhD ............................. Illinois
von Aimm, A., PhD ........................... East Anglia (UK)

Assistant Professors
Alexandre, G., PhD .......................... Claude Bernard Lyon (France)
Fernandez, E., PhD .......................... Loyola
Guo, H., PhD ................................. Harvard
Jain, N., PhD ................................. Brandeis
Kitazono, A., PhD ............................ Nagasaki (Japan)
Labrador, M., PhD ........................... Madrid (Spain)
Nebenfuer, A., PhD ........................... Oregon State
Shpak, E., PhD ................................ Ohio
Venkatachalam, S., PhD ...........................

Adjunct and Research Faculty
Allison, D., MS ............................ Tennessee
Georgiou, S., PhD .......................... Manchester
Hartman, F., PhD ........................... Tennessee
Mazur, P., PhD ............................... Harvard
O’Neill, H., PhD ............................. Dublin (Ireland)

MAJOR DEGREES
Biochemistry and Cellular and Molecular Biology MS, PhD

Admission

Applicants for graduate study are expected to have a background equivalent to that required of undergraduate majors in this department. This includes a knowledge of the basic principles of biochemistry, cell biology, genetics and physiology. Requirements for admission are

• One year of general biology or the equivalent.

• A minimum of 8 hours of approved biology courses beyond the introductory level and including the subject areas of genetics, cell biology and physiology.
• Two years of chemistry including one year of general chemistry and one year of introductory organic chemistry with laboratory.
• At least one semester of biochemistry.
• One year of calculus.
• One year of physics.
• Graduate Record Examination scores.
• A minimum grade point average of 3.00 out of 4.00.

Otherwise superior students, deficient in one or more of the above requirements, may be admitted at the discretion of the department’s Graduate Recruiting Committee.

MASTER OF SCIENCE
BIOCHEMISTRY AND CELLULAR AND MOLECULAR BIOLOGY MAJOR

Requirements

• Biochemistry and Cellular and Molecular Biology 511, 512, and 515, and 6 hours of 516.
• Completion of course requirements as determined by the candidate’s faculty committee.
• Achievement of a 3.00 or better GPA in all courses taken for graduate credit.
• Participation in 601 and 603 during the entire period of residence. Participation in at least one journal club chosen from among 605-608 for three semesters.
• 6 hours of master’s research and a thesis.
• A final examination that covers both the thesis endeavor and the subject matter of the course requirements.

DOCTOR OF PHILOSOPHY
BIOCHEMISTRY AND CELLULAR AND MOLECULAR BIOLOGY MAJOR

Requirements

• Biochemistry and Cellular and Molecular Biology 511, 512, 515, and 6 hours of 516.
• At least two additional approved graduate courses in the life sciences or chemistry, or physics, or other physical science to be determined upon consultation with the mentor and the dissertation committee. No survey courses will be accepted.
• At least 6 hours of topics offered in 615 or its equivalent.
• Participation in 601 and 603 during the entire period of residence. Participation in at least one journal club chosen from among 605-608 for 6 semesters.
• Comprehensive examination, taken before the end of the third year of study.
• A dissertation reporting the results of original and significant research carried out during the term of candidacy.
• A final oral examination which will be concerned primarily with the student’s dissertation.

Petitioning for Master’s Degree

Students who have passed the comprehensive examination in the PhD program and have completed at least 30 hours of approved coursework for graduate credit, at least two-thirds of which must be at or above the 500 level, may petition the department for award of a master’s degree. The additional requirements for such a degree are
• Preparation of a research manuscript suitable for submission for publication in a major scientific journal and oral defense of that manuscript before an examining committee of three faculty members appointed by the head of the department, at least two of whom shall be members of the department.

or
• Publication of at least one full-length paper in a major scientific journal as senior author.

DEPARTMENT OF CHEMISTRY
http://www.chem.utk.edu
Craig E. Barnes, Head
Charles S. Feigerle, Graduate Liaison

Professors
Adcock, J.L., PhD ........................................... Texas
Baker, D.C., PhD ........................................... Ohio State
Barnes, C.E., PhD ......................................... Stanford
Bartmess, J.E., PhD ...................................... Northwestern
Compton, R.N., PhD ..................................... Tennessee
Cook, K.D., PhD ........................................ Wisconsin
Dadmun, M.D., PhD ...................................... Massachusetts
Feigerle, C.S., PhD ........................................ Colorado
Guiochon, G.A. (Distinguished Scientist, Science Alliance Center of Excellence), PhD ................. Université de Paris (France)
Harrison, R.J., PhD ....................................... Cambridge (UK)
Hinde, R.J., PhD ........................................... Chicago
Kabalka, W. (Robert H. Cole Professor, Alumni Distinguished Service Professor), PhD .............. Purdue
Kovac, J.D., PhD ........................................ Yale
Larne, J.Z., PhD .............................................. Wesleyan
Mays, J.W. (Distinguished Scientist, Science Alliance Center of Excellence), PhD ........................ Akron
Pagni, R.M., PhD .......................................... Wisconsin
Schweitzer, G.K. (Alumni Distinguished Service Professor), PhD ................................. Illinois
Sepean, M.J., PhD .......................................... Iowa State
Williams, T.F. (Alumni Distinguished Service Professor), PhD ................................ London (UK)
Woods, III, C. (Associate to the Chancellor), PhD ........................................ North Carolina State
Xue, Z., PhD ................................................... UCLA

Associate Professors
Musfeldt, J.L., PhD ......................................... Florida
Schell, F.M., PhD .......................................... Indiana
Turner, J.F.C., PhD ......................................... Oxford (UK)

Assistant Professors
Best, M.D., PhD ........................................... Texas
Foister, S., PhD ........................................ California Institute of Technology
Lee, Y., PhD ................................................. Texas
Vogt, F., PhD ............................................. Karlsruhe (Germany)
Zhao, B., PhD ................................................ Akron

MAJOR DEGREES

Chemistry

Analytical chemistry concentration
Environmental chemistry concentration
Inorganic chemistry concentration
Organic chemistry concentration
Physical chemistry concentration
Polymer chemistry concentration

PhD

Analytical chemistry concentration
Chemical physics concentration (with Physics Department)
Environmental chemistry concentration
Inorganic chemistry concentration
Organic chemistry concentration
Physical chemistry concentration
Polymer chemistry concentration
Theoretical chemistry concentration

The faculty of the Department of Chemistry at the University of Tennessee, Knoxville, seek to prepare their students to join the international ranks of professional chemists in fundamental areas of chemistry as well as cross-disciplinary sciences in which chemical expertise plays a critical role in the development of new knowledge and technologies. Students planning to major in chemistry for the master’s or doctoral degree will ordinarily have attained a satisfactory record in the traditional areas of chemistry. The department, however, recognizes that modern chemistry transcends traditional disciplinary divisions. Therefore, it encourages students with undergraduate majors in chemical engineering, the biological sciences, physics, mathematics, computer science, or other fields to apply for admission to our program.

Admission
Admission to the graduate program is decided on a case-by-case basis, taking into consideration an applicant’s undergraduate record (traditionally including courses in general, analytical, inorganic, organic, and physical chemistry), performance on the general Graduate Record Examination (required), and supporting information such as references from previous faculty and research mentors, co-authorship of research presentations or papers, and awards. Recommendation for a student’s initial course of study in graduate school is based on the desired specialization, previous training and experience, and performance on departmental diagnostic exams administered following arrival in the department.

MASTER OF SCIENCE

CHEMISTRY MAJOR
Requirements

The requirements for the MS with a major in chemistry consist of the satisfactory completion of the following requirements.

• Research and a thesis to give 6 to 12 hours of graduate credit in Chemistry 500.

• Participation in seminar (Chemistry 501) during the entire period of graduate study, including the presentation of at least one seminar. (No more than 2 hours may be applied to the course requirements.)

• Prescribed courses based on performance on diagnostic examinations.

• Sufficient graduate coursework in chemistry (at the 400 level or above) and/or a related field to make an overall total of 30 hours, including one of the following sequences – 510-511-512; three of 530-531-532-533; 550-551-552, 570-572-573 and 590-594-595. At least 14 hours of this graduate coursework must be at the 500 level or above.

• A final oral examination.

DOCTOR OF PHILOSOPHY

CHEMISTRY MAJOR
Requirements

The requirements for the PhD in chemistry (except for the chemical physics concentration) consist of the satisfactory completion of the following requirements.

• Research and a dissertation to give at least 24 hours of graduate credit in Chemistry 600. Registration must be continuous from the beginning of research.

• Participation in seminar (Chemistry 501) during the entire period of graduate study, including the presentation of at least one seminar.

• Prescribed courses based on performance on diagnostic examinations.

• Completion of the comprehensive examination series and defense of an original research proposal to give 2 hours of credit in Chemistry 601.

• 18 additional hours in courses at the 500 level or above including at least one course above 601 and one of the following sequences – 510-511-512; 350-351-352-353; 550-551-552-553-554; 570-571-572-573; 590-594-595.

• A final oral examination.
The PhD program with a concentration in chemical physics is conducted jointly with the Department of Physics. Requirements depend on the choice of the major department. Chemistry departmental requirements include passing the above degree requirements plus 6 additional hours in physics at the 500 level or above. Three of the additional physics hours can be used to satisfy the 18 hours requirement listed above.

Intercollegiate Graduate Minor in Computational Science

The Department of Chemistry participates in the intercollegiate graduate minor in computational science (IGMCS) program. Any student pursuing a master’s or PhD with a major in chemistry can receive a minor in computational science by completing the appropriate IGMCS requirements. For further information, see the description of the IGMCS listed under the Department of Computer Science. The Department of Chemistry also contributes courses to the IGMCS program curriculum.

DEPARTMENT OF CLASSICS

http://web.utk.edu/~classics/

David W. Tandy, Head

Professors

Craig, C.P. (Lindsay Young Professor), PhD ................. North Carolina
Martin, S.D. (Senior Vice Provost), PhD ................. Michigan
Tandy, D.W. (Distinguished Professor of Humanities), PhD ................. Yale

Associate Professor

Sutherland, E.H., PhD ................. California (Berkeley)

Assistant Professors

Graninger, C.D., PhD ................. Cornell
Lafferty, M.K., PhD ................. Toronto (Canada)
Sklar, R.J., PhD ................. Michigan
Van de Moortel, A., PhD ................. Bryn Mawr

Research Professors

Geisel, G.C., PhD ................. North Carolina
Langdon, M.K., PhD ................. Pennsylvania

Lecturers

Bartera, S., MA ................. Urbino (Italy)
Downey, S.J., PhD ................. Toronto (Canada)

Adjunct Faculty

Dessel, J.P., PhD ................. Arizona
Dzon, M., PhD ................. Toronto (Canada)
Fitzgerald, J.L., PhD ................. Chicago
Heffernan, T.J., PhD ................. Cambridge
Jones, D.W., PhD ................. Chicago
Kulikowski, M., PhD ................. Toronto (Canada)
Shepardson, C., PhD ................. Duke
Stiebert, J., PhD ................. Glasgow (UK)

The Graduate courses in the Classics include the wider reading of Greek and Latin authors in a selected field, a more detailed study of one of the great genres of classical literature, and the development of background for the appreciation of Greek or Roman life and literature.

Students admitted to the Master of Arts with a major in anthropology may pursue a concentration in Mediterranean archaeology (see Department of Anthropology).

DOCTOR OF PHILOSOPHY

Computer Science Major

Admission

A student seeking admission to the PhD program is expected to meet the following requirements.

- The student should have three letters of recommendation sent directly to the department head from individuals capable of assessing the student's potential for advanced work in computer science (for example, college faculty or employers for whom the student has worked after earning a bachelor's degree). The department reserves the right to contact these individuals or other knowledgeable people if additional information is deemed necessary or desirable.

- The student is expected to have taken the GRE verbal and quantitative general test within the past three years and to have these scores sent to the Office of Graduate and International Admissions.
• The student should satisfy the same background requirements as for the master’s program. See the departmental brochure for details.

Requirements

Original research reported in a dissertation of high quality is emphasized. The minimum hour requirements are 24 hours of course 600 Doctoral Research and Dissertation and 24 hours of graduate courses beyond the equivalent of a master’s degree (i.e., beyond 30 graduate hours) graded A-F. Computer Science 530, 560 and 580 or 581 are required for the degree. At least 6 hours of 600-level graded courses must be taken in computer science at the University of Tennessee, Knoxville. The student’s advisor and committee will establish the specific course requirements. The comprehensive examination consists of a departmental written examination and a subsequent oral examination conducted by the student’s committee.

Computer Science Minor

The graduate minor consists of any two of the four core courses (530, 560, 580, 581) plus an additional 3 hours of graded computer science graduate-level courses at or above the 400 level.

Intercollegiate Graduate Minor in Computational Science

The Department of Computer Science participates in the intercollegiate graduate minor in computational science (IGMCS) program. Any student pursuing a master’s or PhD with a major in computer science can receive a minor in computational science by completing the appropriate IGMCS requirements. For further information, see the description of the IGMCS below. The Department of Computer Science also contributes courses to the IGMCS program curriculum.

Interdisciplinary Graduate Minor in Computational Science (IGMCS)

The Interdisciplinary Graduate Minor in Computational Science (IGMCS) is a formal academic program at the University of Tennessee established to allow students to earn a minor in Computational Science simultaneously with a master’s or doctorate in another academic discipline. The program is open to graduate students in all departments, which have approved minor. The program is administered by a committee composed of representatives, including program faculty, from all colleges that have approved the IGMCS program and which have minor programs.

Requirements

Degree Program Hours in Approved IGMCS Courses
Master’s in home department, minor in computational science .................................................. 9
Doctorate in home department, minor in computational science .................................................. 15

Computational Science is an emerging field of study that is truly interdisciplinary, with participating faculty from Mathematics, Computer Science, and many “Domain Sciences” across the curriculum that have embraced computationally intensive methods. Since Computational Science demands some basic level of understanding and skill in all three of these discipline clusters, the IGMCS program is designed to provide students seeking an advanced degree in one of these three areas with the knowledge and experience in the other two that is necessary to round out their education. Course options consist of courses in Mathematics, Computer/Information Science, and other participating departments selected according to a plan approved by the respective home departments, which then must be approved by the IGMCS Program Committee.

Procedures

The student’s home department (i.e. the department in which the student is currently pursuing an advanced degree) must have approved a program of courses with the IGMCS Program Committee prior to declaration of the IGMCS minor. That program will specify the sequences of Computational Science courses, selected from the IGMCS approved list, which are considered appropriate by the home department, and the home department must verify fulfillment of non-computational science degree requirements. Students wishing to participate in this program should contact their college representatives or the Chair of the IGMCS Program Committee.

The student’s graduate committee must include a member of the IGMCS faculty.

The student’s Admission to Candidacy form must contain all courses required for the chosen degree program delineated and labeled “Computational Science courses required for the minor in computational science.” Should the student decide not to apply for admission to the program until after completion of some of the courses, the student’s major professor should file a program change with the cooperating departments and assist the student in obtaining an IGMCS faculty member to serve on the student’s graduate committee.

Successful completion of the minor in Computational Science is recognized by appropriate documentation on the student’s transcript. Students who do not complete the requirements of the minor will still receive academic credit for the computational science courses they have successfully completed.

For more information contact Dr. Terry Moore at tmoore@cs.utk.edu or visit http://igmcs.utk.edu.

DEPARTMENT OF EARTH AND PLANETARY SCIENCES

http://geoweb.gg.utk.edu/

Claudia I. Mora, Head
Jeffrey E. Moersch, Graduate Liaison

Professors

Broadhead, T.W., PhD ............................................................... Iowa
Dunne, W.M. (Associate Dean), PhD ................................. Bristol (UK)
Hatcher, Jr., R.T. (UT Knoxville/ORNL Distinguished Scientist), PhD ........................................... Tennessee
Labotka, T.C., PhD ....................................................... California Institute of Technology
Mckay, L.D. (Jones Professor of Hydrogeology), PhD ............... Waterloo
Mckinney, M.L., PhD ............................................................. Yale
McSween, H.Y. (Distinguished Professor of Science), PhD ........... Harvard
Mora, C.I. (Carden Professor), PhD ........................................ Western Ontario (Canada)
Taylor, L.A. (Distinguished Professor of Science), PhD ............. Lehigh

Associate Professors

Baker, G.S. (Jones-Bibee Professor of Geophysics), PhD ............. Kansas
Clark, G.M., PhD ................................................................. Penn State
Fedo, C.M., PhD ............................................................... Virginia Tech
Kah, L.C., PhD ................................................................. Harvard

Assistant Professors

Finklestein, D.B. (Jones Professor of Environmental Geochemistry), PhD .................................... Illinois
Jessup, M.J., PhD ............................................................... Virginia Tech
Moersch, J.E., PhD ............................................................. Cornell

Lecturers

Deane, W., MS ................................................................. Tennessee
Sunniall, C.D., PhD ............................................................. Texas

MAJOR DEGREES

Geology

MS, PhD

The Department of Earth and Planetary Sciences offers both the Master of Science and Doctor of Philosophy degrees with a major in geology. Persons interested in these programs should contact the Director of Graduate Admissions in the department.
Admission

For admission, an applicant must provide transcripts of previous university work, two rating forms or letters of recommendation, and GRE scores (general). Students are not normally admitted under non-degree status.

Prerequisite for both degrees is a bachelor’s degree, including coursework in mineralogy, optical mineralogy, petrology, stratigraphy, paleontology, structural geology, and field geology. One year each of coursework in calculus and chemistry and one year of coursework in biology, physics, or statistics are also required. Applicants lacking any of these may be admitted, but are expected to make up significant deficiencies in their background through coursework outlined by the graduate committee.

MASTER OF SCIENCE
GEOLOGY MAJOR

Requirements

The department offers the thesis option in the master’s program. Graduation requires successful oral defense of a written thesis and a minimum 3.00 GPA in all graduate coursework.

Course requirements are a minimum of 30 hours, including:

• 6 hours of Thesis 500.
• Registration in 595 during the first two years in residence. Two hours may be counted toward the 30-hour minimum. This requirement may be waived in unusual circumstances.
• 16 hours of geology courses, with at least 14 hours at the 500 or 600 level, including at least one course from any three of the following five groups.

1. 410, 460, 480, 530, 563, 565, 568.
2. 450, 545, 546, 556, 557.
3. 470, 570, 572, 575, 576.
5. Any 400- or 500-level courses with graduate credit from related departments (allied sciences, mathematics, and engineering), selected with approval of the advisor.
• 8 hours of additional graduate coursework.

DOCTOR OF PHILOSOPHY
GEOLOGY MAJOR

The prerequisite for the PhD program, in addition to that for the MS program, is either a master’s degree with a major in geology or a bachelor’s degree plus completion of 24 hours of graded coursework with at least one course from any three of the groups listed in the third bullet above. These courses may be taken while completing other course requirements.

Requirements

Graduation requires passing a comprehensive examination, taken no later than the end of the second year, completion of all course requirements with a minimum 3.00 GPA, completion of the language requirement, and successful oral defense of the dissertation.

The comprehensive examination includes both written and oral parts in which the candidate will be tested on his/her knowledge of the area concerning the proposed dissertation and of related fields. The candidate is expected to be conversant in a wide range of geological sciences.

A minimum of 24 hours of graded coursework beyond the master’s degree is required in addition to the 24 hours of Dissertation 600. The coursework includes 9 hours of 600-level geology courses, 9 hours of 500-level or higher geology courses, and 6 hours of additional graduate courses. Extra departmental coursework is encouraged.

The student must demonstrate a reading knowledge of a foreign language in which there is a body of geologic literature as approved by the student’s dissertation committee. The foreign language requirement may be waived for PhD students whose native language is not English and who have demonstrated mastery of the English language as determined by the student’s dissertation committee.

DEPARTMENT OF ECOLOGY AND EVOLUTIONARY BIOLOGY

http://eeb.bio.utk.edu/
Christine R.B. Boake, Head
Randall Smith, Associate Head
Karen Hughes and Sandy Echternacht, Graduate Liaison

Professors
Boake, C.R.B., PhD .................................................Cornell
Burghardt, G.M., PhD .................................................Chicago
Echternacht, A.C., PhD .................................................Kansas
Etter, D.A., PhD .........................................................Minnesota
Gavrilits, S., PhD ......................................................Moscow State
Greenberg, N.B., PhD .................................................Rutgers
Gross, L.J., PhD .........................................................Cornell
Harris, III, W.R., PhD .................................................Tennessee
Hallam, T.G., PhD ......................................................Missouri
Hughes, K., PhD .........................................................Utah
McCracken, G.R., PhD .................................................Cornell
Petersen, R.H., PhD .....................................................Columbia
Riecher, S.E. (Distinguished Service Professor), PhD ....................Wisconsin
Sayer, G., PhD ..........................................................Idaho
Schilling, E., PhD .........................................................Indiana
Schultz, E., PhD ........................................................ Indiana
Simberloff, D. (Gore Hunger Chair of Excellence), PhD ...............Harvard

Associate Professors
Drake, J.A., PhD ..........................................................Purdue
Small, R., PhD ...........................................................Iowa State
Smith, D., PhD .......................................................... Tennessee
Weltzin, J., PhD ..........................................................Arizona
Wofford, B.E. (Curator of Herbarium), PhD ...........................Tennessee

Assistant Professors
Field, T., PhD ..........................................................Harvard
Fitzpatrick, B.M., PhD ..................................................Davis
Ford, A., PhD ............................................................ Davis
Gilchrist, M.A., PhD ...................................................Duke
Sanders, N.L., PhD .....................................................Stanford
Schweitzer, J.N., PhD .................................................. Arizona
Williams, J., PhD .........................................................Georgia

Research Professors
Cooper, L.W., PhD .....................................................Alaska
Grebe, J.M., PhD ..........................................................Alaska

Research Assistant Professors
Bailey, J.N., PhD .........................................................Arizona
Glass, A.T., PhD .........................................................Northern Arizona

Shared faculty are drawn from other university departments, the Oak Ridge National Laboratory, the United States Geological Survey, and the Tennessee Valley Authority.

MAJOR DEGREES
Ecology and Evolutionary Biology  MS, PhD
Behavior concentration
Ecology concentration (including mathematical ecology)
Evolutionary biology concentration

Admission

Applications are accepted once a year. The deadline for receipt of all application materials is January 6 for those applicants wishing to enroll in the following fall or spring semesters. Applications incomplete as of that date, or received after that date will not be considered. Applicants are expected to have completed a minimum of one year of general biology, two years of chemistry including one year of general chemistry, one year of physics, and one year...
of college-level calculus. Occasionally, applicants who are highly qualified otherwise but lack one of these courses or course sequences will be admitted with the expectation that the deficiency will be made up within the first year of graduate study. Applicants are required to submit scores from the general Graduate Record Examination (GRE) and successful applicants will usually have a composite score on the verbal, mathematical and analytical sections of the GRE of at least 1850. Submission of scores on appropriate (e.g., biology, mathematics) advanced GRE examinations is recommended but not required. Applicants are also expected to have an overall grade point average of at least 3.00 and 3.00 or above for all science and mathematics courses on a 4.00 scale (successful applicants will usually have grade-point averages well above these minima).

Application must be made to both the Office of Graduate and International Admissions and the department. The departmental application requires three letters of reference from persons capable of assessing the applicant’s suitability for graduate work in biology and a statement of professional goals and reasons for applying to this program. Applicants for the doctoral degree are expected to have made prior contact with potential research advisors in the department’s graduate program and this approach is recommended for applicants for the master’s degree program as well. Inquiries should be directed to the Chair, Graduate Committee, Department of Ecology and Evolutionary Biology, The University of Tennessee, Knoxville, Tennessee 37996-1610.

**MAJOR REQUIREMENTS**

**ECOLOGY AND EVOLUTIONARY BIOLOGY MAJOR**

In addition to general requirements of the Graduate Council, aspirants for the Master of Science are expected to:

- Take a prescriptive diagnostic examination during the first semester in residence which covers major concepts in ecology and evolutionary biology. The examination may be taken twice and must be passed before the student is admitted to candidacy.
- Complete course requirements as determined by the department and the student’s faculty research committee.
- Satisfactorily complete and defend a research thesis.

**DOCTOR OF PHILOSOPHY**

**ECOLOGY AND EVOLUTIONARY BIOLOGY MAJOR**

In addition to general requirements of the Graduate Council, aspirants for the Doctor of Philosophy degree are expected to:

- Take a prescriptive diagnostic examination covering major concepts in ecology and evolutionary biology. The examination may be taken twice and must be passed before the student is admitted to candidacy.
- Complete course requirements as determined by the department and the student’s faculty dissertation research committee.
- Pass a written and oral comprehensive examination designed to test for adequate knowledge in those areas essential to the student’s research program.
- Satisfactorily complete and defend a dissertation.

The department does not require a reading knowledge of a foreign language, but this may be imposed by the student’s faculty dissertation research committee. If so, the student has the option of demonstrating reading knowledge of the prescribed language by either (a) passing the official reading examination given by the language department or (b) earning a grade of at least a B in the second semester of a special language reading course for graduate students.

**Environmental Policy Minor**

The department participates in a program designed to give graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. See Department of Political Science for program description.

**DEPARTMENT OF ENGLISH**

http://web.utk.edu/~english/

John P. Zomchick, Head

Misty G. Anderson, Graduate Liaison

**Professors**

- Atwill, J.M., PhD: Purdue
- Cox, D.R. (Executive Associate Dean), PhD: Missouri
- Dumas, B.K., PhD: Arkansas
- Dunn, A.R., PhD: Washington
- Ensor, A.R., PhD: Indiana
- Garnier, J.R., S.B. (Interim Associate Dean and Young Professor), PhD: Princeton
- Goselee, D.F., PhD: Yale
- Goselee, N.M. (Alumni Distinguished and Young Professor), PhD: Yale
- Hefferman, T.J.A. (Curry Professor), PhD: Cambridge (UK)
- Kallet, M. (John C. Hodges Teaching Professor), PhD: Rutgers
- Keene, M.L., PhD: Texas
- Leki, I., PhD: Illinois
- Liuza, R.M., PhD: Yale
- Lofaro, M.A., PhD: Maryland
- Luprecht, M.A., PhD: Florida
- Maland, C., PhD: Michigan
- Malak, M.E. (Special Assistant to the Chancellor and Associate Dean of the Graduate School), PhD: McGill (Canada)
- Smith, A.E., PhD: Houston
- Stillman, R.E., PhD: Pennsylvania
- Wier, A., MFA: Bowling Green
- Zomchick, J.P., PhD: Columbia

**Associate Professors**

- Anderson, M.G., PhD: Vanderbilt
- Elias, A.J., PhD: Penn State
- Hirschfeld, H.A., PhD: Duke
- Hirst, R., PhD: Rensselaer Polytechnic
- Howes, L.L., PhD: Columbia
- Jennings, L.D., PhD: North Carolina
- Knight, M., MFA: Virginia
- Reif, M.J., PhD: Kansas

**Assistant Professors**

- Billone, A.C., PhD: Princeton
- Coleman, D.D., PhD: Stanford
- Dzon, M.C., PhD: Toronto (Canada)
- Fishman, J.M., PhD: Stanford
- Haddox, T.F., PhD: Vanderbilt
- Ikard, D., PhD: Wisconsin
- Schoenbach, L.M., PhD: Virginia
- Seshagiri, U., PhD: Illinois

**Lecturers**

- Aaj, M.P., PhD: Alabama
- Barrow, R., PhD: Iowa
- Burton, J.C., PhD: State University of New York (Stony Brook)
- Capps, S.E., PhD: Tennessee
- Dziuba, E.K., MA: Minnesota
- Goddard, K.C., MA: Tennessee
- Hardwig, M.R., PhD: Tennessee
- Hardwig, W.J., PhD: Florida
- Harris, S.C., PhD: Tennessee
- Havens, K.L., PhD: Canada
- Heffelt, J.K., PhD: Toronto (Canada)
- Hussein, A., PhD: Tennessee
- Knox, L., MA: Indiana
- Larsen, W.B., PhD: Tennessee
- Mabee, F.P., PhD: Southern California
- McCue, K., MA: Tennessee
Requirements

A minimum of 24 hours in English beyond the BA to include 6 hours at the 600 level; 12 additional hours at the 500-600 level (only 3 hours of 593 Independent Study may be applied toward the MA), and 6 hours for graduate credit at any level, including the 400-level. In this coursework, students must maintain at least a 3.00 GPA.

Thesis Option
Written under the direction of a faculty member of the department and approved by a committee of two other faculty members. Six hours of credit will be given.

Non-Thesis Option
Six hours of additional courses at the 500-600 level, making a total of 30 hours of required coursework.

Language Requirement
Evidence of proficiency in one foreign language to be fulfilled in one of the following ways.

• Completion of the second year of a language at college level with a grade of C or better.

• Completion of French 302 or German 332 at the University of Tennessee, Knoxville, with a grade of B or better.

• Passing of the regular PhD foreign language examination as currently administered at the University of Tennessee, Knoxville.

Final Examination
A candidate presenting a thesis must pass a 1-hour oral examination; a candidate presenting a creative project must pass a ninety-minute oral examination. The examination consists of a short thesis defense, but chiefly of questions covering the general history of English and American literature, not merely the coursework taken. A reading list of primary works designed to help the student prepare for these questions is available in the office of the Director of Graduate Studies in English.

A non-thesis student must pass a written examination, followed by a 1-hour oral examination, both consisting of the same sort of questions as the examination taken by the thesis student.

Residence Requirement
There is no residence requirement for the MA, but students should attempt to pursue a full-time program whenever possible.

WRITING CONCENTRATION

The master’s program with writing concentration is intended for those students who plan to do freelance or creative writing, specialize in teaching writing courses at the college level, work as professional editors or writers in business or industry, or pursue doctoral studies. The requirements for the writing concentration are the same as those for the thesis option above with the following exceptions.

Coursework
Writing students may substitute two 400-level writing courses for two 500-level courses. Students must take at least 9 hours in writing and 9 in literature, the remaining 6 to be selected from any English courses at the proper level. Of the courses in writing, at least 3 hours must be taken at the 500 level; additional 500-level courses are strongly recommended.

Writing Project
One of the following writing projects for 6 hours of credit is required.

• A thesis, using research to analyze some aspect of writing or rhetorical theory.

• A creative project, such as a collection of poems or short stories, a short novel, a play, or a creative work of non-fiction prose.

The nature and length of each project will be determined by the Director of Graduate Studies in English after consulting with the student and the project director. In addition to the director, two other Department of English faculty members will supervise and approve the project; at least one should be from the literature faculty.

Final Examination
The reading list may be modified by the MA examining committee, meeting as a body with the student, to reflect the candidate’s particular writing emphasis. However, most of the oral examination should focus upon the literature outlined in the original reading list.

DOCTOR OF PHILOSOPHY

ENGLISH MAJOR

Requirements
A student must successfully complete a program of study, normally six full semesters as outlined below, approved by the candidate’s committee or the Director of Graduate Studies in English.

MAJOR

DEGREES

English

MA

Writing concentration

English

PhD

The Department of English offers the Master of Arts and the Doctor of Philosophy degrees with a major in English. Thesis and non-thesis options are available for the MA, as well as a special concentration in writing. The department also offers a creative writing dissertation option in the doctoral program.

Detailed information about the master’s and doctoral programs and individual graduate courses may be obtained by writing the Director of Graduate Studies in English, 306 McClung Tower. A prospective student may contact the department for application forms or procedures or may download them from the departmental graduate Web site at http://web.utk.edu/~english/graduate.php. For additional information, please visit the graduate Web site through the College of Arts and Sciences home page at www.artssci.utk.edu.

The Department of English does not accept students in non-degree or provisional status. A student who wishes to enter the department must apply in degree-seeking status for his/her application to receive consideration for admission to any graduate program in English.

MASTER OF ARTS

ENGLISH MAJOR

Requirements

A minimum of 24 hours in English beyond the BA to include 6 hours at the 600 level; 12 additional hours at the 500-600 level (only 3 hours of 593 Independent Study may be applied toward the MA), and 6 hours for graduate credit at any level, including the 400-level. In this coursework, students must maintain at least a 3.00 GPA.

Thesis Option
Written under the direction of a faculty member of the department and approved by a committee of two other faculty members. Six hours of credit will be given.

Non-Thesis Option
Six hours of additional courses at the 500-600 level, making a total of 30 hours of required coursework.

Language Requirement
Evidence of proficiency in one foreign language to be fulfilled in one of the following ways.

• Completion of the second year of a language at college level with a grade of C or better.

• Completion of French 302 or German 332 at the University of Tennessee, Knoxville, with a grade of B or better.

• Passing of the regular PhD foreign language examination as currently administered at the University of Tennessee, Knoxville.

Final Examination
A candidate presenting a thesis must pass a 1-hour oral examination; a candidate presenting a creative project must pass a ninety-minute oral examination. The examination consists of a short thesis defense, but chiefly of questions covering the general history of English and American literature, not merely the coursework taken. A reading list of primary works designed to help the student prepare for these questions is available in the office of the Director of Graduate Studies in English.

A non-thesis student must pass a written examination, followed by a 1-hour oral examination, both consisting of the same sort of questions as the examination taken by the thesis student.

Residence Requirement
There is no residence requirement for the MA, but students should attempt to pursue a full-time program whenever possible.
Coursework
At least 54 hours beyond the BA (of which at least 30 hours must be beyond the MA) to include at least 21 hours at the 600 level; at least 15 hours at the 500 level or above (only 3 hours of 593 Independent Study may be applied toward the MA and 3 after the MA); a 3-hour course in teaching composition; and 15 additional hours at any level approved for graduate credit (including a maximum of 12 hours at the 400 level if approved by the Director of Graduate Studies).
Up to 6 of these additional hours may be taken in some cognate field or fields such as history, philosophy, and French. These courses must be drawn from those approved for graduate credit. All other coursework must be in the English Department. In this coursework, students must normally maintain a 3.50 GPA.

Dissertation
Twenty-four hours of dissertation are required. These represent the research for and writing of the dissertation. The research and dissertation will be directed by a faculty member of the department and approved by a doctoral committee of three or four other faculty members.

Language Requirement
A language requirement met in one of the following ways.
- Two languages approved by the Director of Graduate Studies in English. The requirement for each language may be fulfilled by (a) completion of French 302 or German 332 with a grade of B or better; (b) completion at the University of Tennessee, Knoxville, of any two courses on the 300 level or above in the foreign language or literature with at least a grade of B in each course; (c) passing of the regular PhD foreign language examination as currently administered at the University of Tennessee, Knoxville.
- One modern language approved by the Director of Graduate Studies in English. This requirement must be fulfilled by passing the examination on the foreign language given by the University of Tennessee, Knoxville, and completion of two courses given in the foreign language at the 400 level or above, at least one course to be at the 500- or 600-level. A minimum grade of B must be received in each course.
- One modern language approved by the Director of Graduate Studies in English and intensive study of the English language. This requirement must be fulfilled by completion of (a), (b), or (c) for one foreign language; and completion of six hours in English language courses with grades of B or better, at least 3 of which must be from English 508 or 509 History of the English Language (offered in alternate years only). For the other 3 hours, the student may either complete the history of the language sequence or choose one other course in language taught in the Department of English at the 500 or 600 level and approved by the Director of Graduate Studies in English. These courses will not count toward the minimum number of courses for the PhD, and anyone electing this language option may not take the comprehensive examination in linguistics.

Examinations
- A first-year review conducted at the end of the first year of PhD coursework.
- A comprehensive examination which may be divided as the department directs (see the English Department graduate student Web site). The comprehensive examination is given twice a year, normally in March and September. Before a student may take it, he/she must have completed all required coursework. A student must also have met all requirements for foreign languages before beginning the first part of the examination.

Dissertation Defense
A one-hour examination on the dissertation and other related areas is required.

Residence Requirement
Two consecutive semesters as a full-time student are required. For students not on teaching assistantships, full-time consists of 9 or more hours of coursework and/or dissertation hours each semester. For students on assistantships, full-time consists of at least 6 hours of courses and/or dissertation hours and 3 hours of teaching each semester.

DEPARTMENT OF GEOGRAPHY
http://web.utk.edu/~utkgeog/
Carol Harden, Interim Head

Professors
Aiken, C.S., PhD ......................................................... Georgia
Bell, T.L., PhD ............................................................ Iowa
Foresta, R.A., PhD .......................................................... Rutgers
Harden, C.P., PhD ......................................................... Colorado
Horn, S.P., PhD ......................................................... California (Berkeley)
Pulsipher, L.M., PhD .................................................... Southern Illinois
Raison, B.A., PhD ....................................................... Northwestern
Rehder, J.B., PhD .............................................. Louisiana State
Shaw, S.L., PhD ......................................................... Ohio State

Associate Professors
Grissino-Mayer, H., PhD ........................................ Arizona
Orvis, K., PhD .......................................................... California (Berkeley)

Assistant Professors
Drever, A., PhD ...................................................... California (Los Angeles)
Kalafsky, R., PhD ..................................................... New York (Buffalo)
Tran, L.T., PhD ........................................................ Hawaii

Adjunct Faculty
Gripshover, M.M., PhD ............................................... Tennessee
Kappelle, M., PhD ...................................................... Amsterdam
Liu, C., PhD ........................................................... Tennessee
Tankersley, R.D., PhD .............................................. Tennessee
Zanetta, M.C., PhD ....................................................... Ohio State

MAJOR DEGREES
Geography

The master’s degree emphasizes development of professional competence as a geographer and offers opportunities to gain substantial depth in a concentration or a major technique. An emphasis in geographic information science is available for students who have appropriate backgrounds in mathematics and computer science. The doctoral program is for those who have demonstrated proficiency in conducting independent research. The department is particularly well-qualified to direct graduate work in location analysis, transportation geography, urban and rural geography, cultural ecology, and the geography of the natural environment (especially biogeography and geomorphology). The faculty is qualified to direct students from a variety of approaches ranging from historical and humanistic to rigorously analytic and GIS-based.

MASTER OF SCIENCE GEOGRAPHY MAJOR
Requirements
The department offers the thesis and non-thesis options for the Master of Science. Both options require a minimum of 30 hours beyond the completion of a sound undergraduate major program. The MS program requires students to have a background in quantitative methods equivalent to the course content of Geography 415 and some familiarity with key themes and approaches in both physical and human geography. At least two-thirds of the total hours in the degree program must be at or above the 500 level and must include 501 (at each offering dur-
ing residency), 504, and 3 hours at the 600 level. In the thesis option, 6 hours must be Thesis 500. A final examination is required in both programs.

DOCTOR OF PHILOSOPHY

GEOGRAPHY MAJOR

The doctorate is a research degree and is granted only to those who demonstrate proficiency in conducting independent research. Students must have a broad foundation and understanding of the discipline; these should have been achieved in a comprehensive master’s program.

Requirements

Course requirements for the degree shall be determined by the student’s faculty committee in accordance with specific interests and needs. The program must include 504, 515, 599, 9 hours of 600-level seminars, and (at each offering during residency) 501. A minimum of 9 hours must be earned in collateral fields, with courses selected for their relevance to the special fields. PhD students whose master’s-level work was in a field other than geography and for whom the master’s area remains close to their PhD specialty areas may petition to substitute geography hours in courses outside of their specialty areas for up to 3 of the 9 required outside hours. Competency in quantitative methods and basic human and physical geography is required. Additional tools, including languages, will be required as appropriate to the student’s areas of research specialization.

Examinations required for admission to candidacy include a written comprehensive examination, comprised of two written examinations in which the student will be tested on his/her knowledge of two special fields and related areas of geography and an oral examination on the student’s program, the special fields and related areas, and the dissertation proposal. All parts of the written comprehensive examination should be taken within the same semester.

Environmental Policy Minor

The department participates in a program designed to give graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. See Department of Political Science for program description.

Intercollegiate Graduate Minor in Computational Science

The Department of Geography participates in the intercollegiate graduate minor in computational science (IGMCS) program. Any student pursuing a master’s or PhD with a major in Geography can receive a minor in computational science and an oral examination on the student’s program, the special fields and related areas, and the dissertation proposal. All parts of the written comprehensive examination should be taken within the same semester.

DEPARTMENT OF HISTORY

http://web.utk.edu/~history/

Thomas E. Burman, Interim Head
Catherine Higgs, Interim Graduate Liaison

Professors

Ash, S.V., PhD .................................................. Tennessee
Bohstedt, J., PhD ............................................. Harvard
Brummett, P., PhD .......................................... Chicago
Crabtree, L., (Chancellor), PhD .......................... Minnesota
Diacon, T.A. (Vice Provost of Academic Operations), PhD ... Wisconsin
Feller, D., PhD ................................................. Wisconsin
Norrell, R.J. (Bernadotte Schmitt Professor), PhD ............ Virginia

Associate Professors

Appier, J., PhD ................................................. California (Riverside)
Bast, R.J., PhD ................................................ Arizona
Burman, T.E., PhD ............................................ Toronto (Canada)
Dessel, J.P., PhD .............................................. Arizona
Fleming, C.G., PhD ........................................ Duke
Freeberg, E., PhD ........................................... Emory
Glover, L., PhD ............................................... Kentuck
Higgs, C.A., PhD ............................................. Yale
Kulikowski, M., PhD ........................................ Toronto (Canada)
Lulevicius, V.G., PhD ...................................... Pennsylvania
Pieffer, G.K., PhD .......................................... Rutgers
Rubenstein, J., PhD .......................................... California (Berkeley)

Assistant Professors

Black, C., PhD .............................................. New Mexico
DeWeerdth, H., PhD ........................................ Harvard
Liu, L., PhD .................................................. California (San Diego)
McIntosh, J.L., PhD ........................................ Johns Hopkins
Morisse, R., PhD ............................................. Yale
Phillips, D., PhD ............................................. Harvard
Sacco, L., PhD .............................................. Southern California
Stolz, R., PhD ................................................ Chicago
Tompkins, D., PhD ......................................... Columbia
White, G., PhD ............................................. Temple

MAJOR DEGREES

History MA

History PhD

American history concentration
European history concentration

The MA program includes a thesis and non-thesis option. The doctoral program has concentrations in American and European history with special focuses in the areas identified under Group II doctoral fields and Group III teaching fields.

Detailed information may be obtained from the Director of Graduate Studies in History who also advises all incoming students.

MASTER OF ARTS

HISTORY MAJOR

Admission

• Successful completion of a baccalaureate degree from an accredited institution, preferably with a major in history.
• Acceptable scores on the Graduate Record Examination (general).

Requirements

Complete 510 and a 600-level research seminar normally during the fall and spring semesters of the first year in the graduate program. Complete 521 in preparation for the MA examination. As many as 9 related hours may be taken outside the department. As many as 9 graduate hours taken elsewhere may be applied toward the MA degree. Except by prior approval of the Director of Graduate Studies in History, a student’s coursework must be at the 500 level or above.

Thesis Option

Twenty-four hours of coursework and 6 hours of Thesis 500 for a total of 30 hours are required. Thesis students are required to select one MA field and write a thesis. At the end of the program the thesis student will take a two-hour oral examination on both the thesis and the field.

Non-Thesis Option

A total of 30 hours of coursework is required. At least 6 hours must be completed in each of two MA fields. The primary field is examined by a two-hour written exam followed within one week by a one-hour oral examination. The single grade of pass/fail will be given at the conclusion of the oral examination. No examination is given on the secondary field.

Master of Arts Fields

• United States (colonial to present).
• Premodern Europe.
• Modern Europe.
• Asia.
• Retention and Termination.

A 3.00 overall grade point average is required to remain in good standing. MA students must take the MA examination no later than the semester following the completion of 30 hours. A student who fails the MA examination must repeat the examination no later than the following semester. A student who fails the examination a second time or does not take the examination when required will be dropped from the graduate program.

DOCTOR OF PHILOSOPHY

HISTORY MAJOR

Admission

• Successful completion of the MA degree from an accredited institution.
• Acceptable scores on the Graduate Record Examination (general).

Requirements

Before being admitted to doctoral candidacy, a student must fulfill the following requirements.

• Complete History 510 at the University of Tennessee, Knoxville, (may be waived for comparable experience elsewhere).
• Spend two consecutive semesters in residence.
• Complete 9 hours in one Group I doctoral field. There is no minimum hours requirement for a Group II field. Complete 9 hours in one Group III field, including the appropriate 511, 512, or 513 course and two additional courses at the 500 level. The Group III field must be in a different geographic area from the Group II field. Courses taken to fulfill MA degrees may be counted toward all field requirements.
• Fulfill the foreign language requirement.
• Complete two 600-level research seminars. (One must be completed at the University of Tennessee, Knoxville.) Students who have completed a master’s thesis need complete only one research seminar (must be taken at the University of Tennessee, Knoxville), and History 621.
• Maintain a 3.00 overall grade-point average in graduate work attempted.
• Complete 24 hours of graduate coursework (21 hours graded A-F) at the University of Tennessee, Knoxville, beyond that required for the MA. Up to 6 hours may be taken outside of the department.
• Except by prior approval of the Director of Graduate Studies in History, a student’s coursework must be at the 500 level or above.

Language Requirement

Students must demonstrate competence in one foreign language through coursework or examination. The student's doctoral committee may specify any other languages or research tools, such as statistics, essential for the student's preparation. The foreign language requirement must be fulfilled before taking the comprehensive examination.

Group III (Teaching Field) Examination

This is a one-hour oral exam that must be completed at any time before the comprehensive examination is taken. If a student fails the exam, he or she may re-examine the exam one time only and must do so the following semester. European and U.S. history courses may not be used for the Group III World History field.

Comprehensive Examination

The comprehensive examination consists of a written exam (Group I) and an oral exam (Group II) and must be taken no later than

the semester following the semester in which the student completes the residence, coursework, and language requirement (summer excluded). Failure to take the comprehensive examination within the required time will be counted as a failure on the examination. No student will be permitted to take the comprehensive examination unless he or she has passed the Group III examination (see above) and has an overall grade point average of at least 3.00. Qualified students will be examined in one field selected from the Group I list below and one field selected from the Group II list below. The two exams are taken in the same semester. The Group I is an eight-hour written exam. It must be passed before the Group II can be taken. The Group II is a two-hour oral exam. A student who fails either exam must repeat it the following semester (summer excluded). A second failure on either exam will cause the student to be dropped from the history graduate program. A student who does not repeat a failed exam within the required time will likewise be dropped from the program.

Admission to Candidacy

Upon successful completion of the above requirements, a doctoral student may be admitted to candidacy.

Doctoral Fields

- **Group I. Pre-modern Europe; Modern Europe; United States (colonial to present).**
- **Group II.** To be defined by the student’s doctoral committee from within one of the following fields.
  - United States – Colonial and Early Republic; 19th century; 20th century; Regional; Military and Foreign Relations; Social and Cultural; American Political.
  - European – Ancient; Medieval; Early Modern; Modern; Political and Diplomatic; Intellectual and Cultural; Social and Economic; National Fields.
- **Group III (Examined Teaching Field).** World History; Western Civilization; U.S. Civilization.

Dissertation and Defense

Original research forms the basis for the dissertation. Doctoral candidates must register for a minimum of 3 hours of 600 Dissertation Research each semester and must complete 24 hours of dissertation credit. A final oral defense is given on the dissertation in its historical context. The program must be completed within eight years from admission as a potential candidate.

INTERDISCIPLINARY PROGRAMS

*Don Richard Cox, Executive Associate Dean, College of Arts and Sciences, Director*

The College of Arts and Sciences offers a series of interdisciplinary undergraduate majors and minors through its interdisciplinary programs. These programs include Africana studies, American studies, Asian studies, cinema studies, comparative literature, environmental studies, global studies, Judaic studies, Latin American studies, legal studies, linguistics, medieval studies, and women’s studies.

Certain courses within these programs are available for graduate credit as listed below. See the *Undergraduate Catalog* for program descriptions and directors.

LINGUISTICS

*Iliana Leki, English, Chair*

GRADUATE CERTIFICATE IN LINGUISTICS

The linguistics program offers a graduate certificate designed to meet the needs of individuals wishing to apply linguistics in various professional fields. It draws upon the strengths of faculty members in applied linguistics, sociolinguistics, and theoretical linguistics. The requirements focus upon the central aspects of the discipline of linguistics and aim to develop students’ basic knowledge and skills in the core disciplinary areas.

Upon successful completion of this program, students should
have an understanding of the basic theoretical concepts and approaches of the discipline and have gained experience in the use of analytic and research techniques. It is also designed to meet the specific needs of those students who are preparing to teach foreign language at the high school/junior college level and/or to obtain advanced level proficiency in linguistics and cultural knowledge.

Prospective candidates for the certificate may take up to 6 hours of certificate classes before making application for admission to the certificate program. Once admitted to the program, they must maintain a GPA of at least 3.00. Application to the certificate program must be made to the Chair of the Interdisciplinary Linguistics Program by submitting a letter of application and copies of undergraduate transcripts (and graduate transcripts, if applicable). A minimum of 18 hours is required. All courses must be selected in consultation with a program advisor, who must approve all courses for individual students prior to their being taken, except that, as noted above, up to 6 hours may be accepted from candidates upon admission.

Requirements

Students will satisfy the requirements of the certificate program by selecting 18 hours from the following lists, provided that those courses are selected in consultation with a program advisor, who approves their selection. A certificate cannot be earned without program approval by the advisor.

- At least one of the following courses – French 512, German 512, Spanish 512, Linguistics 423, 425.
- Additional courses from the following list for a total of 15 hours – Audiology and Speech Pathology 506, 601, English 508, 509, 680, French 421, 422, 510, German 510, 541, 631, 632, Linguistics 400, 411, 426, 429, 435, 471, 472, 474, 476, 477, 485, 490, 575, Spanish 421, 531, Psychology 400, 543, 617, Statistics 531. Other courses may, where appropriate, be substituted for the courses listed above with the permission of the Chair of the Linguistics Program.
- A 3-hour capstone project, normally the preparation of a paper for presentation at a professional conference or for publication in a journal, planned and completed in consultation with a program advisor.

MEVIDEL STUDIES

Robert Bast, History, Chair

GRADUATE CERTIFICATE IN MEDIEVAL STUDIES

The medieval studies program offers a graduate certificate enabling students with an interest in medieval topics to acquire a broad foundation in the interdisciplinary approaches to medieval research and to begin putting these approaches into practice. For students earning MAS or PhDs in traditional disciplines, the program will augment their training and may make them more attractive candidates for academic positions.

Prospective candidates for the certificate may take up to 6 hours of certificate classes before making application for admission to the certificate program. Once admitted to the program, they must maintain a GPA of at least 3.00. Application to the certificate program must be made to the Chair of the Medieval Studies Program by submitting a letter of application and copies of undergraduate transcripts (and graduate transcripts, if applicable). A minimum of 15 hours is required. All courses must be selected in consultation with a program advisor, who must approve all courses for individual students prior to their being taken, except that, as noted above, up to 6 hours may be accepted from candidates upon admission.

Requirements

Students will satisfy the requirements of the certificate program by selecting 15 hours from the following lists, provided that those courses are selected in consultation with a program advisor, who approves their selection. A certificate cannot be earned without program approval by the advisor.

- Medieval Studies 510.
- 12 additional hours chosen from at least two disciplines. A minimum of 6 hours must be taken in one discipline. Students may choose from the following courses – Art History 425, 431, 441, 451, 571, English 401, 402, 508, 513, 514, 610, 611, 620, 621, French 410, 429, 540, German 541, History 531, Italian 401, 402, Spanish 531, 532, Philosophy 520, 620, Political Science 475. Topics and special topics courses, where appropriate, may be substituted for any of the above courses with the permission of the Chair of the Medieval Studies Program.
- Demonstration of competency in reading medieval Latin either by earning an A or B in Classics 435 or by passing the University of Toronto's MA Medieval Latin exam, given on campus in fall and spring semesters. Where appropriate, students may substitute competency in reading medieval Greek, Hebrew, or Arabic. The chair of Medieval Studies, in conjunction with the Medieval Studies committee, will establish standards for determining competency in these languages as need arises.
- A non-credit capstone project, usually a paper. The paper should be interdisciplinary in its approach to its topic and may be an outgrowth of a seminar paper in another course. This capstone paper must be presented to an audience of Medieval Studies committee members and other interested faculty and graduate students before the certificate is granted.

WOMEN'S STUDIES

Cheryl Brown Travis, Psychology, Chair

GRADUATE CERTIFICATE IN WOMEN'S STUDIES

The women's studies program offers a graduate certificate, enabling students to develop critical thinking about the economic, social, and legal factors influencing women's roles in contemporary and historical societies and to evaluate those roles in the widest possible perspectives. Students may examine representations of women in the arts and the media, evaluate how science and medicine view women as objects of study, and study how women work as practitioners and researchers in these fields.

The program is designed to provide a supplementary perspective for students already enrolled in graduate programs, to provide an entry into graduate study for those who are exploring a number of disciplinary approaches, to provide enrichment for members of the community who have a bachelor's or an advanced degree, and to develop skills for professionals in various fields.

Prospective candidates for the certificate may take up to 6 hours of certificate classes before making application for admission to the certificate program. Once admitted to the program, they must maintain a GPA of at least 3.00. Application to the certificate program must be made to the Chair of the Women's Studies Program by submitting a letter of application and copies of undergraduate transcripts (and graduate transcripts, if applicable). A minimum of 15 hours is required. All courses must be selected in consultation with a program advisor, who must approve all courses for individual students prior to their being taken, except that, as noted above, up to 6 hours may be accepted from candidates upon admission.

Requirements

Students will satisfy the requirements of the certificate program by selecting 15 hours from the following lists, provided that those courses are selected in consultation with a program advisor, who approves their selection. A certificate cannot be earned without program approval by the advisor.
• Women’s Studies 510.
• 12 additional hours drawn from at least two different disciplines. For students enrolled in an MA program, no more than two of the certificate courses may be drawn from that program or the department in which the MA program is housed. Students are encouraged to select from courses at the 500 level and above. Students may choose from the following list—Anthropology 517; Cultural Studies in Education 512, 548, 609; English 584; Health 420, 520; Public Health 585; Law 849, 862, 958; Sport Studies 543; Women’s Studies 400, 410, 422, 425, 434, 469, 510, 543, 548, 593, 609.
• A capstone experience such as presenting research results to a professional group, submitting a work for publication, arranging an exhibit, or presenting a performance to a group approved by the individual advisor and the chair of Women’s Studies.

LIFE SCIENCES
(Interdepartmental)
John Koontz, Interim Chair

MAJOR
Life Sciences
Genome science and technology concentration
Plant physiology and genetics concentration

The program leading to the Master of Science and Doctor of Philosophy degrees with a major in life sciences is interdepartmental and intercollegiate and is designed to augment offerings of individual departments in two concentrations—genome science and technology, and plant physiology and genetics. Students interested in these areas should contact either the Life Sciences chairperson or the director of the area of interest. Each concentration is administered separately and has unique admission requirements.

GENOME SCIENCE AND TECHNOLOGY CONCENTRATION
Cynthia Peterson, Director

The University of Tennessee-Oak Ridge National Laboratory Graduate School of Genome Science and Technology (GST) is a unique and multidisciplinary program for full-time graduate study leading to the Master of Science or Doctor of Philosophy degree. The program focuses on developments in the biological and computational sciences relating to genome sequences, and the program is designed to take advantage of collaboration of the University of Tennessee, Knoxville, and the Oak Ridge National Laboratory. Students are trained in emerging areas of genome science, with emphasis on mammalian genomics, structural biology, proteomics, computational biology and bioinformatics, and bioanalytical technologies. Scientists from both campuses participate in teaching. Research projects pursued for either the MS or PhD are mentored jointly by a faculty member from each campus. A year-long introductory course in Genome Science and Technology focuses on inquiry conducted on a genome-wide scale. Laboratory rotations during the first year offer students hands-on experience in a variety of focus areas.

Applicants are expected to have a background in the biological, physical, or computational sciences. Requirements for admission are one year of general biology or the equivalent; two years of chemistry, including one year of general chemistry and one year of introductory organic chemistry with laboratory; one year of calculus; one year of physics; at least 8 hours in cognate sciences related to the program; a combined GRE score of 1800 for the verbal, quantitative, and analytical sections is highly desirable; three letters of recommendation; and a minimum grade point average of 3.00 out of 4.00. Coursework in genetics, cell biology, and computer sciences is advantageous. Superior students, deficient in one or more of the above requirements, may be admitted at the discretion of the program admissions committee. Deficiencies will be made up as a part of the courses taken by the individual student.

Requirements for the PhD are satisfactory completion of the genome science and technology core courses, (Life Sciences 505, 515-516, 520-521, 540-541; Biochemistry and Cellular and Molecular Biology 511 and 512); three semesters of GST laboratory, satisfactory completion of formal advanced courses in the areas of the student’s interest, passing both written and oral comprehensive examinations, a dissertation reporting the results of original and significant scientific research (a minimum of 24 hours of course 600 is required), a final oral/written examination on the dissertation, and a formal seminar presentation of the dissertation research. Participation in at least one seminar during each semester of residence after the first year is strongly recommended. The master’s degree requires a minimum of 30 hours of study approved by the student’s committee, a thesis, and an oral examination.

Intercollegiate Graduate Minor in Computational Science

The Graduate School of Genome Science and Technology participates in the intercollegiate graduate minor in computational science (IGMCS) program. Any student pursuing a PhD with a major in Life Sciences (genome science and technology concentration) can receive a Minor in Computational Science by completing the appropriate IGMCS requirements. For further information see the description of the IGMCS listed under the Department of Computer Science. The Graduate School in Genome Science and Technology also contributes courses to the IGMCS program curriculum.

PLANT PHYSIOLOGY AND GENETICS CONCENTRATION
Otto J. Schwarz, Director

This program provides the opportunity for intensive training and research experience in areas transcending the usual boundaries of botany, biochemistry, and agricultural plant sciences. Solutions of problems concerning the interactions of physiology and genetics in applied and fundamental aspects of plant science are the focus.

Admission requirements are a BA with a major in a biological, behavioral, or physical science; GRE (general) score; three letters of recommendation; and coursework including a year of calculus (differential and integral), one year of chemistry, and a year of physics. Specific course deficiencies may be corrected during the first year.

Required courses are Life Sciences 510; Biochemistry and Cellular and Molecular Biology 511, 512, 521, 522, Plant Sciences 471 or Ecology and Evolutionary Biology 560; Microbiology 410. The master’s degree requires a minimum of 30 hours of study approved by the student’s committee, a thesis, and an oral examination. The minimum requirements for the doctoral degree include at least 6 hours above the 600 level, 24 hours of course 600, courses approved by the student’s committee, a comprehensive examination, a doctoral dissertation, and a defense of dissertation.

DEPARTMENT OF MATHEMATICS

http://www.math.utk.edu/

Michael Frazier, Head
David F. Anderson, Graduate Liaison

Professors
Alexiadis, V., PhD ........................................ Delaware
Anderson, D.F., PhD ...................................... Chicago
Daiverman, R.J., PhD ..................................... Wisconsin
Dobbs, D.E., PhD ........................................... Cornell
Dyjak, J., PhD ............................................... Warsaw (Poland)
Feng, X., PhD ............................................. Purdue
Frazier, M., PhD .......................................... UCLA
Gavrillets, S., PhD ....................................... Moscow State
Gross, L., PhD ............................................. Cornell

Gavrilets, S., PhD ........................................ Moscow State
Gross, L., PhD ............................................. Cornell

http://www.math.utk.edu/
Hinton, D.B., PhD                    Tennessee
Karakashian, O., PhD                Harvard
Lenhart, S., PhD                   Kentucky
Mulay, S., PhD                     Purdue
Plaut, C.P., PhD                   Maryland
Rajput, B.S., PhD                  Illinois
Richter, S., PhD                   Michigan
Rosinski, J., PhD                  Wroclaw (Poland)
Schaefer, P.W., PhD                Maryland
Simpson, H., PhD                   California Institute of Technology
Son, R.P., PhD                     Oregon State
Stephenson, K.R., PhD              Wisconsin
Sundberg, C., PhD                  Wisconsin
Thistlethwaite, M., PhD            Manchester (UK)
Wade, W.R., PhD                    California (Riverside)
Wagner, G.G., PhD                  Duke
Xiong, J., PhD                     North Carolina

Assistant Professors

Tzermias, P., PhD                  California (Berkeley)
Todorova, G.H., PhD               Moscow State
Freire, A., PhD                    Princeton
Schulze, T., PhD                  Northwestern

Associate Professors

Szczepanski, A., PhD              California (San Diego)
Sukanek, K., MS                   Mississippi
Bonee, K., MS                      Tennessee
Baiamonte, M., MS                  Texas A&M

Lecturers

Bonee, K., MS                      Tennessee
Campbell, T., MM                   Tennessee
Cook, T., MS                       Tennessee
Fowler, J., MA                     Kentucky
Gilbert, M., MS                    Tennessee
Guest, R., MS                      Baylor
Hagan, R., MS                      Tennessee
Howard, J., MS                     Tennessee
Kilianian, H., MS                  Tennessee
Linwood, D., PhD                   Courant Institute
Long, J., PhD                      Michigan
McCland, M., MA                   Murray State
Mount, J., PhD                     Illinois
Peery, M., MM                      Tennessee
Pringle, K., PhD                   Oregon
Reagan, R.D., MM                   Tennessee
Remus, C., MS                      Tennessee
Self, C., MS                       Tennessee
Smith, K., MM                      Tennessee
Stein, D., MS                      Tennessee
Sukanek, K., MS                    Mississippi
Szczepanski, A., PhD              California (San Diego)

For additional information, please visit the graduate Web site on the Department of Mathematics’ homepage at www.math.utk.edu.

MASTER OF MATHEMATICS

Mathematics Major

Before admission to the Master of Mathematics program, the applicant must have either (a) certification for teaching secondary mathematics in at least one state, or (b) three years of elementary school, secondary school, or community college teaching experience. Applicants must have successfully completed one year of calculus (141-142 or equivalent) and a course in matrix algebra (251 or equivalent).

Requirements

The following requirements must be met.

• Complete 30 hours of coursework of which 21 must be at the 500 level. The coursework must include 504, 505, 506, 507, and 6 hours in 509. At most, 6 hours may be taken outside the Department of Mathematics (selected in consultation with the advisor).

• Pass a final examination upon completion of all coursework.

In exceptional circumstances, part of admission requirement (b) might be satisfied concurrently with coursework. Normally, Master of Mathematics degree students will start the program by taking 504 during the summer.

MASTER OF SCIENCE

Mathematics Major

Requirements

The department offers two options for the Master of Science degree. The first option requires a thesis for which 6 hours must be earned along with 24 additional hours of work in acceptable courses numbered above 400. Of the additional hours, 6 may be in an area outside the department and 15 must be in courses in mathematics numbered above 500.

After one semester of graduate study, a student whose advisory committee gives its approval may choose the non-thesis option for which 30 hours in courses numbered above 400 are required. Of these, 21 hours (at least 15 of which must be in mathematics) must be in courses numbered above 500. Of the 30 hours, 9 in courses approved by the advisory committee may be taken in fields other than mathematics. This option also requires that a written final examination be passed and that credit be received for a reading course (598) in which a term paper or project is required.

APPLIED MATHEMATICS CONCENTRATION

Requirements

For this concentration, available under the thesis or the non-thesis option, the student must complete the following.

• Prerequisites – Mathematics 371, 471, or 472; 512 or both 431 and 435; 447-448 or 445-446; 453.

• One hour of Mathematics 519 or 589.

• One course from each of the following five areas.
  5. Statistics – Mathematics 525, 527; Statistics 571; Ecology and Evolutionary Biology 560.

The Mathematics Department has three graduate degrees -- the Master of Mathematics degree, intended primarily for teachers; the Master of Science degree, designed to prepare students for industrial employment and for teaching; and the Doctor of Philosophy degree, designed to prepare students for industrial employment and for college and university teaching and research. Contact the department office for additional information.

A graduate minor in mathematics requires at least 6 hours of resident graduate credit in courses numbered above 400. The courses must be approved by both the major department and the Department of Mathematics.
DOCTOR OF PHILOSOPHY
MATHEMATICS MAJOR

Requirements

For the PhD program in mathematics, the student must meet the following five requirements in addition to those of the Graduate Council.

• Demonstrate competency in advanced calculus and linear algebra by either a satisfactory performance on a diagnostic examination or by passing the appropriate 400-level course with a grade of B or better by the end of the student’s first year of graduate school. The appropriate course for advanced calculus is the 447-448 sequence and for linear algebra is the 457-458 sequence or 453.

• Satisfy either the standard program or the interdisciplinary mathematical ecology/evolution concentration. A student intending to work in mathematical ecology/evolution may complete either but is encouraged to complete the interdisciplinary mathematical ecology/evolution concentration.

• Take at least two different one-semester research seminars and 599.

• Pass an examination in the field of specialization after requirements in bullets 1-3 have been met. This examination will be given by a committee appointed by the department head. A student may take this specialty examination no more than two times.

• Pass a one-year, 600-level sequence in mathematics outside the student’s area of specialization. The sequence selected to fulfill this requirement must be approved by the department head and the student’s doctoral committee.

These requirements must be completed no later than the start of the student’s seventh year (as a mathematics graduate student at UT).

Standard Program

A student must pass written examinations on two of the following year-long sequences – algebra (551-552), analysis (545-546), computational and applied mathematics (571-572), differential equations (535-536), stochastics (523-524), and topology-geometry (561-562).

A student must pass one examination by the middle of his/her third year and both examinations by the middle of his/her fourth year. A student may not take any examinations after four failures.

In addition to the two year-long sequences chosen for the written examinations, a student must take four one-semester 500-level courses from the following list grouped by examination area – analysis (545-546, 545-547), computational and applied mathematics (571-572, 574, 575, 576, 577, 578), differential equations (513-514, 515-516, 531-532, 535-536, 537-538, 585), stochastics (521-522, 523-524, 525-526, 527), and mathematical ecology/evolution (583). Ecology and Evolution Biology 509, 511, 512, 514. For the purposes of this requirement, the following pairs of Ecology and Evolutionary Biology courses count as a one-semester course – 509/514, 511/514, and 512/514.

These four courses must contain a year-long sequence in an area different from the two written examinations and at least two areas different from the two written examinations. A grade of B or better is required in each of the four courses, with at least a B+ in two of the courses.

Intercollegiate Graduate Minor in Computational Science

The Department of Mathematics participates in the intercollegiate graduate minor in computational science (IGMCS) program. Any student pursuing a master’s or PhD with a major in Mathematics can receive a minor in computational science by completing the appropriate IGMCS requirements. For further information, see the description of the IGMCS listed under the Department of Computer Science. The Department of Mathematics also contributes courses to the IGMCS program curriculum.

DEPARTMENT OF MICROBIOLOGY

http://web.bio.utk.edu/micro/

Jeffrey M. Becker, Head
Pamela Small, Graduate Liaison

Professors
Becker, J.M., PhD ........................................... Cincinnati
Moore, R.N., PhD ........................................... Texas
Saylor, G.S., PhD .......................................... Idaho
Small, P.L.C., PhD ........................................ Stanford

Associate Professors
Jouline, I.B., PhD ........................................... St. Petersburg (Russia)
Wilhelm, S.W., PhD ....................................... Western Ontario (Canada)

Assistant Professors
Alexandre, G.M., PhD ................................. Université Claude Bernard Lyon (France)
Buchan, A., PhD ........................................... Georgia
Onami, T.M., PhD .......................................... California (San Diego)
Reynolds, T.B., PhD ...................................... Vanderbilt
Sangster, M.Y., PhD ................................. Western Australia (Perth)
Sparer, T.E., PhD ........................................ Emory University School of Medicine
Su, C., PhD ................................................ Penn State
Zinser, E.R., PhD ........................................ Harvard

Research Faculty
Fleming, J., PhD ........................................... Tennessee
Hause, M., PhD ........................................... California (Irvine)
Layton, A.C., PhD ...................................... Purdue
Lee, B-K, PhD ........................................... Tennessee
Pfiffer, S., PhD ........................................... Florida State
Ripp, S., PhD ........................................... Oklahoma State
Sanseverino, J., PhD ..................................... Lehigh

Lecturer
McPherson, F.E., MS ...................................... Tennessee

Adjunct Faculty
Biggerstaff, J., PhD ........................................ Brunel (England)
Keller, M., PhD ........................................... Regensburg (Germany)
Schadt, C., PhD ........................................... Colorado
Verberkmoes, N., PhD ................................ Tennessee
White, B., MAT ........................................... Memphis

MAJOR DEGREES
Microbiology

The Department of Microbiology offers both the Master of Science and Doctor of Philosophy. Students have the option of select-
lecting from a variety of graduate research programs. For a departmental brochure, contact the department head.

Admission
Students are expected to have completed an undergraduate program with a 3.00 or better GPA on a 4.00 system. Included in the undergraduate course credits should be a full year of general biological science; one year of calculus; two years of chemistry, including one year of organic; one year of physics; and an introductory course in microbiology. In many cases, deficiencies in requirements may be removed by taking appropriate courses during the first year of graduate study. The department also requires the general portion of the Graduate Record Examination. A satisfactory score on each part is 550 or higher with rare exceptions. Three letters of recommendation should be submitted by current or former faculty members.

Each new graduate student meets with an advisory committee chaired by the departmental Director of Graduate Studies to plan a program of study for the first one or two semesters until a research advisor is selected. All first-year students participate in a laboratory rotation program during the first semester of study. This program allows the student to adjust smoothly to the research programs of the department, to develop a background of research procedures and concepts, and to facilitate the selection of a research professor. Usually the student selects a research professor toward the end of the laboratory rotation period. The major professor assists in the selection of and carrying out of a suitable research program and in the naming of a thesis or dissertation committee.

MASTER OF SCIENCE
MICROBIOLOGY MAJOR
The program leading to the MS is designed to provide the student with broad basic knowledge, to permit the acquisition of technical competence in the fundamentals of research, and to encourage creative and independent thinking.

Requirements
Two to three calendar years are usually needed for the course of study that has the following requirements.
- 30 hours including 6 thesis hours.
- A 3.00 GPA in all courses taken for graduate credit after 12 hours have been earned in courses graded A-F.
- A 3.00 GPA in courses taken in the department.
- A complete course sequence in biochemistry or molecular biology.
- Presentation of a research thesis and its oral defense.

DOCTOR OF PHILOSOPHY
MICROBIOLOGY MAJOR
The program leading to the PhD is designed to develop the student's ability to pursue independent and original research in microbiology and allied fields, to teach both oral and written communication of the results of research to the scientific community, and to train effective teachers. Students may enter the program after receiving either a bachelor's or master's degree. Students who enter with a bachelor's degree usually receive the PhD after four or five years; those with a master's degree usually take three or four years to complete the degree.

Requirements
Departmental requirements are as follows.
- A 3.00 GPA in all courses taken for graduate credit after 12 hours have been earned in courses graded on the A-F scale.
- A 3.00 GPA in courses taken in the department.
- Satisfactory performance in at least one semester as a teaching assistant.
- One semester of physical chemistry.
- One course in statistics.
- Two semesters of biochemistry or molecular biology.
- Satisfactory performance in a comprehensive examination that must be attempted before the end of the fifth semester in the program and passed before admission to candidacy.
- The presentation of a research dissertation and its oral defense.

DEPARTMENT OF MODERN FOREIGN LANGUAGES AND LITERATURES
http://web.utk.edu/~mfll/
Chauncey J. Mellor, Interim Head
Stefanie Ohnesorg, Graduate Liaison

Professors
Briozo-Skov, F., PhD..........................Washington
Campion, E.J., PhD..........................Yale
Creel, B., PhD..........................California (Davis)
DiMaria, S., PhD..........................Wisconsin
Essl, J., PhD..........................Brown
Handelsman, M.H. (Distinguished Professor), PhD.............Florida
Hodges, C.R. (Dean of the Graduate School), PhD.............Chicago
Holmlund, C., PhD..........................Wisconsin
Holub, R. (Provost), PhD..........................Wisconsin
Levy, K.D., PhD..........................Kentucky
Mellor, C.J., PhD..........................Chicago
Rivera-Rodas, O., PhD..........................California (Davis)
Romeiser, J.B., PhD..........................Vanderbilt
Young, D.J., PhD..........................Texas

Associate Professors
Ayo, A., PhD..........................Arizona
Blackwell, S.H., PhD..........................Indiana
Cruz-Cámara, N., PhD..........................State University of New York (Buffalo)
Kaplan, G., PhD..........................Pennsylvania
LaCure, J., PhD..........................Indiana
Lee, D.E., PhD..........................Stanford
McAlpin, M.K., PhD..........................Columbia
Ohnesorg, S., PhD..........................McGill (Canada)
Pervukhina, N.K., PhD..........................Bryn Mawr
Silva-Filho, E., PhD..........................North Carolina

Assistant Professors
Arnold, M.N., PhD..........................Texas
Cano, L., PhD..........................Penn State
Dubriel, S., PhD..........................Emory
Duke, D., PhD..........................Pittsburgh
Gimmel, M., PhD..........................Indiana
Gregory, A., PhD..........................Texas
He, D., PhD..........................British Columbia
Horiguchi, N., PhD..........................Pennsylvania
Johnson, E., PhD..........................Tennessee
Kong, K., PhD..........................Michigan
Magillou, D.H., PhD..........................Princeton

MAJORS

French
German
Spanish
Modern Foreign Languages

First concentration
French
German
Spanish
Applied linguistics
French
German
Italian

DEGREES
MA
MA
MA
PhD
The Department of Modern Foreign Languages and Literatures offers graduate programs leading to the Master of Arts degree with majors in French, German and Spanish, and the Doctor of Philosophy degree with a major in modern foreign languages. Inquiries should be addressed to the graduate liaison.

MASTER OF ARTS

French Major

Thesis Option
- Completion of a minimum of 24 hours in coursework plus at least 6 hours in course 500 Thesis. French 501 is required. A maximum of 6 hours may be taken at the 400 level; the rest at the 500 level; and under certain conditions, the student may take 600-level seminars. If the student chooses to have a minor (such as Italian or Portuguese), at least 24 hours (including 6 hours of thesis) must be taken in the major and 6 hours in the minor.
- A thesis with a minimum of 6 hours in course 500.
- A written examination covering the coursework and selected items from a master reading list.
- A final oral examination covering the thesis.

Non-Thesis Option
- Completion of at least 30 hours with a maximum of 9 at the 400 level and the rest at the 500 level, including French 501. Under certain conditions, the student may take 600-level seminars. If the student chooses to have a minor (such as Italian or Portuguese), at least 24 hours must be taken in the major and 6 hours in the minor.
- A research paper from a course, which the candidate substantially expands with the approval of the committee.
- A written examination covering the coursework and selected items from a master reading list.
- A final oral examination to discuss the research paper.

German Major

Thesis Option
The minimum requirements are 24 hours of coursework and 6 hours of Thesis 500. German 510 and 519 are required, as are three courses on German literature or culture, one of which may be at the 400 level. Also, students must take three additional courses, only one of which may be chosen from 411-412 or 485. All graduate teaching assistants should take 512, and other candidates may take 512 or any other course above 500. A maximum of three 400-level courses may be counted toward the 24 hours of course credit. An exam over the designated reading list is required, as is a thesis defense and a standardized language exam, such as the Zentrale Mittelstufenprüfung. Students who are interested in future doctoral research and dissertation.

Non-Thesis Option
The minimum requirements are 30 hours of coursework, including at least one 600-level course for which a seminar paper is required. German 510 and 519 are required, as are three courses on German literature or culture, one of which may be at the 400 level. Also, students must take three additional courses, only one of which may be chosen from 411-412 or 485. All graduate teaching assistants should take 512, and other candidates may take 512 or any other 500-level course. A maximum of three 400-level courses may be counted toward the 30 hours of coursework. A common written exam over the designated reading list is required, as is a standardized language exam, such as the Zentrale Mittelstufenprüfung. Each non-thesis MA candidate will have a committee of three faculty members in German to whom the student will submit a dossier consisting of the seminar paper and one paper previously submitted in a graduate course. The length and type of the papers is described in greater detail in the Manual for Graduate Students in German.

Spanish Major

Thesis Option
- Completion of a minimum of 24 hours in coursework plus at least 6 hours in course 500 Thesis. Spanish 550 is required. A maximum of 6 hours may be taken at the 400 level; the rest at the 500 level; and under certain conditions, the student may take 600-level seminars. If the student chooses to have a minor (such as Italian or Portuguese), at least 24 hours (including 6 hours of thesis) must be taken in the major and 6 hours in the minor.
- A thesis with a minimum of 6 hours in course 500.
- A written examination covering the coursework and selected items from a master reading list.
- A final oral examination covering the thesis.

Non-Thesis Option
- Completion of at least 30 hours with a maximum of 6 at the 400 level and the rest at the 500 level, including Spanish 550. Under certain conditions, the student may take 600-level seminars. If the student chooses to have a minor (such as Italian or Portuguese), at least 24 hours must be taken in the major and 6 hours in the minor.
- Three term papers that have been accepted by the student's advisory committee.
- A written examination covering the coursework and selected items from a master reading list.

Doctor of Philosophy

Modern Languages Major

The PhD with a major in modern foreign languages requires advanced training in a major language (French, German, Spanish) and either a second language (French, German, Italian, Portuguese, Russian, Spanish) or applied linguistics.

Admission
Applicants must have completed a BA in French, German or Spanish to be accepted into this program. Both graduates of institutions in the United States and those with undergraduate degrees from institutions outside the United States must have a grade point average of at least 3.00. Consideration will also be given to applicants who do not have an undergraduate degree in one of the three foreign languages but do have the equivalent of an undergraduate major in one of them.

Requirements
Candidates must complete a minimum of 63 hours of coursework beyond the bachelor's degree in addition to 24 hours of doctoral research and dissertation.

For candidates with French or Spanish as a first concentration, two tracks are available.

- **Track I.** The coursework for Track I must be distributed as follows: at least 39 hours in the first concentration; at least 18 hours in the second concentration; and at least 6 hours in a cognate field or in either the first or second concentration as approved by the student’s graduate committee.

- **Track II.** The coursework for Track II must be distributed as follows: at least 45 hours in the first concentration; at least 12 hours in the second concentration; and at least 6 hours in a cognate field or in either the first or second concentration as approved by the student’s graduate committee. Because Track II students will have taken 12 graduate hours instead of 18 hours in the second concentration, they will normally not be eligible to teach that field at insti-
tutions which follow SACS guidelines for college foreign language teaching.

The coursework for all concentrations must be distributed as follows:

- **First Concentration: German.** A minimum of 39 hours of German courses beyond the bachelor’s degree, distributed as follows.
  - **400 level** – A maximum of 6 hours of 400-level classes taken for the MA may be applied.
  - **500 level** – A minimum of 21 hours must be taken. These must include German 512, 519, and 560. These hours are excluded if 512 is used as part of a second concentration in applied linguistics, another course must be substituted in the first concentration.
  - **600 level** – A minimum of 12 hours must be taken, exclusive of dissertation hours.

- **First Concentration: French or Spanish.** A minimum of either 39 (Track I) or 45 (Track II) hours of French or Spanish courses beyond the bachelor’s degree, distributed as follows.
  - **400 level** – A maximum of 6 hours of 400-level classes taken for the MA may be applied.
  - **500 level** – A minimum of 21 (Track I) or 27 (Track II) hours must be taken. These must include French 512, 519, 584 or Spanish 512 and 550. These hours are excluded if 512 is used as part of a second concentration in applied linguistics, another course must be substituted in the first concentration.
  - **600 level** – A minimum of 12 hours must be taken, exclusive of dissertation hours.

- **Second Concentration.** A minimum of 18 (German or Track I) or 12 (Track II) hours beyond the bachelor’s degree, taken in the field of applied linguistics or in a second language, either French, German, Italian, Portuguese (Track II only), Russian or Spanish. For Track I and German, 12 of these hours must be at the 500 level or above. For Track II, 3 of these hours must be at the 500 level or above.

**French students choosing applied linguistics** must take French 421 or 429; 425; 512; and 9 (Track I) or 3 (Track II) hours of appropriate electives in English or French.

**German students choosing applied linguistics** must take German 425, 435 or 510, 512, 3 hours of German linguistics, such as 426, 436, 631, or 632, and 6 hours of linguistics electives in English or German.

**Spanish students choosing applied linguistics** must take Spanish 421 or 429; 425; 512; and 9 (Track I) or 3 (Track II) hours of appropriate electives in English or Spanish. The student’s graduate advisor must approve the electives chosen.

**Cognate Field.** Six hours in graduate courses numbered 400 and above in a field outside the department or language family of the first concentration but related to the student’s principal area of research. Students choosing applied linguistics as a second concentration are strongly urged to take their cognate work in a second language. With the consent of the student’s graduate committee, the 6 hours in the cognate field may be substituted by 6 hours in either the first or second concentration.

**Additional requirements.** For any languages taken as a first or second concentration, a student must demonstrate competence by taking a test. The test will include reading, writing, listening, and speaking, and should be completed by the time the student reaches 40 hours of study beyond the bachelor’s degree. Standardized examinations that may be used for this purpose include applicable portions of either the National Teachers Examination, the MLA Examination for Teachers and Advanced Students, or the proficiency standards of the United States Foreign Service Institute (FSI).

For students choosing applied linguistics as an area of second concentration, reading competence in a second language is required. Competence will be determined by translation of a text from the foreign language into English, the test will be administered by the department.

A comprehensive examination on the language and literature of the first and second concentrations must be passed before the student may be admitted to candidacy. The candidate is required to defend his/her dissertation in an oral examination. Central emphasis is put on the doctoral dissertation as a final test of the candidate’s scholarly qualifications.

Graduate Teaching Assistants with a second concentration in another language should have the opportunity and will be strongly encouraged to instruct in the languages of both their first and second concentration, subject to staffing needs. Doctoral students are strongly encouraged to reside and study abroad and will be assisted in identifying potential sources of financial support (e.g., Fulbright, McClure, Rotary fellowships).

**SCHOOL OF MUSIC**

[Link to website]

Roger L. Stephens, Director
Angela L. Batey, Associate Director for Graduate Studies

**Proфессors**

- Bayne, P.S., MLS - North Carolina
- Brock, J.P., MM - Alabama
- Coker, J., MA - Sam Houston
- Jacobs, K.A., DMA - Texas
- Leach, C.F., DM - Northwestern
- McCandless, W.S., MM - Wisconsin
- McClelland, D.K., MA - Columbia
- Moore, M.C., PhD - Michigan
- Northington, D.B., DMA - Yale
- Pederson, D.M., PhD - Iowa
- Sousa, G.D., PhD - Ohio State
- Stephens, R., MM - East Carolina
- Stulnberger, D.R., DMA - Maryland

**Associate Professors**

- Adams, F., MM - Tennessee
- Baldwin, W., DMA - Maryland
- Batey, A.L., DMA - South Carolina
- Binder, S., DM - Florida State
- Boling, M., MM - Tennessee
- Brown, D.R., MM - Wisconsin
- Brunell, D., DM - Indiana
- Carter, P.Z., MM - Colorado
- Freeman, C., MPA - Oklahoma City
- Gay, L.C., PhD - Columbia
- Murphy, B.A., PhD - Ohio State
- Ryser, D., PhD - Kent State
- Ryder, D., DMA - Iowa
- Searle, S.R., MM - Tennessee
- Smith, C., BM - State University of New York
- Sperl, G.R., MM - Indiana
- Stephens, M.B., MA, MM - Ohio State
- Wentzel, A.N., MM - Southern California
- Zel'manovich, M., MA - Lvov

**Assistant Professors**

- Al-Tar, N., PhD - California (Los Angeles)
- Carlson, R.G., PhD - North Carolina
- DiSimone, L., MM - New England Conservatory of Music
- Douglass, M., MM - Tennessee
- Ewell, P., PhD - Yale
- Fellenbaum, J., MM - Northwestern
- Frigo, C., DMA - South Carolina
- Hawthorne, W.W., PhD - Cincinnati
- Skoog, A., MA - Stephen F. Austin
- Stewart, M., PhD - Ohio State
Lecturers
Brown, K., BA .................................................. Tennessee
Holloway, H., BM .............................................. Tennessee
McCollough, S., MM .......................................... Tennessee

Part-time Lecturers
Carlson, J., PhD .................................................. Duke
Douglas, E., MM .................................................. Tennessee
Dunne-Sousa, D., PhD ......................................... Ohio State
Hart-Reilly, K., BM ............................................. Tennessee
Ladd, K., PhD .................................................... Ohio State
Miller, H., PhD .................................................. Maryland
Secrist, P., MM .................................................... Yale
Thompson, D.V., MM .......................................... DePaul
Vincent, L., MM ................................................... Tennessee
Werner, W., MM ................................................... Tennessee

MISSION STATEMENT

The mission of the School of Music is to provide the highest quality instruction in the musical arts and to cultivate creative activity and research in the areas of composition, education, musicology, pedagogy, performance, and theory. As part of its mission, the school enriches the musical and educational lives of its students, the university community and citizens of Tennessee. In support of this mission, the school's curricula and course offerings are designed to:

- Develop technical and artistic abilities in performance.
- Foster individual and collaborative work.
- Promote an understanding of theoretical, historical and cultural studies of music.
- Provide skills in teaching and the knowledge of educational principles.
- Encourage interpretive, creative and scholarly expression. Such preparation enables students to be competitive in music careers and related fields and to continue study at an advanced level.

To foster a greater understanding of music, the faculty regularly engage in artistic, educational, and scholarly activities through performances, workshops, publications, and participation in professional organizations.

The school fulfills its service mission to enrich the educational and cultural life of the university community at large by offering a broad range of courses, performance opportunities, as well as public concerts, recitals, and musical productions.

The school also aims to promote a greater understanding of cultural diversity among faculty and students; build a diverse student and faculty community; and offer curricula that require students to engage with the musical richness of our world and develop their own musical identities within an increasingly interconnected globe.

MASTER OF MUSIC

Music MAJOR

Applications must have completed an undergraduate degree that is approximately equivalent in music requirements to degrees conferred by the University of Tennessee, Knoxville, with a major appropriate to the applicant's prospective area of concentration on the master's level.

Applicants who plan to pursue the concentration in performance or music education are required to audition for the appropriate area faculty. Applicants for admission to the program in composition must submit scores and tape recordings of representative works. Applicants for the concentration in jazz, if appropriate, must audition in jazz improvisation and jazz piano proficiency and interview with members of the faculty in this area. Other applicants are required to have an interview with members of the faculty of the prospective area of concentration.

All entering master's degree students are required to take diagnostic examinations in music theory, ear-training, and music history/literature. These examinations are given by the School of Music at the beginning of each semester.

Requirements

A minimum of 33 hours of coursework is required for the Master of Music degree. These hours are specifically distributed according to the area of concentration. All concentrations require coursework in music bibliography, music history/literature and music theory and allow for elective courses. Specific curricula are available from the school. All concentrations require a written and oral final examination.

A thesis is required of students in composition, musicology, and music theory. A graduate recital or performance project is given in lieu of thesis by students with concentrations in performance, pedagogy, jazz, accompanying, choral conducting, and instrumental conducting.

The concentration in music education is designed for persons who hold a bachelor's degree in music or music education and certification to teach music in the public schools. Both thesis and non-thesis options are available.

ARTIST CERTIFICATE IN MUSIC

The Artist Certificate in Music is a full-time graduate performance program designed to prepare the most talented, outstanding keyboard and string performers for careers as professional performing musicians. Students accepted into this certificate program must demonstrate the ability to perform advanced repertoire with technical and artistic mastery and have the potential for success at major competitions or auditions for major orchestras, or want to begin a professional career. Students will take courses that build the repertoire, artistry, and performance skills necessary for a professional performer.

Admission

Applicants to this graduate certificate program must hold a minimum of the bachelor's degree or equivalency, and follow the procedures and regulations for applying for admission to graduate study at the University of Tennessee, Knoxville, and the Graduate Division of the School of Music. Required credentials for admission to the School of Music include an application, university application fee, official transcripts of all post-secondary studies, two letters of recommendation, and a repertoire list. Students whose first language is not English must submit TOEFL results of 550 (paper-based test), 213 (computer-based test), or 80 (Internet-based Test) or higher to be considered for admission.

Final admission to the certificate program is granted following successful completion of a thirty-minute admission audition. The audition repertoire should include selections demonstrating the student's ability to perform in various musical styles. If distance to the audition is a hardship, applicants may submit a thirty-minute...
videotape/DVD (public performance preferred). The student must also present a live audition before a designated faculty committee during the first semester of residence.

Once accepted, all students are required to take the diagnostic examinations in musicology, area literature, music theory, and ear training before registering for courses. The examinations are given on the first day of registration each semester, beginning at 9:00 a.m. and concluding at approximately 4:00 p.m. Each entering student should notify the graduate secretary to indicate the semester that s/he intends to enter and take the examinations.

Program of Study

Students may specialize in string or keyboard performance. To receive the artist certificate in music, the student must successfully complete an artist certificate curriculum of at least 19 hours (see School of Music Graduate Handbook, available in 211 Music Building) with a cumulative GPA of 3.00 or better. The curriculum is centered on intensive activities related to performance, including private lessons, large and small ensembles, recitals, and courses in area literature, performance practices, and repertoire. Courses chosen for music electives should be lecture courses. All required recitals are to be performed in public with a committee of the School of Music faculty in attendance. Enrollment for a minimum of two semesters is required with a maximum of two years allowed for completion of the program. The School of Music may require additional hours. All course requirements must be completed at the University of Tennessee, Knoxville.

DEPARTMENT OF PHILOSOPHY

http://web.utk.edu/~philosophy/

John R. Hardwig, Head
Denis Arnold, Graduate Liaison

Professors

Aquila, R.E., PhD ........................................ Northwestern
Graber, G.C., PhD ........................................ Michigan
Hardwig, J.R., PhD ........................................ Texas
Nolt, J.E., PhD ........................................ Ohio State
Postow, B.C., PhD ........................................ Yale

Associate Professors

Arnold, D., PhD ........................................ Minnesota
Hamilin, H.P., PhD ........................................ Georgia
Reidy, D.A., JD, PhD ........................................ Kansas

Assistant Professors

Coffman, E.J., PhD ........................................ Notre Dame
Douglas, H., PhD ........................................ Pittsburgh
Shaw, J.C., PhD ........................................ Washington (St. Louis)

Adjunct Faculty

Gale, R.M., PhD ........................................ New York

MAJOR DEGREES

Philosophy MA
Religious studies concentration

Philosophy PhD

The MA program includes thesis and non-thesis options and offers a concentration in religious studies. Detailed information may be obtained from the Director of Graduate Studies in Philosophy. Details concerning the religious studies concentration may be obtained from the Director of Graduate Studies in the Department of Religious Studies.

MASTER OF ARTS

PHILOSOPHY MAJOR

Requirements

Thesis Option

The course requirements for an MA with thesis are 30 hours, including 6 hours in Philosophy 500. Of non-thesis hours, at least two-thirds must be in courses at or above the 500 level. See the department’s graduate student handbook for more specific details.

Non-Thesis Option

The non-thesis MA requires 30 hours of coursework of which at least two-thirds must be in courses at or above the 500 level. Students seeking the non-thesis option must also pass a final written examination on all work offered for the degree. An additional oral examination may be required. As a part of the master’s degree, and in addition to a final comprehensive examination, a culminating (capstone) experience is expected. Examples of culminating experiences include presenting a paper at a refereed national or regional philosophy conference or presenting a paper at a departmental colloquium.

DOCTOR OF PHILOSOPHY

PHILOSOPHY MAJOR

Requirements

Students will ordinarily hold an MA with a major in philosophy or an equivalent degree when entering the PhD program. However, highly qualified applicants without an advanced degree may be admitted directly to the PhD rather than MA program if that is their preference. For students taking an MA in our department, 24 hours of additional coursework beyond those applied to the MA degree are required. For students admitted directly into the program without an advanced degree, 48 hours of coursework are required. For those admitted with advanced degrees in other fields, the number of hours required will be determined by the Graduate Committee. In all cases, this does not include credit hours for work on the dissertation (Philosophy 600) and the student’s dissertation committee may require additional coursework at its discretion. See the department’s graduate student handbook for more specific requirements.

Students must normally demonstrate a reading knowledge of one living foreign language in which there exists a significant body of philosophical literature. (In special circumstances relating to the area of dissertation research, the Graduate Committee may approve a language not satisfying these conditions or the requirement of a foreign language may be waived in favor of other appropriate research skills, if approved by the Graduate Committee upon recommendation by the Director of Graduate Studies.)

DEPARTMENT OF PHYSICS AND ASTRONOMY

http://www.phys.utk.edu/

Soren P. Sorensen, Head
Marianne Brinig, Director of Graduate Program

Professors

Barnes, F.E. (Joint Faculty), PhD ........................................ California
Bingham, C.R., PhD ........................................ Tennessee
Blass, W.E., PhD ........................................ Michigan State
Breinig, M.J., PhD ........................................ Oregon
Callicott, T.A., PhD ........................................ Purdue
Cardall, C.Y. (Joint Faculty), PhD ........................................ California
Compton, R.N., PhD ........................................ Tennessee
Crater, H.W. (UTSI), PhD ........................................ Yale
Dagotto, E.R. (Distinguished Professor), PhD ........................................ Bariloche (Argentina)
Dai, P., PhD ........................................ Missouri
Davis, L. (UTSI), PhD ........................................ Auckland (New Zealand)
Eguiluz, A.G. (Joint Faculty), PhD ........................................ Brown
Elston, S.B., PhD ........................................ Massachusetts
Georgiou, S., PhD ........................................ Manchester (UK)
Greene, G.L. (Joint Faculty), PhD ........................................ Harvard
Guidry, M.W., PhD ........................................ Tennessee
Handler, T., PhD ........................................ Rutgers
Kamyshkov, I., PhD ........................................ ITEP (Russia)
Levin, J.C., PhD ........................................ Oregon
Macek, J. (Distinguished Professor), PhD ........................................ Rensselaer Polytechnic Institute
Moreo, A. (Joint Faculty), PhD ........................................ Bariloche (Argentina)
Nazarewicz, W., PhD ............................................Warsaw (Poland)
Painter, L.R. (Special Assistant to the Chancellor), PhD ........Tennessee
Pegg, D.J., PhD ....................................................... New Hampshire
Plummer, E.W. (Distinguished Professor), PhD ..................Cornell
Quinn, J.J. (Lincoln Chair), PhD .................................. Maryland
Read, K.F. (Joint Faculty), PhD .....................................Cornell
Riedinger, L.L. (Interim Vice Chancellor for Research), PhD ..........Vanderbilt
Shib, C.C., PhD ....................................................... Cornell
Siopsis, G., PhD ....................................................California Institute of Technology
Sorensen, S.P., PhD .................................................Copenhagen (Denmark)
Thompson, J.R., PhD ..............................................Duke
Weitinger, H.H. (Joint Faculty), PhD ............................Groningen (Netherlands)
Zhang, Z. (Joint Faculty), PhD .....................................Rutgers
Associate Professors
Efremenko, Y.Y. (Joint Faculty), PhD ......................ITEP (Russia)
Pariggar, C. (UTSI), PhD ...........................................Otago (New Zealand)
Assistant Professors
Barzykin, V., PhD.....................................................Illinois
Grzywacz, R., PhD ................................................Warsaw (Poland)
Jones, K.L., PhD ....................................................Surrey (England)
Papenbrock, T.F. (Joint Faculty), PhD ......................Heidelberg (Germany)
Spanier, S.M., PhD ................................................Mainz (Germany)
Director of Undergraduate Laboratories
Parks, J.E., PhD .......................................................Kentucky

MAJOR DEGREES

Physics MS
Astrophysics concentration
Atomic, molecular, optical, and low temperature physics concentration
Biophysics concentration
Chemical physics concentration
Condensed matter and surface physics concentration
Elementary particle physics concentration
Geophysics concentration
Health physics concentration
Mathematical and computational physics concentration
Nuclear and relativistic heavy ion physics concentration
Theoretical physics concentration

Physics PhD
Astrophysics concentration
Atomic, molecular, optical, and low temperature physics concentration
Biophysics concentration
Chemical physics concentration
Condensed matter and surface physics concentration
Elementary particle physics concentration
Geophysics concentration
Health physics concentration
Mathematical and computational physics concentration
Nanomaterials concentration
Nuclear and relativistic heavy ion physics concentration
Theoretical physics concentration

Departmental graduate programs leading to the MS and the PhD are also available at the University of Tennessee Space Institute, Tullahoma, where opportunities for study and research are available in laser applications, quantum and applied optics, laser spectroscopy, fluid physics, medical physics, computational physics, and theoretical physics. For additional information, contact the department head.

Admission
A student who enrolls in graduate study with the intention of attaining an advanced degree in physics will have completed an undergraduate major in physics or its equivalent. Physics 311-312, 321, 361, 431-432, 421, 461, and 411-412 constitute the minimum coursework prerequisite to graduate study.

A student who intends to present physics as a graduate minor will have completed an undergraduate minor in physics or its equivalent. Physics 311 and 431-432 constitute the minimum coursework prerequisite to a minor in physics.

In addition to meeting the Graduate Council’s minimum requirements, applicants are strongly encouraged to submit scores from the Graduate Record Examination (general and subject).

All first-year graduate students are required, for advising purposes only, to take a diagnostic examination in undergraduate physics during the fall semester registration period.

MASTER OF SCIENCE PHYSICS MAJOR

Requirements

Thesis Option
The course requirements include 24 hours of physics courses, of which at least 12 hours are taken from Physics 506, 511-512 or 513-514, 521-522, 531, 541, 571, 573. Each candidate must present an acceptable thesis, 6 hours of 500, and pass an oral examination on course material and thesis.

Geophysics concentration. The department offers an MS thesis program with a concentration in geophysics. Program requirements are 12 hours from Physics 506, 513-514, 521-522, 531, 541, 571, 573; a minimum of 12 additional hours in geology, geophysics, and/or physics, as approved by the student’s committee; and the presentation of an acceptable thesis, 6 hours of Physics 500, and the passing of an oral examination on course material and thesis.

Project Option
The course requirements include a minimum of 30 hours of graduate credit in courses composed of Physics 506, 511-512; 6 hours from Physics 593, 594 for a Project in Lieu of Thesis; 9 hours from 411-412, 421, 431-432, 461-462, 507, 508, 521-522, 531, 541, 555, 571, 573 (at least 3 hours above the 500 level); and 6 hours from a single minor field outside of the Physics Department, such as computer science, mathematics, engineering, chemistry, biology, education, business, or law.

The candidate must pass an oral examination on course material and on the project representing the culmination of an original research project completed by the student. A written report must be approved and accepted by the Physics Graduate Committee and the department head. An electronic version of the written report must also be submitted to the permanent electronic archive of the Physics Department available on the Internet.

Non-Thesis Option
Students seeking the non-thesis option must apply to the department’s graduate committee for permission to enroll under this program. The requirements are the satisfactory completion of 30 hours of coursework composed of 18 hours from Physics 506, 511-512 or 513-514, 521-522, 531, 541, 571, 573; a minimum of 12 additional hours in geology, geophysics, and/or physics, as approved by the student’s committee; and the oral examination on course material and thesis.

DOCTOR OF PHILOSOPHY PHYSICS MAJOR

Requirements

All students are expected to take the graduate core curriculum in physics consisting of Physics 521-522, 531, 541, 551, and 571. Students concentrating in chemical physics may substitute Chemistry 572 for Physics 551 and should complete at least 6 hours from Chemistry 530, 570, 571, 573, 595, 630, 670, and 690. Students must take a minimum of 15 hours of 600-level courses with 6 of these hours in their concentration area. Physics 601-602 are normally required of students concentrating in atomic physics; Physics 621-622 of students in nuclear physics; Physics 626-627 of students in elementary particle physics (and/or Physics 611-612 for students concentrating in theoretical elementary particle physics); Physics 615-616 of students in astrophysics and cosmology; and Physics 671-672 of students in condensed matter and surface physics.

Students concentrating in nanomaterials must take a minimum 15 hours of 600-level courses, of which at least 6 hours are offered by the department and at least 6 hours are from a list of
courses offered by several departments which are appropriate for a concentration in nanomaterials. This list is available from the Director of the Graduate Program. In addition to the departmental core curriculum listed above, they must take additional courses at the 400- through 500-level, with at least 6 hours offered by the department and 6 hours from the list.

To be admitted to PhD candidacy, students must fulfill all general requirements of the Graduate Council; pass the qualifying examination; have at least a 3.00 GPA on the graduate core curriculum in physics; form a doctoral committee; and pass the comprehensive examination.

The qualifying examination is designed to test the student's general knowledge of the fundamentals of physics. The performance needed to pass this examination corresponds to a mature command of the material typically included in the undergraduate physics major curriculum. The qualifying examination should be passed after the student's first year of study. Based on the student's performance on the qualifying examinations, the coursework, the GRE scores, and optional research participation, the faculty will decide if the student will be allowed to continue in the PhD program.

Students are required to find a research advisor and form a doctoral committee before the end of the second year of study. This committee is responsible for advising the student and monitoring his/her progress toward the doctoral degree.

The comprehensive examination is designed to test the student on specific knowledge and skills in the areas essential to the student's research program; on capability to successfully complete the doctoral dissertation; and on general knowledge of the graduate core curriculum. The most essential component of this examination is the presentation and defense of an original research proposal. The comprehensive examination must be passed before the end of the third year of study. It contains both a written and an oral component and is conducted by the student's doctoral committee and an additional faculty member appointed by the department head.

The dissertation topic will be chosen with reference to one of the fields in which research facilities can be made available either at the University of Tennessee laboratories in Knoxville; the University of Tennessee Space Institute at Tullahoma, Tennessee; the Oak Ridge National Laboratory, Oak Ridge, Tennessee; or at other research facilities used by the university faculty.

Intercollegiate Graduate Minor in Computational Science

The Department of Physics and Astronomy participates in the intercollegiate graduate minor in computational science (IGMCS) program. Any student pursuing a master's or PhD with a major in Physics can receive a minor in computational science by completing the appropriate IGMCS requirements. For further information, see the description of the IGMCS listed under the Department of Computer Science. The Department of Physics also contributes courses to the IGMCS program curriculum.

DEPARTMENT OF POLITICAL SCIENCE

http://web.utk.edu/~polisci/

David L. Feldman, Head
Robert Gorman, Graduate Coordinator

Professors

Cunningham, R.B., PhD ............................ Indiana
Feldman, D.L., PhD ................................. Missouri
Fitzgerald, M.R., PhD .............................. Oklahoma
Folz, D.H., PhD ................................. Tennessee
Freeland, P.K., PhD ............................... Wisconsin
Gant, M.M., PhD ................................. Michigan State
Gorman, R., PhD ................................. New York
Lyons, W., PhD ..................................... Oklahoma
Scheb, J.M., PhD ................................. Florida

Associate Professors

Houston, D.J., PhD .............................. State University of New York (Binghamton)
Nownes, A.J., PhD ................................. Kansas

Assistant Professors

Brule, D.J., PhD ................................. Texas A&M
Down, I., PhD ................................. North Carolina
Hwang, W., PhD ................................. Michigan State
Jepson, E., PhD ................................. Wisconsin
Kelly, N., PhD ................................... North Carolina
Morgan, J.M., PhD ............................... North Carolina

MAJORS DEGREES
Planning
- Environmental planning concentration
- Land use planning concentration
- Political science concentration
- Public administration concentration
- Real estate development/economic development concentration
- Transportation planning concentration
- Urban design concentration

Political Science
- MA, PhD

Public Administration
- MPA, JD-MPA

The Department of Political Science offers the Master of Arts, Master of Public Administration, Master of Science in Planning, and Doctor of Philosophy. The department also offers a dual program with the College of Law. Inquiries concerning all programs should be directed to the departmental office.

Admission

Three departmental recommendation forms must be submitted to the Department of Political Science, at least two of which must be completed by instructors at the institution most recently attended. In addition, scores on the general portion of the Graduate Record Examination must be submitted.

MASTERS OF ARTS

POLITICAL SCIENCE MAJOR

Admission

A bachelor’s degree or its equivalent is required for admission. Normally an overall average of 3.00 is also required together with an average of 3.20 in the last two years of political science or social science. In addition, a composite score of at least 1100 on the verbal and quantitative parts of the GRE is normally required.

Requirements

Thesis Option (30 hours)

Coursework, preparation of a thesis, and an oral examination on coursework and the thesis, are required. At least 12 hours must be in political science, with 6 in the field of methodology (Political Science 510 and either 511 or 512). Six hours may be earned through thesis credit.

Non-Thesis Option (36 hours)

Coursework, and a written comprehensive examination on all coursework are required. At least 12 hours must be in political science with 6 in the field of methodology (Political Science 510 and either 511 or 512) and 3 hours in the 600-level research seminar in the student’s first field of interest.
MASTER OF PUBLIC ADMINISTRATION
PUBLIC ADMINISTRATION MAJOR

The MPA program is intended to prepare students for public service careers by acquainting them with management principles, analytical tools, and the ethical dilemmas they will face as public administrators. It consists of a total of 39 hours, including a core program, an elective specialization and a recommended internship.

Admission

Applicants for admission to the program must have a bachelor's degree or its equivalent. Normally, an overall average of 3.00 and an average of 3.20 in the last two years of political science or social science courses are required. In addition, a composite score of 1100 on the verbal and quantitative parts of the GRE is desired.

Students must demonstrate proficiency in the use of software applications for the personal computer. This requirement can be fulfilled by achieving a satisfactory grade in Political Science 596. Exceptions to this requirement will be considered on an individual basis.

Requirements

The MPA is a non-thesis program requiring 39 hours. Specific requirements include the following.

Core Curriculum (24 hours)

General Perspectives (9 hours) – 550, 552, and one from 442, 539, 540, 548, 558, or 566.

Analytical skills (6 hours) – 512, 514.

Management skills (9 hours) – 560 and two from 556, 562, 564.

Specialization (9 hours) – A specialization is designed by the student in consultation with the coordinator of the MPA program. Possible specializations include general government, public health, budgeting and finance, planning, natural resources, program evaluation, criminal justice, public relations, personnel, and others.

Recommended Internship (6 hours) – Internships are arranged in consultation with the coordinator of the MPA program.

Final Examination – A written final examination, which may be followed by an oral examination, is required.

DUAL JD-MPA

The College of Law and the Department of Political Science in the College of Arts and Sciences offer a coordinated dual degree program leading to the conferral of both the Doctor of Jurisprudence and Master of Public Administration degrees. In this program, a student may earn the MPA and JD in about four years rather than the five years that otherwise would be required. Students pursuing the dual degree program should plan to be enrolled in coursework or an internship for one summer term in addition to taking normal course loads for four academic years.

Admission

Applicants for the JD-MPA program must make separate application to, and be independently accepted by, the College of Law for the JD and the Department of Political Science and the Office of Graduate and International Admissions for the MPA degree. Applicants must also be accepted by the dual degree committee. All applicants must submit a Law School Admission Test (LSAT) score. An applicant’s LSAT score may be substituted for the Graduate Record Examination (GRE) score, which is normally required for admission to the MPA program. Application may be made prior to or after matriculation in either the JD or the MPA program, but application to the dual program must be made prior to entry into the last 29 hours required for the JD and prior to entry into the last 15 hours required for the MPA.

Requirements

A dual degree candidate must satisfy the requirements for both the JD and the MPA degrees, as well as the requirements for the dual program. The College of Law will award a maximum of 9 hours of credit toward the JD degree for successful completion of approved graduate-level courses (500 or 600 level) offered in the Department of Political Science. The MPA program will award a maximum of 9 hours of credit toward the MPA degree for successful completion of approved courses offered in the College of Law. All courses for which such cross-credit is awarded must be approved by the JD-MPA coordinators in the College of Law and the Department of Political Science. All candidates for the dual degree must successfully complete Administrative Law (Law 821). An internship is strongly recommended for students in the dual degree program, as it is for all MPA candidates, but an internship is not required.

During the first two years in the dual program, students will spend one academic year completing the required first year of the College of Law curriculum and one academic year taking courses solely in the MPA program. During those first two years, students may not take courses in the opposite area without the approval of the JD-MPA coordinators in both academic units. In the third and fourth years, students are strongly encouraged to take both law and political science courses each semester.

Dual degree students who withdraw from the program before completion of the requirements for both degrees will not receive credit toward either the JD or the MPA degree for courses taken in the other program except as such courses qualify for credit without regard to the dual program.

Awarding of Grades

For grade recording purposes in the College of Law and the Department of Political Science, grades awarded in courses in the other unit will be converted to either Satisfactory or No Credit and will not be computed in determining a student’s GPA or class standing. The College of Law will award a grade of Satisfactory for an approved MPA course in which the student earns a grade of B or higher and a grade of No Credit for any lower grade. The Political Science Department will award a grade of Satisfactory for an approved law course in which the student earns a grade of 2.30 or higher and a grade of No Credit for any lower grade. The official academic record of the student maintained by the Office of the University Registrar shall show the actual grade assigned by the instructor without conversion.

MASTER OF SCIENCE IN PLANNING
PLANNING MAJOR

The Master of Science in Planning (MSP) degree is the normal route for entry into professional positions in urban and regional planning or related fields. Graduates are candidates for positions in regional, city, county, and metropolitan planning agencies; in local, state, and federal agencies concerned with physical, economic, and administrative planning; in private business and organizations dealing with development problems; and in private consulting. The Planning Accreditation Board, a joint undertaking of the American Institute of Certified Planners and the Association of Collegiate Schools of Planning, accredits the MSP program.

Admission

Applicants for admission to the program must have a bachelor’s degree or its equivalent. Normally, an overall grade point average of 3.00 and an average of 3.20 in the last two years of un-
undergraduate courses are required. In addition, a composite score of 1100 on the verbal and quantitative parts of the GRE is desired. Students must demonstrate proficiency in the use of software applications for the personal computer, as well as in statistics. Taking an undergraduate statistics course can satisfy the latter. Achieving a satisfactory grade in Political Science 596 can fulfill the software applications requirement. Exceptions to this requirement will be considered on an individual basis.

Requirements
The MSP is a non-thesis program requiring 43 hours. Specific requirements include the following.

- **Core Curriculum (28 hours)** – 514, 531, 560, 581, 582, 583, 584, 585, 589, and 596 (1 hour). Students should plan to enter the program in the fall term to take core courses in the proper sequence.
- **Concentration (9 hours)** – Each student must choose a concentration from the environmental planning, land use planning, political science, public administration, real estate development/economic development, transportation planning, and urban design. Concentration courses are drawn from a prescribed set in the subject area from the department's curriculum and from other departments in the university.
- **Recommended Internship (6 hours)** – Internships are arranged in consultation with the coordinator of the MSP degree program.
- **Comprehensive Exam** – Each student must pass a final comprehensive exam. Successful completion of a comprehensive exam is required before graduation. The exam will normally be taken after completion of the core requirements in the second year. Based on the material generally used by the American Institute of Certified planners (AICP), this requirement provides an additional capstone experience as well as preparation for meeting AICP professional certification requirements.

**DOCTOR OF PHILOSOPHY**

**POLITICAL SCIENCE MAJOR**

The PhD program prepares students for careers in college teaching, as well as careers in other occupations related to service in the public or private sectors.

Admission
Applicants for admission to the program should normally have completed a master's degree in political science or a related field with a 3.50 GPA and have earned a composite score of at least 1100 on the verbal and quantitative parts of the Graduate Record Examination.

Requirements
Doctoral students admitted to the program must complete 84 hours beyond the bachelor's degree, including 24 hours of coursework beyond the master's degree, graded A-F, must successfully pass written comprehensive examinations in two broad subfields of political science, and must pass a final oral examination on the dissertation.

In addition, students must satisfy a research tool requirement. Usually, students meet this requirement by completing 12 hours of coursework numbered above 500 in empirical theory and research methodology. However, if a student's advisor and program committee certify that competency in a foreign language is a more appropriate research tool, a foreign language can be used instead.

In addition to the total hours required for the degree, the following requirements must also be met.

- At least 69 hours must be in political science courses.
- At least 54 hours in political science must be in courses numbered above 500.
- Completion of Political Science 510, 511, and 512.
- Completion of at least three courses or seminars at the University of Tennessee, Knoxville, in each of the two broad subfields in which the students take examinations.
- Completion of at least one course or seminar in each of the five broad subfields available for graduate instruction in the department.
- At least 6 hours must be earned in political science courses numbered above 600.
- A total of 24 hours must be earned by writing the dissertation.

**Environmental Policy Minor**

The department houses a program designed to give graduate students an opportunity to develop an interdisciplinary specialization in environmental policy.

The program is designed to give master's and doctoral level graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. While administered through the Political Science Department, the program is coordinated by a committee of representatives from the following participating departments and programs – Agricultural Economics; Civil and Environmental Engineering; Ecology and Evolutionary Biology; Economics; Forestry, Wildlife and Fisheries; Geography; Management; Political Science; and Sociology.

Students may request admission to the minor following admission to a graduate program in one of the participating departments. Students in good standing in one of these programs may apply for admission to the minor in environmental policy. The coordinating committee will consider the admission of interested students. Applicants should have a background in both natural and social sciences evidenced by prior coursework or experience.

Requirements
One course in environmental studies from the student's major discipline and one course in quantitative methods are required. These requirements may be fulfilled before or after admission to the minor. All students admitted to the minor will be required to register for Political Science 549 and to complete the following courses.

- A choice of Ecology and Evolutionary Biology 421 or 484 or another Ecology and Evolutionary Biology course with the consent of the program coordinating committee or Geography 433 or approved equivalent as determined by the program coordinating committee.
- 6 hours of coursework outside the major discipline approved by the coordinating committee.

Doctoral students seeking a minor in environmental policy must also complete, in addition to above, a policy-relevant dissertation approved by the coordinating committee.

**DEPARTMENT OF PSYCHOLOGY**

http://psychology.utk.edu

James E. Lawler, Head
Lowell Gaertner, Liaison
Brent Mallinckrodt, Liaison
Deborah Welsh, Liaison

Professors
Burghardt, G.M. (Alumni Distinguished Professor), PhD .................. Chicago
Handler, L., PhD .................................................. Michigan State
Hector, M., PhD .................................................. Michigan State
Jones, W.H., PhD .................................................. Oklahoma State
Lawler, J.E., PhD ........................................ North Carolina
Lounsbury, J.W., PhD ........................................ Michigan State
Lubar, J., PhD .................................................. Chicago
Mallinckrodt, B., PhD ........................................ Maryland
DOCTOR OF PHILOSOPHY

PSYCHOLOGY MAJOR

A student with a BA or BS may apply to the Department of Psychology for admission to the doctoral program with a concentration in clinical psychology, counseling psychology, or experimental psychology. All students must submit scores from the Graduate Record Examination (general and subject).

CLINICAL PSYCHOLOGY CONCENTRATION

This program is designed to lay the groundwork for a career as a clinical psychologist capable of working in both academic and applied settings. The program emphasizes the theoretical foundations of psychology, as well as supervised experience oriented toward the development of practical skills. The program embodies a model of clinical psychology in which practice and research are integrated.

Requirements

After forming the doctoral committee, each student must pass a comprehensive examination administered and evaluated by the committee. Clinical program students must complete a pre-dissertation research project by the end of the second year.

The comprehensive examination is organized around a research case study of one client who has been assessed and/or treated by the student in the departmental psychological clinic. In addition to the case presentation, the paper presents the student’s comprehensive review of relevant research and theory as a context for procedure, results, and discussion of the case. All doctoral students must complete a minimum of 78 hours of graduate-level courses, including courses required by their program; at least 6 hours in courses outside of psychology; and at least 24 hours of dissertation research (Psychology 600). Finally, students must complete an acceptable doctoral dissertation and conduct a satisfactory oral defense of the dissertation.

Requirements are as follows.

- Apprenticeship with one faculty member during the first year, two days each week.
- A written pre-dissertation research project (completed before forming a doctoral supervisory committee) reported in a form acceptable to two members of the faculty or, if reviewed and accepted for publication or external presentation, by one member of the faculty.
- A supervised clinical placement two days (16 hours) each week during the second year and the following option during the third and fourth years – continued two day clinical placement in the third and fourth years or teaching assistantship in the department in either the third or fourth year and two-day clinical placement in the other year.
- Satisfactory completion of listed courses (or equivalents) in the following categories.
  1. Foundations of Psychology: Biological Factors, Perception, Learning, Thinking, Motivation (513).
  2. Interviewing and Observation (558) and Laboratory (559).
  3. Research Practicum (509), 4 hours.
  4. Life-Span Development (512) or Developmental Psychology (511).
  5. Personality: Theory and Research (570) and Developmental Psychopathology (597).
  8. Psychological Assessment I and II (594-595) and Laboratory (596).
  9. Analysis of Variance for Social Sciences (521) and Multiple Regression for Social Sciences (522).

MAJOR DEGREES

Psychology

MA

Experimental psychology concentration
General psychology concentration

PhD

Clinical psychology concentration
Counseling psychology concentration
Experimental psychology concentration

MASTER OF ARTS

PSYCHOLOGY MAJOR

This program is appropriate for students who desire a master’s degree as part of their progress toward a doctorate or for those who wish to complement a degree in a different field.

Admission

Any student with a BA or BS may apply to the Department of Psychology for admission to the master’s program. All students must submit scores from the Graduate Record Examination (general and subject).

Major Advisor and Committee

Initially, the Director of Experimental Psychology will advise the student. As soon as possible, the student must select an advisor and obtain his or her approval for registration. Subsequently, the advisor and student will select two additional faculty members to comprise the student’s master’s committee. Final committee approval comes from the graduate dean, upon recommendation by the department head.

Requirements

All students must complete 32 hours of graduate-level courses in psychology. These hours must include 515, 521-522, or Statistics 531-532 or an equivalent sequence; 565 or 420; 6 hours of Thesis 500; and 12 hours of 500- or 600-level foundation courses; plus additional graduate level hours to reach the 32-hour requirement. Students must earn a grade of B or better in all courses that are to count toward the 32-hour total. Students must also propose, conduct, and successfully defend an original piece of research in the form of a master’s thesis.
11. Field Placement in Clinical Psychology (695).
13. Psychometrics (555).
15. Psychodynamic Psychotherapy I and II (670-671) and Laboratory (673), 4 hours.
16. Doctoral Research and Dissertation (600), 24 hours.

- Students who choose a teaching assistantship in the third or fourth year must have satisfactorily completed 528 College Teaching in Psychology.
- Satisfactory completion of a one-year clinical internship at a site approved by the program.

COUNSELING PSYCHOLOGY CONCENTRATION

The counseling psychology program is based upon the scientist-practitioner model of training which stresses both research and practice. It is designed to enable students to become behavioral scientists skilled in psychological research and its application. Students are trained to work with people who have generally integrated or intact personalities, to focus on these individuals' strengths and assets, and to use relatively brief interventions to further enhance these strengths or to remediate deficiencies within them. While working with others, counseling psychologists tend to focus on the interactions of the personal, educational, and vocational environments of the individuals, groups, families, and organizations with whom they work.

Requirements

The counseling psychology program consists of a minimum of 107 hours of graduate credit. This includes 83 hours of coursework and 24 hours of dissertation research (see below).

Students are assigned a temporary faculty advisor upon admission to the program. By the end of their first calendar year, students are expected to have selected an advisory committee. Prior to taking their comprehensive exams, students must form and meet with their doctoral committee, present an acceptable program of study to the doctoral committee, and have their research competency approved by the program's research review committee. The examinations cover the counseling psychology core and the student's cognate.

In addition to approving a student's program of study, the doctoral committee approves the student's dissertation proposal and verifies that the student's dissertation is acceptable for the doctoral degree. The doctoral dissertation is original research that is theoretically based and psychological in nature. It must fulfill the requirements and procedures as stated in the current University of Tennessee, Knoxville, Graduate Catalog.

The following are required of all students.

- Students must accumulate a minimum of 600 hours in practicum experience. Students are required to have three semesters of individual practicum and one semester of group practicum. Practicum sites include the University of Tennessee, Knoxville, Counseling Center; community agencies; the University of Tennessee, Knoxville, Career Resources Center; and area schools. Opportunities for additional practicum experiences exist in the community.
- In addition to coursework, students must demonstrate competency in research methodology and academic scholarship prior to the doctoral committee's approval of the student's dissertation proposal. The research project is to be initiated after the student has entered the counseling psychology program.
- Satisfactory completion of the following curriculum.
  A. Psychological Foundations – minimum of 21 hours.
     1. History and Systems of Psychology.
     2. Biological Bases of Behavior.
  4. Social Basis of Behavior.
  5. Individual Behavior – minimum of 6 hours.
  6. Life Span or Developmental Psychology.
- B. Quantitative and Research Skills – minimum of 15 hours.
  1. Statistics – minimum of 6 hours.
  2. Qualitative Research – minimum of 3 hours.
- C. Counseling Psychology Core – minimum of 39 hours.
  1. Prepracticum in Career Development.
  2. Vocational Theory and Practice.
  3. Practicum – minimum of 9 hours.
  5. Cross-cultural Counseling.
  7. Assessment – minimum of 6 hours.
  8. Group Counseling.
- D. Departmental Seminar.

- Students who wish to have experiences as a teaching assistant must first satisfactorily complete department's teaching practicum course.

EXPERIMENTAL PSYCHOLOGY CONCENTRATION

The PhD program in psychology with a concentration in experimental psychology is designed to allow students to select from a variety of specializations oriented toward careers in research, teaching, and application of psychology in academic, institutional, or industrial settings. The program is flexible, individualized, and emphasizes a professional apprenticeship model of training.

Requirements

- 12 hours of statistics and research (521-522 or Statistics 531-532 or equivalent and 6 additional hours in research methods or design).
- 15 hours in experimental psychology (565 or equivalent and four courses from the following – 510, 511 or 512, 513, 543, 546 or 547, 550, 560, and 570 or 571).
- 6 hours of research practicum (509).
- Psychology 528 – preparation for college teaching.
- Two 600-level graduate seminars.
- 6 hours of graduate level courses outside the Psychology Department.
- A pre-dissertation research project involving the collection of original data or the original analysis of existing data, reported in publishable form and accepted by the student's advisory committee.
- A comprehensive examination, determined and evaluated by the student's doctoral committee. This examination is comprised of an integrative review or theoretical paper and an oral exam or additional questions.
- 24 hours of dissertation research (600).
- An original piece of research in the form of a doctoral dissertation, proposed, conducted, and defended.
DEPARTMENT OF RELIGIOUS STUDIES

http://web.utk.edu/~religion

Gilya G. Schmidt, Head
Rosalind Hackett, Graduate Liaison

Professors
Fitzgerald, J. L., PhD .............................. Chicago
Hackett, R.I.J., PhD .............................. Aberdeen (UK)
Levering, M.L., PhD .............................. Harvard
Reynolds, C.H., PhD .............................. Harvard
Schmidt, G.G., PhD .............................. Pittsburgh

Associate Professors
Gwynne, R.W., PhD .............................. Washington
Hodges, J.O., PhD .............................. Chicago
Hulsether, M.D., PhD .............................. Minnesota

Assistant Professors
Scott, R., PhD ................................. Northwestern
Shepardson, C.C., PhD .............................. Duke
Stiebert, J., PhD .............................. Glasgow (UK)

Adjunct Faculty
Heffernan, T.J.A., PhD .............................. Cambridge (UK)

The Master of Arts degree with a major in philosophy and a concentration in religious studies is available. Contact the department for details of this program. Graduate courses in religious studies provide opportunity for students in a variety of disciplines to pursue work in religious studies as a graduate concentration.

DEPARTMENT OF SOCIOLOGY

http://web.utk.edu/~utsocdep/

R. Scott Frey, Head
Sherry Cable, Graduate Liaison

Professors
Frey, R.S., PhD ................................. Colorado State
Jalata, A., PhD .............................. State University of New York (Binghamton)
Shover, N.E., PhD .............................. Illinois

Associate Professors
Bohan, S., PhD ........................ Penn State
Cable, S., PhD ........................ Penn State
Dahms, H., PhD ........................ New School for Social Research
Jones, R.E., PhD ........................ Washington State
Kurth, S.B., PhD ........................ Illinois (Chicago)
Shefler, J., PhD ........................ California (Davis)

Assistant Professors
Bui, H., PhD ............................. Michigan State
Feldmeyer, B., MA .............................. Penn State
Geller, P., PhD .............................. Wisconsin
Pressler, L., PhD .............................. Cincinnati

MAJOR DEGREES
Sociology
Criminology concentration
Environmental sociology concentration
Political economy concentration

The Sociology Department offers graduate study leading to the Master of Arts and the Doctor of Philosophy degrees. The MA program includes a thesis and non-thesis option. The criminology concentration includes 505, 551, 653 and 655. The environmental sociology concentration includes 560, 661 and 665. The political economy concentration includes 504, 541, 543, 644, and 645.

Both the master’s and the doctoral program allow for the construction of individualized programs of study. Detailed information may be obtained from the Programs and Curriculum Committee in Sociology. New students are admitted in fall semester only. Applications must be received by the Office of Graduate and International Admissions by February 1.

Admission
- Acceptable scores on the general Graduate Record Examination (verbal, quantitative, and analytical) are required.
- Overall undergraduate grade point average (GPA) of 3.00 or higher.
- Three letters of recommendation (forms may be obtained from the department).
- Completion of the appropriate previous degree (baccalaureate, preferably with a major in one of the social sciences, for the MA program; master’s degree in one of the social sciences for the doctoral program).

MASTER OF ARTS SOCIOLOGY MAJOR

Requirements
Thesis Option
A minimum of 30 hours beyond the baccalaureate degree, including 24 hours of coursework and 6 hours of Thesis 500, is required. Students must complete Sociology 521, 531, Statistics 531, and one foundation course (504, 505, or 560). At or near the end of all coursework, the student must take an oral examination on course material and thesis. The examination will be administered by the student’s committee.

Non-Thesis Option
A minimum of 30 hours of coursework is required, including Sociology 521, 531, Statistics 531, and one of 504, 505, or 560. Sociology 534, 622, and Statistics 532 are recommended. A student’s plan of study should follow one of these approaches.
- **Plan 1** – 6 hours in one of the department’s concentrations and 6 hours in a second area, including areas outside the department, subject to the approval of the student’s committee.
- **Plan 2** – 12 hours in a special area of study approved by the student’s committee and the department’s Programs and Curriculum Committee. Students are encouraged to prepare a paper synthesizing their knowledge of the concentration(s). Students who incorporate supervised field experience in their programs are encouraged to prepare a report based on those experiences that demonstrates their understanding of research, theory, and report writing. All students must take final written and oral examinations that include questions on their general coursework in theory and methods and on their special areas of study.

Subject to approval by the student’s committee, up to 12 hours may be taken in courses outside the department for either program. Sociology courses at the 400 level may also be taken with the approval of the student’s committee.

DOCTOR OF PHILOSOPHY SOCIOLOGY MAJOR

Requirements
Twenty-four hours of coursework beyond the master’s degree are required (exclusive of Satisfactory/No Credit credits). Twelve hours of course credit in Sociology at the 600 level are required. Students who enter the program without the courses required for the MA (521, 531, Statistics 531) or their equivalents must take them as remedial work, which does not apply to their residence. Students must complete Sociology 622; 534, 633, or 636; and Statistics 532 or another advanced course in statistics. Completion of 9 hours in each of two concentrations is encouraged. A student who cannot achieve his/her educational goals within the department’s concentrations may construct an individualized course of study subject to the approval of the student’s doctoral committee and the Curriculum Committee. Sociology courses at the 400 level may not be taken without the consent of the student’s advisor and the Curriculum Committee. Six hours may be
taken in related fields without petitioning for approval. The student's program may include a minor or cognate field.

**Comprehensive Examinations**

Written examinations in four areas are required (sociological theory, research methodology, and two substantive areas). Doctoral students are eligible to take the theory and methodology examinations whenever offered. Substantive examinations may be taken upon completion of theory and methodology examinations. Detailed information on examinations and examination options may be obtained from the department.

**Dissertation and Final Examination**

A dissertation based on original research must be completed (24 hours). The candidate must pass an oral defense of the dissertation, including the theory and methodology related to the research, in accordance with the deadlines specified by the Graduate School.

**Environmental Policy Minor**

The department participates in a program designed to give graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. See Department of Political Science for program description.

**Intercollegiate/Interdisciplinary Gerontology Minor**

Graduate students in the Department of Sociology may pursue an intercollegiate/interdisciplinary minor in gerontology. The gerontology minor gives the student an opportunity for combining knowledge about aging in American society with his/her major concentration.

Core courses and a practicum are offered by the College of Social Work and selected departments within the Colleges of Education, Health, and Human Sciences and Arts and Sciences. A cross-listed seminar between contributing programs is designed to integrate experiences from different sources and to demonstrate the multi-faceted nature of working within an aging society. Please refer to the College of Education, Health, and Human Sciences for specific requirements.

**DEPARTMENT OF THEATRE**

http://theatre.utk.edu

Calvin MacLean, Head

**Professors**

Black, W.R., MFA ................................. Illinois
Custer, M., MFA ................................. Wisconsin
MacLean, C., MFA ................................. Massachusetts

**Associate Professors**

Diamond, J., MFA ............................... New York
Van den Berg, K., PhD ............................ Indiana
Weber, T., MFA ................................. Alabama

**Assistant Professors**

Campelli, J., MFA ................................. Penn State
Pickart, C., MFA ................................. Penn State
Sams, J., MFA ................................. Penn State
Yeager, K., BFA ................................. Penn State

**MAJOR DEGREE**

**THEATRE MAJOR**

**Requirements**

At least 12 hours each of 520, 523, and 525. Coursework in this concentration is conducted in a conservatory environment. In the third year, students are expected to intern with either the resident professional Clarence Brown Theatre Company or another regional professional theatre.

**DESIGN CONCENTRATION**

Any such credits applied from a previous graduate program to the MFA design/technical theatre programs must submit samples of their work. Auditions are required of MFA degree performance applicants. Not all areas of concentration accept applicants every year.

For detailed information about the graduate program, contact the Director of Graduate Studies, Department of Theatre.
The College of Business Administration was originally the School of Commerce, dating back to 1919. Commerce was changed to Business in 1937 and gained college status in 1947. The college-wide MBA program was approved in 1966 and the doctoral program in 1971.

Graduate programs of the College of Business Administration are designed to prepare men and women to assume positions in the increasingly complex world of business and industry, teaching and research, and government.

Viewing the business firm as operating in dynamic social, political, and economic environments that demand leaders capable of dealing with innovation and rapid change, the college places central importance on development of students’ thought processes and leadership potential. Emphasis is focused on flexibility of mind, receptivity to new ideas, and capacity to adapt one’s reasoning powers. Our objective is to encourage the student to develop the ability to reason analytically and logically, and to develop a commensurate plan of action. Above all else, we strive to instill the irrepressible desire to continue to learn and grow in knowledge throughout the student’s life.

Interdisciplinary partnerships are encouraged among academic units in the college, with other university academic units and with the private sector, enhancing the process of inquiry and critical thinking which is crucial to total quality management.

The College of Business Administration is fully accredited by the American Assembly of Collegiate Schools of Business and is associated with other leading graduate schools of business as a member of the Graduate Management Admission Council.

The College of Business Administration offers programs leading to five advanced degrees – the Doctor of Philosophy with majors in business administration, economics, industrial and organization psychology, and management science; the Master of Arts with a major in economics; the Master of Science with majors in human resource development, management science, and statistics; the Master of Accountancy; and the Master of Business Administration.

A limited number of teaching and other assistantships that require from ten to twenty hours of service per week are available through the departments of the college. Remuneration includes remission of fees and tuition as well as a monthly stipend. Awards are generally made on the basis of scholarship and performance on the appropriate (GMAT or GRE) admission test. Application forms may be obtained in any of the departments. Information on college-administered fellowships is available from the appropriate department or office.

Applications must be received by March 1 for consideration of assistantships and fellowships to be awarded for the following fall term.

Facilities for research and service include the Center for Business and Economic Research and the Center for Executive Education.

Academic Standards

A graduate student in the College of Business Administration whose grade point average falls below 3.00 will be placed on probation. A student on probation will be dropped from the program unless his/her cumulative graduate grade point average is 3.00 or higher at the end of the probationary period. The probationary period is defined as the next semester’s coursework as established by the degree program.

MASTER OF BUSINESS ADMINISTRATION

BUSINESS ADMINISTRATION MAJOR

Two tracks are available for the MBA – the regular, full-time program and MBA programs for working professionals.

The full-time MBA is for students seeking a full-time, weekday program that follows the traditional academic format. The nature of this program precludes students from simultaneously working full-time outside of school. In addition to the regular full-time program, there are full-time dual-degree programs – the JD-MBA with the College of Law and the MS-MBA program with the College of Engineering and the College of Education, Health and Human Sciences. Descriptions of these dual-degree programs follow the description of the executive tracks of the MBA.

For students who wish to continue working full-time while they earn their MBA degree, there are four programs for working professionals. In these programs, students carry a full academic course load in addition to their full-time jobs. Each of these programs is designed to serve a different group of students. Descriptions of the MBA programs for working professionals follow the description of the regular, full-time program.
Admission

Applications are accepted for fall semester only. The application deadline for fall semester is February 1. Applications by United States citizens and permanent residents received after February 1 will be considered as space allows.

To be considered for admission, the applicant’s file must be complete. A completed file includes the Application for Graduate Admission, transcripts of prior college work, an MBA program application, two completed applicant recommendation forms, and the Graduate Management Admission Test (GMAT) score report. Additional information is required by the Office of Graduate and International Admissions for international students.

For admission to the MBA program, consideration is given to: (1) applicant’s academic record with particular attention to the last two years of undergraduate work and previous graduate studies; (2) scores on the GMAT and the Test of English as a Foreign Language (TOEFL) for those whose native language is not English; (3) quality of work experience and other activities that demonstrate potential for leadership; and (4) recommendations from professors and work supervisors. The admission decision is based on all factors that make up the total application; therefore, there is no automatic cut-off for either grade point averages or GMAT scores. However, admission preference will be given to applicants with full-time work experience after obtaining the undergraduate degree.

Prerequisites

There are no specific course prerequisites for admission; however, we recommend that non-business undergraduates take an introductory course in accounting, finance, or statistics prior to entry. Undergraduate courses and work experience should demonstrate ability with both qualitative and quantitative work.

Requirements

MBA Core

The MBA core (29 hours) consists of a 3-hour foundations course taken during the three weeks prior to the beginning of fall semester, a 15-hour core course and a 1-hour career development course taken in the first semester (fall 1), a 9-hour core course taken in the second semester (spring 1), and a 1-hour capstone in the third semester (fall 2). The topics introduced within these courses follow three major themes. The first theme covers what every manager needs to know and includes such functional topics as finance, economics, strategy, decision tools, global business, environmental analysis, and leadership skills development. The second theme focuses on functions involved in the flows of product, information, and finances within a globally integrated value chain and includes but is not limited to, operations management, logistics management, demand management, customer relationship management, supplier management, and resource management. The third theme involves integrating the content of the other two themes using information technology. Throughout all three themes, significant emphasis is placed on learning the topics in an integrated fashion. Students will understand how various business functions are integrated within an organization, as well as how integration should occur across organizations within the context of a value chain.

Students in the first-year core undertake active learning within a team-based environment. Many core requirements are experiential exercises in which self-discovery within a team setting is an important element of the learning process. Individualized support is provided for developing both written and oral communication skills.

Concentration and Electives

A concentration area may be indicated on the MBA Program Application or this declaration may be deferred until after matriculation. In any event, selection should be made after the first semester and must be made after completion of the first year. Requests for changes in concentration areas must be submitted for approval to the MBA Program Office.

Among the 15 hours in the concentration/electives block, 9 must be taken in one of the primary concentrations. For the specific courses required in primary concentration areas, see the appropriate department.

Finance, logistics, marketing, and operations management represent primary concentrations. A secondary concentration, innovation and entrepreneurship, can be taken in conjunction with one of the primary concentrations.

The first course in each concentration is designed to provide a foundation upon which the concentration can be built. These courses will be delivered in the latter part of the spring semester of the first year after the spring core course has been completed. They are intended to prepare students for their summer internships. However, these courses should not be thought of as simply the first 3 hours in a 9-hour elective. Rather, these courses are self-contained, intensive introductions to a specialty area of business. Students choose two of these courses in the spring semester, which will permit them flexibility for choosing concentrations in the second year of the program. Two additional courses in the concentration area will be taken in the second fall semester to meet the 9-hour requirement for a concentration.

Elective courses may be chosen from any 500-level courses in the College of Business Administration. Courses outside the college, as well as courses listed in The Graduate Catalog numbered below 500, may be included as an elective only with written prior permission via formal petition to the MBA Program Office.
Secondary Concentration - Innovation and Entrepreneurship

Innovation and entrepreneurship is a secondary concentration (9 hours) that must be taken in conjunction with one of the other MBA concentrations. The secondary concentration makes the MBA concentration/electives block 18 total credit hours. It provides the skills to launch a new business and to function successfully within an established corporation that employs entrepreneurial management strategies. It teaches how to assess entrepreneurial opportunities, apply strategic consulting thinking to problem solving, assess the commercial potential of an idea or innovation, develop strategic, business and financial plans, develop effective presentations, and serve as an effective member of an entrepreneurial/innovation team. Minimum course requirements are Business Administration 520, plus two from Business Administration 595, Management 551.

Transfer Credits

Graduate-level courses taken at other institutions accredited by the Association to Advance Collegiate Schools of Business that otherwise conform to university policy may be credited toward MBA degree requirements within the following limits.

• Concentration area – 6 hours (provided at least 6 hours of work at this institution are included in the concentration area).
• Elective Area – 3 hours.

Because of the fully integrated nature of the first-year curriculum, no credit hours are transferred into this core curriculum. The maximum number of hours that may be transferred to elective and concentration areas is 6 semester hours. Transfer credit will be considered upon formal petition to the Director of the MBA Program and must meet all requirements of the Graduate Council.

Other Requirements

The application for Admission to Candidacy must be approved by three faculty members in the student’s area of concentration and the Director of the MBA program. It should be submitted to the Office of the University Registrar at least one full semester prior to the date the degree is conferred. (The Admission to Candidacy application for the MBA degree must be submitted in the spring semester for graduation in the following fall semester.) To qualify for the degree, the student must achieve a B average (3.00) or above in MBA core courses required in his/her program, a B average or higher in courses comprising the concentration area, and a B average or higher in the overall program.

MBA PROGRAMS FOR WORKING PROFESSIONALS

Each of the four MBA programs for working professionals is designed to serve the needs of a different student group.

The programs share a common course structure of 36 credit hours of classroom learning (Business Administration 551, 552, 553) and 9 credit hours of projects applied within the student’s business organization (Business Administration 561, 562 and 563). Students carry a full, 15 credit-hour load each semester. In each program, all participants begin and complete the program together.

The courses are functionally integrated, and the broad curriculum objectives are similar in each of the MBA programs for working professionals. All are oriented toward applied learning and are highly interactive, making extensive use of experiential learning techniques. Emphasis and depth of subject material within the curriculum varies somewhat from program to program depending on the intended student group. All programs result in the same Master of Business Administration degree as the full-time MBA.

Admission

Primary consideration is given to the applicant’s professional achievements and recommendations from the applicant’s organization. Applicants must meet the minimum requirements of the Graduate Council and submit transcripts of all undergraduate and graduate work. Applicants may need to take the Graduate Management Admission Test (GMAT) (see specific program descriptions). No cut-off score exists for either grade point averages or GMAT scores; however, admission is competitive, and applicants will be evaluated on their ability to operate on a par with other high achieving participants. Students whose native language is not English must take the Test of English as a Foreign Language (TOEFL) unless they are United States citizens or have earned a degree from an accredited United States college or university within the past two years. A minimum TOEFL score of 213 on the computer-based test, 550 on the paper test, or 80 on the Internet-based Test is required for admission to graduate study.

Prerequisites

Although there are no specific course prerequisites for admission, undergraduate studies and professional experience should demonstrate ability with both qualitative and quantitative work.

Transfer Credit

Because of the integrated nature of the course delivery for the MBA programs for working professionals, no credit hours may be transferred as substitutes for program curriculum.

Other Requirements

Other requirements are the same as those for the full-time MBA program.

Aerospace and Defense MBA Program

The Aerospace and Defense MBA is provided for a national audience of professionals from defense and commercial aerospace organizations who have five years of work experience. The emphasis in this program is providing a solid grounding in the broad range of business functions. However, much of this coverage will be delivered within the context of the aerospace and defense industry. Beyond a basic grounding in business fundamentals, this program will offer advanced concepts especially relevant to managing complex value streams. Advanced coverage and emphasis will be given to value stream integration, lean manufacturing, and industrial statistics in particular. This mix of topical coverage is ideal for engineers and others with technical backgrounds that are transitioning into program management where business and leadership skills are critical.

The program starts each spring semester (January) and is completed in three consecutive semesters spread over twelve months. Classes are held during six residency periods, lasting from nine days each. Between residency periods, formal coursework continues with bi-weekly distance learning through live, internet cyber classes. Additional graded work includes a number of large-scale projects completed under faculty supervision, resulting in significant written reports and oral presentations.

Applications to this program are accepted for a spring entry only. The early application deadline is August 15, and the final application deadline is October 1 of each year. The GMAT may be waived for applicants with 5 or more years of professional work experience or a graduate degree.

The program will not be offered in those years in which the enrollment is insufficient.

Additional information on the Aerospace and Defense MBA can be found at www.emba.utk.edu

Physician Executive MBA Program

The Physician Executive MBA is provided for an international audience of physicians. The students for whom this program is designed have an MD, MBBS, or DO degree with five or more years of work experience. The curriculum objectives are the same as those for the Executive MBA, but in the Physician Executive MBA, many of the functional skills are taught in the con-
text of the health care industry with specialized content related to the health care environment. The Physician Executive MBA is the right choice for physicians who want to have a voice in the health care industry, in their own careers, and are seeking a program that allows them to continue their practice while earning their MBA degree.

The Physician Executive MBA is three consecutive semesters completed in twelve months. The class meets in Knoxville for week-long residence periods in January, April, August and December. Between residence periods, live distance learning classes are held each Saturday morning, and there are asynchronous internet assignments.

Applications are accepted for January entry only. Applications are accepted through the year. The final application deadline is November 1. Applicants to the Physician Executive MBA are not required to take the GMAT.

Additional information on the Physician Executive MBA can be found at www.pemba.utk.edu

**DUAL JD-MBA PROGRAM**

The College of Business Administration and the College of Law offer a coordinated dual program leading to the conferral of both the Doctor of Jurisprudence and the Master of Business Administration. The dual program saves the student approximately 15 hours (one semester) over the time that would be required to earn both degrees independently.

The establishment of the dual program recognizes the increasingly complex body of knowledge necessary to the creative conduct of business and business-related law practice, the complementary nature of many aspects of the graduate programs of the College of Law and the College of Business Administration, and the intellectual benefits inherent in the concurrent study of both business and business-related law. The program is designed to accommodate the interests of students who contemplate a career in public service and want to acquire the skills and perspective of the lawyer and the business-oriented manager, contemplate a career in business management and want to acquire the skills and perspective of a lawyer, or contemplate a career as a lawyer specializing in business-related law and want to acquire the skills and perspective of the business-oriented manager.

**Admission**

Applicants for the JD-MBA program must make separate application to, and be competitively and independently accepted by, the College of Law for the JD, Graduate and International Admissions and College of Business Administration for the MBA degree, and by the Dual Program Committee.

Students who have been accepted by both colleges may apply for approval to pursue the dual program anytime prior to or after matriculation in either or both colleges. Such approval will be granted, provided that dual program studies are started prior to entry into the last twenty-eight semester hours of JD coursework and prior to the third semester of the MBA program. Students interested in entering the dual degree program should submit a letter of application to the Dual Program Committee. Upon receipt of the application, the Dual Program Committee will determine eligibility and assign students to advisors who will be responsible for course approval and supervision of the student’s progress through the dual program.

**Requirements**

A dual program candidate must satisfy the graduation requirements of each college. Students withdrawing from the dual program before completion of both degrees will not receive credit toward graduation from either college for courses in the other college, except as such courses qualify for credit without regard to the dual program.

The College of Law will award up to 9 semester hours of credit toward the JD for acceptable performance in approved graduate-level courses offered by the College of Business Administration. The College of Business Administration will award up to 6 semester hours of credit toward the MBA for acceptable performance in approved courses offered in the College of Law. The approval of courses is the responsibility of the student’s assigned advisors.

Students may begin their studies in either the JD or the MBA program, but may not enroll in MBA coursework while completing the first year of the law curriculum and may not enroll in JD coursework while completing the first year of the business curriculum. During the first year in the JD program, students register through the College of Law. During the first year in the MBA program, students register as graduate students. After the first
two years, any term in which students take law courses or a mixture of law and graduate courses, they are classified and registered as law students. If taking only graduate courses, they are classified and registered as graduate students.

Approved Dual Credit

MBA courses in which the student has earned a B grade or higher and are to be counted toward the JD program must include 9 semester hours approved by the College of Law. The 6 hours of law courses in which the student has earned a 2.30 or C+ grade or higher and are to be counted toward the MBA must be selected from those approved by the director of the MBA Program.

DUAL MS–MBA PROGRAM – ENGINEERING

The College of Business Administration and the College of Engineering offer an integrated program leading to the conferral of the Master of Business Administration degree with a major in business administration (concentration in operations management) and the Master of Science degree in one of the following engineering majors – aerospace, biomedical, chemical, computer, electrical, engineering science, industrial, materials science, mechanical, and nuclear engineering. (Refer to each major for specific information and requirements.)

The establishment of the dual program addresses the critical need for personnel trained in both engineering and management who can integrate an increasingly complex body of knowledge for rapid introduction of new products to the marketplace. The objective of the dual degree program is to prepare graduates to take a leading management role in companies that must react quickly to a dynamic market where forces of competition require rapid changes via short cycles in design, manufacturing, and product development. Since the development of a commercial product is a central part of the program, this program is also for students who wish to become an entrepreneur.

Admission

Applications are accepted for fall semester only. Applicants for the MS-MBA program must make separate applications to be accepted by Graduate and International Admissions for the Master of Business Administration and the Master of Science in one of the following engineering majors – aerospace, biomedical, chemical, computer, electrical, engineering science, industrial, materials science, mechanical, or nuclear engineering, and by the Dual Program Committee.

Students will initially apply for the MBA program, indicating on their application the intent to pursue the dual MS-MBA program and the appropriate engineering major (refer to the MBA program for separate instructions). Students accepted for both the MBA and one of the engineering degree programs will be assigned to Dual Program Committee advisors, who will be responsible for course approval and supervision of the students’ progress through the dual program.

Applications by United States citizens and permanent residents received after the MBA application deadline (February 1) will be considered as space allows. Additional information is required and different application dates are established by Graduate and International Admissions for international students.

Requirements

All engineering students enrolled in the dual program must complete common coursework designed to provide them with an integrated, multidisciplinary teamwork experience. The MBA curriculum consists of 30 hours of common coursework in the College of Business Administration and 12 hours of common coursework in the College of Engineering. Engineering common coursework includes a culminating 3-hour integrated project course requiring a comprehensive report, and a final examination as required by the Dual Program Committee, to be taken during the first session of summer following the second year.

During the second year, dual degree candidates will take courses in their engineering major. The coursework for each option is designed to provide students with a concentration in their major and advanced skills to accomplish their teamwork assignments.

Dual degree candidates enrolled in engineering science option are required to take 18 hours of graduate-level engineering courses during the second year of the program. This option requires a coursework plan, approved by the Dual Program Committee, including a concentration in which the student can accomplish his/her teamwork assignments.

DUAL MS-MBA

August – First Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Administration 511 (MBA Core I)</td>
<td>3</td>
</tr>
<tr>
<td>Fall – First Year</td>
<td></td>
</tr>
<tr>
<td>Business Administration 512 (MBA Core II)</td>
<td>15</td>
</tr>
<tr>
<td>*504 Product Development Process</td>
<td>1</td>
</tr>
<tr>
<td>Spring</td>
<td></td>
</tr>
<tr>
<td>Business Administration 513 (MBA Core III)</td>
<td>9</td>
</tr>
<tr>
<td>*506 Product Selection and Evaluation</td>
<td>2</td>
</tr>
<tr>
<td>*508 Integrated Product, Process, and Manufacturing System Design</td>
<td>3</td>
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<tr>
<td>Summer</td>
<td></td>
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<tr>
<td>– Internship</td>
<td>1</td>
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<tr>
<td>Fall – Second Year</td>
<td></td>
</tr>
<tr>
<td>*509 Multidisciplinary Project</td>
<td>3</td>
</tr>
<tr>
<td>– Engineering Major</td>
<td>1</td>
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<tr>
<td>Spring</td>
<td></td>
</tr>
<tr>
<td>– MBA Hub Course Elective</td>
<td>3</td>
</tr>
<tr>
<td>*509 Multidisciplinary Project</td>
<td>1</td>
</tr>
<tr>
<td>– Engineering Major</td>
<td>9</td>
</tr>
<tr>
<td>Summer (first session)</td>
<td></td>
</tr>
<tr>
<td>*594 Culminating Integrated Project Report</td>
<td>3</td>
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<tr>
<td>Total 60</td>
<td></td>
</tr>
</tbody>
</table>

* See showcases in the College of Engineering for course disciplines.

For additional requirements for the Master of Science degree with majors in aerospace engineering, biomedical engineering, chemical engineering, computer engineering, electrical engineering, engineering science, industrial engineering, materials science and engineering, mechanical engineering, or nuclear engineering, refer to program descriptions for those majors.

The dual degree candidate must satisfy the curriculum and graduation requirements of the engineering major being pursued and the College of Business Administration.

Students withdrawing from the dual degree program before completing both degrees will not receive credit toward graduation in either degree program for courses taken in the other degree program, except as such courses qualify for credit without regard to the dual degree program. The MS and the MBA degrees will be awarded upon successful completion of the requirements of the dual program.

Approval Dual Credit

A maximum of 15 hours of the common program courses completed in the College of Engineering may be counted toward the MBA degree program.

DUAL MS–MBA PROGRAM – SPORT MANAGEMENT

The College Business Administration and the College of Education, Health, and Human Sciences offer an integrated program leading to the conferral of the Master of Science with a major in sport studies (concentration in sport management) and the Master of Business Administration.

Increasingly, sports and sports-related companies are represented by significant business enterprises. Success in these enterprises requires the application of business fundamentals, analytical techniques, and management skills within the specific context of the sports industry. The objective of the dual degree program is to train individuals in sport management and business management to integrate both sport and management and to prepare them to undertake leadership roles in this growing, dynamic and competitive industry.
Admission

Applications are accepted for fall semester only. Applicants for the MS-MBA program must make separate applications to and be accepted by Graduate and International Admissions for the Master of Business Administration program and for the Master of Science sport studies major (sport management concentration).

Students will initially apply for the MBA program, indicating on their application the intent to pursue the dual MS-MBA program. Students accepted for both the MBA and MS programs will be assigned to Dual Program Committee advisors, who will be responsible for course approval and supervision of the students' progress through the dual program.

Applications by U.S. citizens and permanent residents received after the application deadline (February 1) will be considered as space allows. Additional information is required and different application dates are established by Graduate and International Admissions for international students.

Requirements

The MBA curriculum consists of 31 hours of common coursework in the College of Business Administration. Dual degree candidates enrolled in the sport management concentration are required to take 30 hours of graduate level sport management courses and internship.

The dual degree candidate must satisfy the curriculum and graduation requirements of the sport management concentration and the College of Business Administration. Students withdrawing from the dual program before completing both degrees will not receive credit toward graduation in either degree program for courses taken in the other degree program, except as such courses qualify for credit without regard to the dual degree program.

The MBA and MS degrees will be awarded upon successful completion of the requirements of the dual program.

DUAL MS-MBA

<table>
<thead>
<tr>
<th>August – First Year</th>
<th>Hours</th>
<th>Credit</th>
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</thead>
<tbody>
<tr>
<td>Business Administration 511</td>
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<tr>
<td>Fall – First Year</td>
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<td>Business Administration 501</td>
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<td></td>
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<tr>
<td>Business Administration 512</td>
<td>15</td>
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<tr>
<td>Spring – First Year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business Administration 513</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>MBA Elective Recommend: Marketing 520</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Sport Management 554</td>
<td>3</td>
<td></td>
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<tr>
<td>Summer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sport Management 511</td>
<td>3*</td>
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<tr>
<td>Sport Management 535</td>
<td>3</td>
<td></td>
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<tr>
<td>Fall – Second Year</td>
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<tr>
<td>Sport Management 532</td>
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<tr>
<td>Sport Studies 542</td>
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<tr>
<td>Sport Management Elective</td>
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</tr>
<tr>
<td>Sport Management, Sport Studies, or Recreation &amp; Leisure Studies Elective</td>
<td>3</td>
<td></td>
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<tr>
<td>Spring – Second Year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sport Management 595</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Sport Management 501</td>
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<td></td>
</tr>
<tr>
<td>Total 61</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Can also be taken in the fall with an elective being taken in the summer.

DOCTOR OF PHILOSOPHY

BUSINESS ADMINISTRATION MAJOR

The primary objective of the PhD with a major in business administration is to prepare a select number of qualified students for careers in university-level teaching and research and for responsible positions in business and government.

Admission

Students seeking a PhD must be recommended for acceptance by the College of Business Administration to the Office of Graduate and International Admissions. Actual admission is based on the applicant’s overall standing compared with other applicants and with the number of vacancies in each department. The Graduate Council requires the Graduate and International Admissions Application, transcripts from all previous college work, and additional information from international students. The college requires the PhD application, scores from the GMAT, and four written recommendations. All materials should be received by the College of Business Administration no later than March 1. Late applications are considered only if space is available.

Under exceptional circumstances, a student may be considered for acceptance into the PhD program without having a master’s degree. An applicant in this situation should have an outstanding undergraduate background and should represent a deep and sincere commitment to the pursuit of a career in research and instruction.

Overview

The PhD normally requires four years of intensive study and research beyond the master’s degree. Typically, the first two years of a student’s program consist of coursework, writing, and research. The third and fourth years require completion of courses, the comprehensive exam, and completion of the dissertation. It is emphasized that the PhD program is structured for full-time students only. Upon acceptance of a student by a particular departmental faculty, the student is expected to remain in residence until the dissertation has been completed and all requirements are met for completion of the PhD.

Since the program focuses on the development of competent scholars, heavy emphasis is placed on both teaching and research skills. As part of the doctoral program, each student is required to serve as a teaching assistant to an undergraduate business class or as a research assistant to a senior faculty member. Students with strong teaching skills may be assigned their own classes. Typically, the College of Business Administration offers financial support for doctoral students during their tenure in the program.

The PhD program is highly flexible, offering a wide array of concentrations and cognates. Moreover, heavy emphasis is placed on individualized instruction and close student-faculty interaction. Instruction takes the form of regular classes, doctoral seminars, and independent study and research. Students are also encouraged to attend lectures and discussions by visiting scholars throughout the year.

The six concentrations offered in the PhD program are accounting, finance, human resource development, logistics, marketing, and statistics.

More detailed information concerning these specific areas is available by writing directly to each department or by accessing the College of Business Administration Web page.

Requirements

Doctoral students must file a program of study that has been approved by their doctoral committee within one year of completing their first year of doctoral studies. This committee is nominated by the department chairperson in a student’s intended area of concentration, subject to the Graduate Council’s policies and procedures.

Students must complete at least three years of full-time coursework beyond the baccalaureate degree, with two years of residence on the Knoxville campus.

Students are required to have a sound and broad base on which to build their PhD coursework. The departmental doctoral advisor will work with the student to determine what, if any, courses need to be completed. All such work is subject to approval by the temporary doctoral advisory committee and the Dean of the MBA Program. Specific concentrations may have prerequisites.

Research Tools. A minimum of 9 semester hours of graduate research methods must be completed. At least 6 semester hours
in statistics courses beyond Statistics 531 are required. The remaining 3 semester hours may be completed in additional statistics courses (not to include Statistics 531) or in other areas such as research methodology, management science, computer science, econometrics, and psychometrics.

Concentrations – accounting, finance, human resource development, logistics, marketing, and statistics. The concentration is the focal point of the PhD program. Students are expected to master the literature and research techniques in the concentration area and to do quality research as evidenced by the preparation of an acceptable dissertation. A minimum of 12 semester hours of course work is required, including at least 9 hours of doctoral seminars. Graduate work taken in the concentration at other institutions is considered by the temporary doctoral advisory committee in approving the specific coursework required. See the appropriate departments for specific course requirements.

A minimum of 9 semester hours of graduate coursework is required in an area outside, but complementary to, the concentration. The student may choose the cognate from one of the following – one of the six concentration areas listed above, economics, or a related area in another school or college of the university. Hybrid cognates combining courses from multiple disciplines are permitted with the approval of the doctoral advisor and the temporary doctoral advisory committee.

Comprehensive Examinations
Comprehensive written examinations over the concentration area are required of each person seeking candidacy for the PhD. This examination is administered in two sessions of approximately 4 hours each. Students qualify in the cognate area by completing a one-session, 4-hour examination or an equivalent jointly approved by the student’s major professor and the student’s advisor in the cognate area. Comprehensive examinations are generally offered during the fall and spring terms. Comprehensive examinations must be taken within five years of matriculation.

When either the concentration or cognate area examination is passed, the remaining examination must be passed within the next thirteen months.

Doctoral Committee
A doctoral student is advised to give serious attention early in the program to the composition of his/her doctoral committee. In accordance with Graduate Council policy, the student and the major professor identify a doctoral committee composed of at least four faculty members, three of whom, including the chair, must be approved by the Graduate Council to direct doctoral research. When the doctoral committee has been formed, the temporary doctoral advisory committee ceases to exist.

Admission to Candidacy
Students may apply for admission to candidacy for the PhD after maintaining at least a B average in coursework, successful completion of comprehensive examinations, and acceptance of a research proposal for the dissertation by the student’s doctoral committee.

Admission to candidacy must be approved at least one full semester prior to the date the degree is conferred. (Admission in the fall permits graduation in the following spring semester.)

Application for admission to candidacy must include a listing of all courses taken in each of the fields required for the degree (business functional areas, basic disciplines, concentration, and cognate area). Graduate courses accepted from other institutions are required of each person seeking candidacy for the PhD. A minimum of 9 semester hours of graduate coursework is required, including at least 9 hours of doctoral seminars. Graduate work taken in the concentration at other institutions is considered by the temporary doctoral advisory committee in approving the specific coursework required. See the appropriate departments for specific course requirements.

When either the concentration or cognate area examination is passed, the remaining examination must be passed within the next thirteen months.

Doctoral Committee
A doctoral student is advised to give serious attention early in the program to the composition of his/her doctoral committee. In accordance with Graduate Council policy, the student and the major professor identify a doctoral committee composed of at least four faculty members, three of whom, including the chair, must be approved by the Graduate Council to direct doctoral research. When the doctoral committee has been formed, the temporary doctoral advisory committee ceases to exist.

Admission to Candidacy
Students may apply for admission to candidacy for the PhD after maintaining at least a B average in coursework, successful completion of comprehensive examinations, and acceptance of a research proposal for the dissertation by the student’s doctoral committee.

Admission to candidacy must be approved at least one full semester prior to the date the degree is conferred. (Admission in the fall permits graduation in the following spring semester.)

Application for admission to candidacy must include a listing of all courses taken in each of the fields required for the degree (business functional areas, basic disciplines, concentration, and cognate area). Graduate courses accepted from other institutions are required of each person seeking candidacy for the PhD. A minimum of 9 semester hours of graduate coursework is required, including at least 9 hours of doctoral seminars. Graduate work taken in the concentration at other institutions is considered by the temporary doctoral advisory committee in approving the specific coursework required. See the appropriate departments for specific course requirements.

When either the concentration or cognate area examination is passed, the remaining examination must be passed within the next thirteen months.

Doctoral Committee
A doctoral student is advised to give serious attention early in the program to the composition of his/her doctoral committee. In accordance with Graduate Council policy, the student and the major professor identify a doctoral committee composed of at least four faculty members, three of whom, including the chair, must be approved by the Graduate Council to direct doctoral research. When the doctoral committee has been formed, the temporary doctoral advisory committee ceases to exist.

Admission to Candidacy
Students may apply for admission to candidacy for the PhD after maintaining at least a B average in coursework, successful completion of comprehensive examinations, and acceptance of a research proposal for the dissertation by the student’s doctoral committee.

Admission to candidacy must be approved at least one full semester prior to the date the degree is conferred. (Admission in the fall permits graduation in the following spring semester.)

Application for admission to candidacy must include a listing of all courses taken in each of the fields required for the degree (business functional areas, basic disciplines, concentration, and cognate area). Graduate courses accepted from other institutions are required of each person seeking candidacy for the PhD. A minimum of 9 semester hours of graduate coursework is required, including at least 9 hours of doctoral seminars. Graduate work taken in the concentration at other institutions is considered by the temporary doctoral advisory committee in approving the specific coursework required. See the appropriate departments for specific course requirements.

When either the concentration or cognate area examination is passed, the remaining examination must be passed within the next thirteen months.

Doctoral Committee
A doctoral student is advised to give serious attention early in the program to the composition of his/her doctoral committee. In accordance with Graduate Council policy, the student and the major professor identify a doctoral committee composed of at least four faculty members, three of whom, including the chair, must be approved by the Graduate Council to direct doctoral research. When the doctoral committee has been formed, the temporary doctoral advisory committee ceases to exist.

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When either the concentration or cognate area examination is passed, the remaining examination must be passed within the next thirteen months.

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COLLEGE OF BUSINESS ADMINISTRATION

by AACSB International and are among the first programs in the
nation to receive this accreditation.

Admission
Students may begin graduate coursework for the MAcc only
in fall semester. The application deadline is March 1 (February 1
for international students) and applications received after that
date will be considered as space allows.
The program is designed both for students who have completed an accredited baccalaureate degree program with a major
in accounting and others. Students with an accounting degree
from an accredited baccalaureate degree program normally
meet all prerequisites for the program. Students with outstanding
undergraduate records in areas other than accounting may enter
the MAcc program, (which starts in the fall semester) by completing coursework in introductory accounting and economics, and
the following prerequisite undergraduate courses – Accounting
311, 321, 411, 414, and 431; Information Management 341; and
Finance 301, or their equivalents as approved by the Director of
the MAcc program. All prerequisites must be completed prior to
the start of graduate coursework in fall semester.
In addition to the general admission requirements, MAcc applicants are required to take the Graduate Management Admission Test (GMAT) and submit information on forms provided by
the Department of Accounting and Information Management. Applicants whose native language is not English must submit results
of the Test of English as a Foreign Language (TOEFL).
For admission to the MAcc program, consideration is given to
• Applicant’s academic record with particular attention to
the last two years of undergraduate work.
• Scores on the GMAT, and TOEFL for those whose native
language is not English.
• Internships and/or work experience and other activities
that demonstrate potential for leadership.
• Recommendations from professors and/or work supervisors.
The admission decision is based on all factors that make up
the total application; therefore, there is no automatic cutoff for either grade point average or GMAT scores.
Students will be expected to have a laptop computer for use
in the classroom and for assignments. Additional details concerning the hardware and software configurations required are posted on the departmental Web site.

Requirements
A student’s program encompasses a minimum of 30 semester hours of graduate coursework. Specifically, the student must
complete courses in accounting and other areas as indicated
below. Each course is 3 semester hours of graduate credit.
Students take 12 hours each semester and 6 hours in the first
summer session. Program requirements are
• Business Core (9 hours) - Business Administration 521,
522, 523.
• Concentration (21 hours).
Two concentrations are available.
Audit and Controls
Accounting 507, 518, 519, 521, 531; Information Management 541, 543
Taxation
Accounting 507, 521, 531, 532, 533, 534, 539.
Students may further modify their programs with approval of
the Director of the MAcc program.

Transfer Credits
A maximum of 6 semester hours taken at other AACSB accredited institutions that otherwise conform to the transfer policy of the
Graduate Council may be credited toward MAcc requirements.

Other Requirements
To qualify for the degree, a student must maintain a B average (3.00) or above in the 30 semester hours comprising the
Master of Accountancy program. The student must satisfactorily
demonstrate his/her ability to recognize, analyze, and solve accounting policy problems and integrate concepts from the various areas of accounting by passing a comprehensive written examination. This examination is included in the capstone courses
(Accounting 519 for the audit and controls concentration and Accounting 539 for the taxation concentration).

DOCTOR OF PHILOSOPHY
BUSINESS ADMINISTRATION MAJOR
ACCOUNTING CONCENTRATION
This degree provides a research-oriented terminal qualification for those seeking entry-level faculty positions in accounting.
Students take approximately three years of coursework beyond
the bachelor’s degree, including a doctoral sequence designed to
expose students to various areas of accounting research. Courses in accounting and other areas are selected to supplement the
student’s individual background and to prepare the student in an
area of accounting specialization (financial, managerial, auditing,
tax or systems). The final year is normally spent completing the
doctoral dissertation. Minimum course requirements are 12 hours
including 611, 612, 619, and one other accounting course to be
approved by the PhD accounting program advisor.

DEPARTMENT OF ECONOMICS
http://econ.bus.utk.edu
Robert A. Bohm, Head
M.N. Murray, Graduate Liaison
Professors
Bohm, R.A. (G.A. Spiva Scholar), PhD . . . . . . . .Washington (St. Louis)
Clark, D.P. (Beaman Professor), PhD . . . . . . . . . . . . . . .Michigan State
Fox, W.F. (William B. Stokely Distinguished Professor
of Business), PhD . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .Ohio State
Murray, M.N. (Douglas A. and Brenda Horne Professor), PhD . . . .Syracuse
Neilson, W.S. (J. Fred Holly Chair of Excellence),
PhD . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .California (San Diego)
Associate Professors
Bruce, D. (Stokely Faculty Scholar), PhD . . . . . . . . . . . . . . . . .Syracuse
Cherry, T.L. (Stokely Faculty Scholar), PhD . . . . . . . . . . . . . . .Wyoming
Gauger, J.A., PhD . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .Iowa State
Mohsin, M., PhD . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .York (Canada)
Munkin, M., PhD . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .Indiana
Santore, R., PhD . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .Ohio State
Assistant Professors
Chakraborty, A., PhD . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .Oregon
Evans, M. (CBER Faculty Fellow), PhD . . . . . . . . . . . . . . . . . .Colorado
Gilpatric, S., PhD . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .Texas A&M
Schaur, G., PhD . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .Purdue
Vossler, C. (Stokely Faculty Scholar), PhD . . . . . . . . . . . . . . . . . .Cornell
Research Professor
Bray, L.G., PhD . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .Tennessee
McKee, M., PhD . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .Carlton (Canada)
Shelton, R.B., PhD . . . . . . . . . . . . . . . . . . . . . . . . . . . . .Southern Illinois
Research Associate Professor
Burton, M., PhD . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .Tennessee
Lecturers
Baker, K., PhD . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .New Mexico
Bueckman, D., PhD . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .Tennessee
D’Urso, V.T., PhD . . . . . . . . . . . .Massachusetts Institute of Technology
Kauffman, C., PhD . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .Tennessee
Schuler, G., PhD . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .Houston
Emeriti Faculty
Chang, H.S., PhD . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .Vanderbilt
Davidson, P. (J. Fred Holly Chair of Excellence Emeritus),
PhD . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .Pennsylvania
Herzog, Jr., H.W., PhD . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .Maryland


DOCTOR OF PHILOSOPHY

ECONOMICS MAJOR

Admission to the PhD program is based on promise of outstanding scholarship as demonstrated by previous academic performance, by scores achieved on the general portion of the GRE, and by recommendations.

Requirements

The program requires a minimum of 48 hours of coursework beyond the bachelor’s degree or 24 hours beyond the master’s degree, plus at least 24 hours of 600 Doctoral Research and Dissertation, and successful completion of the following.

Economic Theory

Microeconomic theory and macroeconomic theory by a qualifying exam taken not later than the beginning of the fourth semester of study.

Quantitative Methods

Completion of 581, 582 and 583 with grades of B or better, or by qualifying examination.

Other Requirements

Students failing a qualifying examination must retake the examination the next time offered. A qualifying examination may be taken a third time only with approval of the department. Failing a qualifying examination for a third time will result in dismissal from the doctoral program.

Students are required to demonstrate competence by comprehensive examination in at least two fields of specialization in economics. Students failing a comprehensive examination must retake the examination the next time offered. A comprehensive examination in a specific field may be taken a third time only with approval of the department.

Students are required to complete (with a grade of B or better) two elective courses in economics at the 500 level or above. The two elective courses must be outside the core subject areas and outside the fields of specialization.

Students are required to complete a doctoral dissertation and to defend it successfully before the faculty.

DEPARTMENT OF FINANCE

http://bus.utk.edu/finance

James W. Wansley, Head

Phillip R. Daves, Doctoral Program Advisor

Professors

Black, H.A. (James F. Smith, Jr. Professor), PhD . . . . . . . . . . . . . . . . Ohio State
Boehm, T.P. (AmSouth Scholar), PhD . . . . . . . . . . . . . . . . . Washington (St. Louis)
DeGennaro, R.P. (SunTrust Professor), PhD . . . . . . . . . . . . . . . . . . Ohio State
Ehrhardt, M.C. (Paul and Beverly Castagna Professor in Investments), PhD . . . . . . . . . . . . . . . . . . . . . . Georgia Tech
Philippatos, G.C. (Distinguished Chaired Professor of Banking and Finance), PhD . . . . . . . . . . . . . . . . New York
Wachowicz, Jr., J.M. (AmSouth Scholar), PhD . . . . . . . . . . . . . . . . . . Illinois

Wansley, J.W. (Clayton Homes Chair of Excellence), PhD . . . . . . . South Carolina

Associate Professors

Collins, M.C. (David E. Sharp Home Federal Bank Professor), PhD . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Georgia
Daves, P.R. (Stokely Faculty Scholar), PhD . . . . . . . . . . . . . . . . . North Carolina
Murphy, D.L., PhD . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Florida
Woldtke, T. (Reagan Faculty Scholar), PhD . . . . . . . . . . . . . . . . Tulane

Assistant Professor

Fauver, L., PhD . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Florida

Lecturers

Murphy, S.P. (Distinguished Lecturer), MBA . . . . . . . . . . . . . . . Loyola
Sexton, L.S. (Distinguished Lecturer), MBA . . . . . . . . . . . . . . . . Tennessee

MOBILE
MAJOR BUSINESS ADMINISTRATION MAJOR
FINANCE CONCENTRATION
The concentration is for those interested in careers in corporate financial management, security analysis and investments, banking and financial institutions, and real estate. Minimum course requirements are – 511 plus two from the following – 512, 525, 532, 581, and 599 (Torch Fund only).

DOCTOR OF PHILOSOPHY BUSINESS ADMINISTRATION MAJOR
FINANCE CONCENTRATION
Minimum course requirements for the concentration are Finance 641, 651, 652, 653, and 654 plus curriculum in supporting areas.

INDUSTRIAL AND ORGANIZATIONAL PSYCHOLOGY
(Interdepartmental)
http://bus.utk.edu/iopsc
Joan R. Rentsch, Program Liaison

Committee
Ladd, R.T., Management
Rentsch, J.R., Management
Rush, M.C., Management
Woehr, D.J., Management

Adjunct Members
Schumann, D.W., Marketing and Logistics

DOCTOR OF PHILOSOPHY
INDUSTRIAL AND ORGANIZATIONAL PSYCHOLOGY MAJOR
Admission
Applicants for admission should request information and application forms from both the Office of Graduate and International Admissions, and the Director, Industrial and Organizational Psychology Program.
Two separate applications must be completed. One Graduate Application for Admission (apply for major in industrial and organizational psychology) and one application for admission to the industrial and organizational psychology major. New students are admitted in fall semester only. Applications must be received by Graduate and International Admissions by February 1.

The master’s degree with a major in industrial and organizational psychology is generally not required of individuals pursuing a doctoral degree.

At least one year of college mathematics and one course in statistics are required. Ordinarily, an undergraduate grade point average of 3.70 or above is required with no evidence of special weakness in mathematics and physical sciences.

Test scores on each section of the general portion (verbal and quantitative) of the Graduate Record Examination (GRE) are required. Customarily, those students admitted to the program have performed at or above the 69-79th percentile on the general tests. (This corresponds to a raw score of approximately 600 on each of the tests.)

Requirements
The PhD with a major in industrial and organizational psychology can be completed with a minimum of 90 semester hours in the major. Students must be in residence full time for one year; must maintain an overall 3.00 grade point average with no more than one grade below B in the Industrial/Organizational Psychology, General Psychology, and Research Cores; must complete an applied research project prior to beginning dissertation work; must pass a comprehensive examination; and must pass a final oral examination on their dissertation research.

Course Requirements

<table>
<thead>
<tr>
<th>Course Requirements</th>
<th>Hours Credit</th>
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<tbody>
<tr>
<td>1 Industrial/Organizational Psychology Core</td>
<td>9</td>
</tr>
<tr>
<td>2 Research Core</td>
<td>12</td>
</tr>
<tr>
<td>3 General Psychology Core</td>
<td>9</td>
</tr>
<tr>
<td>4 Industrial/Organizational Psychology Seminars</td>
<td>9</td>
</tr>
<tr>
<td>5 Approved Electives</td>
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</tr>
<tr>
<td>Supervised Practicum, Internship, or Field Training (690)</td>
<td>15</td>
</tr>
<tr>
<td>Ethics (635 or equivalent)</td>
<td>3</td>
</tr>
<tr>
<td>Dissertation (600)</td>
<td>24</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
</tr>
</tbody>
</table>

1. Industrial and Organizational Psychology 567, 568, and 569.
2. Statistics 537, 538, or equivalents 579, 679 or equivalent; Industrial and Organizational Psychology 605.
3. One course in each of the following areas – biological bases of behavior, cognitive bases of behavior, history, and systems of psychology.
4. 600-level Industrial/Organizational Psychology courses, from a program committee approved list.
5. Courses supporting the student’s course of study.

DEPARTMENT OF MANAGEMENT
http://bus.utk.edu/mgt
Robert T. Ladd, Interim Head
E. Kate Atchley, Assistant Head

Professors

<table>
<thead>
<tr>
<th>Subject</th>
<th>Degree</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duchon, D., PhD</td>
<td>Houston, TX</td>
<td></td>
</tr>
<tr>
<td>Ladd, R.T. (Associate Dean and William B. Stokely Professor of Business), PhD</td>
<td>Georgia</td>
<td></td>
</tr>
<tr>
<td>Miller, A. (Associate Dean and William B. Stokely Chair of Management), PhD</td>
<td>Washington, D.C., Texas</td>
<td></td>
</tr>
<tr>
<td>Ploewman, D.L., PhD</td>
<td>Maryland, MD</td>
<td></td>
</tr>
<tr>
<td>Rentsch, J.R. (Stokely Faculty Scholar), PhD</td>
<td>Akron, OH</td>
<td></td>
</tr>
<tr>
<td>Rush, M.C., PhD</td>
<td>Maryland</td>
<td></td>
</tr>
<tr>
<td>Stahl, M.J. (William B. Stokely Distinguished Professor of Management), PhD</td>
<td>Rensselaer Polytechnic Institute, NY</td>
<td></td>
</tr>
<tr>
<td>Woehr, D.J., PhD</td>
<td>Georgia Tech</td>
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</table>

Associate Professors

<table>
<thead>
<tr>
<th>Subject</th>
<th>Degree</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elenkov, D.S., PhD</td>
<td>Massachusetts Institute of Technology, MA</td>
<td></td>
</tr>
<tr>
<td>Morris, M.L. (Stokely Faculty Scholar), PhD</td>
<td>CFLE, Tennessee</td>
<td></td>
</tr>
<tr>
<td>Smith, A.D. (Reagan Faculty Scholar), PhD</td>
<td>North Carolina</td>
<td></td>
</tr>
</tbody>
</table>
The human resource development program integrates occupational education, training, career development, and organizational development. The curriculum goal of the program centers around producing organizational effectiveness through a guiding framework that focuses on developing human resource skills and understanding of organizational culture, systems and structures, and decision making; individual, group, organizational learning; high performance teaming; organizational change, communication processes; and analysis, action, measurement of economic outcomes. Human resource development required (core) courses and human resource development electives are offered in diverse formats enabling working professionals to obtain the master’s or doctoral degree.

MAJOR
HUMAN RESOURCE DEVELOPMENT

The Master of Science degree with a major in human resource development provides a flexible graduate program for professionals wishing to pursue in-depth study within and across subject areas of human resources.

Admission
Applicants must submit an application for admission to Graduate and International Admissions by February 1. Additionally, applicants must submit an application, three letters of reference from persons familiar with their potential for success in doctoral work, and a statement describing personal career objectives directly to the Human Resource Development Program by March 1. New students are admitted in fall semester only.

Applicants must hold a master’s degree from an accredited institution and present evidence of ability to do PhD work, including having maintained a graduate GPA of 3.30 or better, on a 4.00 scale. Applicants without a graduate degree in an area related to human resources may be required to complete additional coursework as part of their program. If the applicant has prior work experience in human resource development, human resource management, or a related occupational area, a reference letter should be provided by the work supervisor. Recent Graduate Record Examination (GRE) or Graduate Management Admission Test (GMAT) scores are required of all applicants. Any person whose native language is not English must submit results of the Test of English as a Foreign Language (TOEFL).

Requirements
The Doctor of Philosophy degree with a major in business administration and a concentration in human resource development is for graduate students who seek careers in higher education or as managers/administrators of human resources. The curriculum, a minimum of 60 hours, is designed to enable students to achieve professional objectives, develop needed competencies, and gain desirable experiences and understanding of human resources. Students not possessing a master’s degree before acceptance to the program may be required to complete additional coursework before enrolling into any courses associated with the doctoral program. Students must be in residence full time for one year and must maintain an overall 3.00 grade point average with no more than one grade below B in the human resource development courses, research core, and business core. Students who did not complete a thesis in their master’s program must complete a pre-doctoral research project prior to beginning dissertation work. All students must pass a comprehensive examination and a final oral examination on their dissertation research. Detailed information regarding the PhD concentration program of study may be obtained from the program liaison. Course equivalencies and substitutions must be approved by the student’s doctoral committee and program liaison.

For the latest updates check the home page of the Human Resource Development Program through the College of Business Administration’s Web site.

Course Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Hours Credit</th>
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<tbody>
<tr>
<td>1Human Resource Development Core</td>
<td>6</td>
</tr>
<tr>
<td>2Human Resource Development Seminars</td>
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<tr>
<td>3Research Core</td>
<td>12</td>
</tr>
<tr>
<td>4Business Core</td>
<td>9</td>
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<tr>
<td>Dissertation</td>
<td>24</td>
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<tr>
<td><strong>Total 60</strong></td>
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</tr>
</tbody>
</table>
DEPARTMENT OF MARKETING AND LOGISTICS

http://mlt.bus.utk.edu

Ted Stank, Head
Lloyd M. Rinehart, Graduate Liaison (Logistics)
Dan Flint, Graduate Liaison (Marketing)

Professors
Barnaby, D.J., PhD ........................................... Purdue
Cadotte, E.R., PhD ........................................ Ohio State
Gardial, S.F. (Associate Dean and Beaman Professor), PhD ........... Houston
Mentzer, J.T. (Harry J. and Vivienne R. Bruce Chair of Excellence in Business), PhD ........................................ Michigan State
Schumann, D.W. (Taylor Professor in Business), PhD ........... Missouri
Stank, T.P. (John H. “Red” Dove Professor of Logistics), PhD ............. Georgia

Associate Professors
Dabholkar, P.A., PhD ........................................... Georgia State
Flint, D.J. (Proffitt’s, Inc. Professor of Marketing), PhD ............. Tennessee
Foggin, J.H., DBA ........................................ Indiana
Holcomb, M.C., PhD ........................................ Tennessee
Kahn, K.B. (Stokely Faculty Scholar), PhD ........................... Virginia Tech
Moon, M.A., PhD ........................................ North Carolina
Myers, M.B. (Nestle USA Professor of Marketing), PhD ........... Michigan State
Reizenstein, R.C., PhD ........................................ Cornell
Rentz, J.O., PhD ........................................ Georgia
Rinehart, L.M., PhD ........................................ Tennessee

Assistant Professors
Esper, T.L., PhD ........................................ Arkansas
Mollenkopf, D., PhD ......................................... Drexel
Sahin, F., PhD ........................................ Texas A&M
Tate, W., PhD ........................................ Arizona State
Xu, A., PhD ........................................ Michigan State

Emeriti Faculty
Davis, Jr., F.W., PhD ........................................ Michigan State
Dicer, G.N., DBA ........................................ Indiana
Mundy, R.A., PhD ........................................ Penn State
Woodruff, R.B., DBA ......................................... Indiana

Lecturers
Collins, M.E. (Distinguished Lecturer), MBA .................. Middle Tennessee State
Dittmann, J., PhD ........................................ Missouri

MAJOR
Business Administration
Logistics concentration
Marketing concentration

DEGREES
MBA, PhD

MASTER OF BUSINESS ADMINISTRATION

BUSINESS ADMINISTRATION MAJOR

LOGISTICS CONCENTRATION
Minimum course requirements are Logistics 510, 546, and 547.

MARKETING CONCENTRATION
Minimum course requirements are Marketing 520 and 530.

DOCTOR OF PHILOSOPHY

BUSINESS ADMINISTRATION MAJOR

LOGISTICS CONCENTRATION
Minimum course requirements are Logistics 611, 612, 613, 614, and 615.

MARKETING CONCENTRATION
Minimum course requirements are 611, 612, 613, 614, 615, and 616.

The logistics concentration and marketing concentration are research-oriented doctoral programs of instruction that provide perspectives and skills necessary for academic career pursuit in the fields of marketing and logistics respectively. Students pursuing these programs will take a minimum of 42 hours of coursework (beyond that required for an MBA) that covers concepts and issues in marketing or logistics (depending on the concentration), a support field of study, and both quantitative and qualitative scholarly research methods. Upon completion of the coursework and comprehensive examinations, each candidate conducts dissertation research on a unique topic in marketing or logistics that, adds to the knowledge base of the discipline. Successful completion and defense of the dissertation qualifies the candidate to pursue academic opportunities at research-oriented universities or a career in industry or government.

DEPARTMENT OF STATISTICS, OPERATIONS AND MANAGEMENT SCIENCE

http://stat.bus.utk.edu
http://www.bus.utk.edu/mgmtsci

Kenneth C. Gilbert, Head
Mary Sue Younger, Graduate Liaison

Professors
Bozdogan, H. (Toby and Brenda McKenzie Professor in Business), PhD ........................................ Illinois
Edirisinghe, C.P., PhD ........................................ British Columbia (Canada)
Gilbert, K.C., PhD ........................................ Tennessee
Guess, F.M., PhD ........................................ Florida State
Leitnaker, M.G., PhD ....................................... Kentucky
Mee, R.W., PhD ........................................ Iowa State
Noon, C.E., PhD ........................................ Michigan
Srinivasan, M.M. (Ball Corporation Distinguished Professor of Business), PhD ....................................... Northwestern

Associate Professors
Bichescu, B., PhD ........................................ Cincinnati
Bowers, M.R., PhD ........................................ Clemson
Leon, R.V., PhD ........................................ Florida State
Seaver, W.L., PhD ........................................ Texas A&M
Younger, M.S., PhD ....................................... Virginia Tech

Assistant Professors
Bensmail, H., PhD ........................................ Paris VI (France)
Zaretski, R., PhD ........................................ Cornell

Lecturers
Cwiek, C.M. (Distinguished Lecturer), MS ...................... Tennessee
Schmidhammer, J.L., PhD ................................ Pittsburgh

Adjunct Faculty
Husch, D.S., PhD ........................................ Tennessee
McGuire, S.A., PhD ........................................ Kansas State

MAJORS
Business Administration
Applied statistical strategies

DEGREES
MBA
Operations management concentration
PhD
Statistics concentration
MS

Statistics
Industrial statistics concentration

Graduate Certificate Program

1 Human Resource Development 602, 603
2 Students consult with doctoral advisor and committee to select 3 courses from Human Resource Development 605, 606, 607, 608, 609, 613.
3 Statistics 531-532 or 537-538 or equivalent; Statistics 579 or Industrial/Organizational Psychology 627 or equivalent; Marketing 612.
4 Marketing 611; Management 571; Industrial/Organizational Psychology 568.
MASTER OF BUSINESS ADMINISTRATION

BUSINESS ADMINISTRATION MAJOR

OPERATIONS MANAGEMENT CONCENTRATION

Minimum course requirements are Operations and Management Science 540, 541 and one course from Management Science 526, 551, Statistics 566, Industrial Engineering 522, 526, or an applicable course approved by designated faculty.

MANAGEMENT SCIENCE

MASTER OF SCIENCE

MANAGEMENT SCIENCE MAJOR

The Master of Science degree with a major in management science is designed as preparation for a career in the application of quantitative techniques for the solution of complex problems. The program’s flexibility also makes it appropriate as preparation for doctoral study in management science.

Management science coursework will expose students to both the theoretical development of quantitative techniques and their application to managerial decision making. In addition to the development of sufficient mathematical maturity for creative use of quantitative skills, the program requires concentrated study in a supporting area.

Supporting areas are available in other departments of the College of Business Administration, as well as in computer science, public administration, geography, health, and other areas, subject to approval by the Management Science Committee.

Admission

The master’s program requires three applicant recommendation forms and the GRE or GMAT. Applications are encouraged from all majors, but a mathematics background equivalent to the completion of at least two years of college calculus and proficiency in a computer language is required. The program is designed to be completed in four semesters by full-time students. However, students may start the program in any semester and may pursue the Master of Science degree with a major in management science on a part-time basis.

Requirements

<table>
<thead>
<tr>
<th>Hours</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Requirements</td>
<td>21</td>
</tr>
<tr>
<td>1Management Science 531, 532, 533, 534, 551; Statistics 563; Operations and Management Science 541.</td>
<td></td>
</tr>
<tr>
<td>2Applied Statistics Course</td>
<td>3</td>
</tr>
<tr>
<td>3Applied Specialization Area (as approved by advisor)</td>
<td>8</td>
</tr>
<tr>
<td>4Information Systems Elective (as approved by advisor)</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
</tr>
</tbody>
</table>

1 Choose from Statistics 566, 571, 572, 573, 574, 575.

A thesis option is available to qualified students. The Management Science Committee will work closely with the student in tailoring a program to his/her needs. The committee must approve a tentative overall program during the student’s first semester and must approve all courses on a semester-by-semester basis.

Recognizing the diverse backgrounds and needs of management science MS students, the Management Science Committee is prepared to waive some of the above requirements on an individual basis. The total course load will remain 36 hours for all students.

DOCTOR OF PHILOSOPHY

MANAGEMENT SCIENCE MAJOR

The PhD with a major in management science is designed to prepare students for research related to the application of mathematical tools to complex decision making. Three primary objectives of the program are

- To provide, through management science coursework, a thorough knowledge of common management science/operations research mathematical models and their uses.
- To provide sufficient advanced study in a supporting area to qualify the graduate for a joint-faculty position in the supporting area and management science. The candidate may choose from the business functional areas (accounting, finance, marketing, management, and logistics) or other disciplines (e.g., computer science, forestry, ecology, and public administration).
- To develop in the student, through coursework in mathematics, statistics and computer science, a high degree of mathematical maturity to enhance a potential career in management, research, or teaching.

Admission

The doctoral program requires three recommendation forms and the GRE or GMAT, in addition to the Graduate Council’s requirements.

Requirements

A minimum of 48 semester hours of coursework taken for graduate credit (exclusive of thesis or dissertation) is required. Some of the hours may be the coursework from a master’s program, although a master’s is not a prerequisite for the doctorate. The candidate must complete a minimum of 24 hours at the University of Tennessee, Knoxville, at least 6 of which must be at the 600 level. Both of these requirements are exclusive of thesis or dissertation credits. Entering students who have completed graduate studies in applicable fields will be granted course credits for work that is equivalent to required courses in the program.

The program includes approximately 16 to 20 semester hours of coursework in the applied area.

Qualifying Examinations

The student must demonstrate mastery of probability theory and statistical inference (Statistics 563, 564) by passing a written qualifying examination.

Mastery of 12 to 14 semester hours in mathematics coursework must be demonstrated by passing a written qualifying examination. Topics normally include numerical analysis (either Mathematics 471, 472, 453, and 571, or 571-572) and real analysis (Mathematics 445-446). Other options may be approved. In exceptional circumstances, the faculty will consider waiving the mathematics and/or statistics qualifying examinations.

These requirements generally are completed by the end of the first year of the program.

There is no foreign language requirement.

Comprehensive Examination

Prior to admission to candidacy for the degree, and normally after completion of the second year of the program, the student must pass a written comprehensive examination covering the theory of deterministic and stochastic management science models. Topics included in this examination are determined on an individual basis. Students will be expected to demonstrate an integrative ability that goes beyond simple mastery of course content.

Research and Dissertation

The student must complete 24 hours of Management Science 600 (Doctoral Research and Dissertation), through which he/she
is expected to make a significant contribution to the discipline. A final oral examination is conducted over the dissertation and such other segments of the program that the faculty committee deems appropriate. This effort, which is beyond the minimum 48 hours of coursework, normally is completed in the third year of the program.

**Academic Standards**

A graduate student in the College of Business Administration whose grade point average falls below 3.00 will be placed on probation. A student on probation will be dropped from the program unless his/her cumulative grade point average is 3.00 or higher at the end of the probationary period. The probationary period is defined as the next semester's course work as established by the degree program for full-time students and the next two semester's course work as established by the degree program for part-time students.

**Prerequisites for Management Science Courses**

The management science program is interdisciplinary and students in other degree programs are encouraged to enroll in management science courses. Course prerequisites are designed to indicate the level at which courses are taught. Interested students whose prior coursework does not match the prerequisites are encouraged to seek the instructor's guidance and consent to enroll.

**STATISTICS**

**MASTER OF SCIENCE STATISTICS MAJOR**

The Master of Science with a major in statistics provides students with the foundation in theory and practice required for careers in applied statistics. In addition to the education traditionally offered in such a program, the department offers a concentration in industrial statistics, which provides unique opportunities for experiences in practical applications of statistics. Through involvement in the University of Tennessee Practical Strategies for Process Improvement Institute and related programs, department faculty members participate in a variety of consulting and research projects in industry. Students may supplement their classroom study with an industrial internship and participation in research projects dealing with industrial problems. Department faculty members also collaborate with researchers from many academic disciplines. Statistics graduate students may gain consulting experience by working with faculty involved in these consulting activities. All students are encouraged to participate in supervised internships or consulting activities as part of their graduate program.

Individuals with undergraduate or graduate degrees in other disciplines are encouraged to enter the program. The candidate's mathematical background should include differential and integral calculus of several variables. Individuals with limited mathematical background should seek departmental guidance regarding specific ways in which they may prepare themselves for the program by taking coursework as non-degree students. Requests for application forms and further information may be sent to the Director of Graduate Studies, Department of Statistics, Operations and Management Science, Stokely Management Center, The University of Tennessee, Knoxville, Tennessee 37996-0532 or fguess@utk.edu or http://stat.bus.utk.edu.

**Admission**

Applicants for statistics must submit results of the Graduate Record Examination (GRE) general portion, although GMAT exam scores may be substituted. Applicants must have completed at least two years of college-level mathematics, including the calculus of several variables and matrix algebra, and be proficient in a computer language. Applicants whose native language is other than English must submit results of the Test of English as a Foreign Language (TOEFL).

**Requirements**

A minimum of 33 hours must be completed for the master's degree. Six hours in statistical methods, 6 hours in statistical theory, and 1 hour in statistical computing are required of all students. Students must complete a minimum of 21 hours in approved statistics courses, exclusive of consulting, internship, independent study, or thesis.

**Thesis or Independent Study**

The thesis option for the master's degree requires the student to complete 6 hours for the thesis. Alternatively, the non-thesis option requires a minimum of 3 hours for an independent study project.

**Comprehensive Examination**

Students must pass a two-part written comprehensive examination covering theory and methods. Upon failing either part of the examination, the student may retake it. The result of the second examination is final. For students writing a thesis, this examination must be passed before the thesis is defended.

**INTERCOLLEGIAE GRADUATE STATISTICS PROGRAM**

The Intercollegiate Graduate Statistics Program (IGSP) is a formal University of Tennessee, Knoxville, academic program established to enable students to earn either a minor or an MS in statistics simultaneously with a master's or doctoral degree in another department. Approved coursework taken to meet doctoral requirements in the student's home department may also be credited toward the MS in statistics. Similarly, approved coursework in statistics taken to meet the requirements for a master's or doctoral degree in another department may also count toward the minor in statistics. The program is open to graduate students in all departments, which have an approved minor, and/or MS joint major curriculum offered through the program. The program is administered by an executive committee, consisting of college representatives from all colleges with approved programs, with advisory input from the program faculty.

**Course Options**

Courses options consist of courses in statistics, offered either by the Department of Statistics, Operations and Management Science or by other departments, which have been reviewed and approved by the IGSP Executive Committee. Students taking an MS with a major in statistics must pass the two-part comprehensive examination covering statistical theory and methods. Students taking a minor in statistics in conjunction with a doctorate in another field must pass a written comprehensive examination in statistics, constructed and evaluated by the student's examination committee. No formal comprehensive examination is required of students earning a statistics minor along with a master's in another field beyond questions the home department wishes to include as part of the comprehensive examination for the master's degree.

**Procedures**

The student's home department must have approved a program of courses with the executive committee. That program will specify the sequences of statistics courses, chosen from the IGSP approved list, that are considered appropriate by the home department. Students who wish to participate in this program should con-
tact their college representative or the Chair of IGSP in the Department of Statistics, Operations and Management Science.

The student's graduate committee must include a member of the IGSP faculty. For students seeking doctoral degrees or the Master of Science with a major in statistics, the committee member must be a faculty member in the Department of Statistics, Operations and Management Science.

The student's Admission to Candidacy form must contain all courses required for the chosen degree program set off in a group and labeled, "Statistics courses required for the minor or MS in statistics." Should the student decide not to apply for admission to the program until after completion of some of the courses, the student's major professor should file a program change with the cooperating departments and assist the student in obtaining a Department of Statistics, Operations and Management Science faculty member to serve on the student's graduate committee.

Successful completion of the statistics MS or minor is recognized by appropriate documentation on the student's transcript. Students who do not complete the requirements of the minor or MS will still receive academic credit for the statistics courses they have successfully completed.

For information contact myoung@utk.edu or http://www.bus.utk.edu/stat/igsp.

DOCTOR OF PHILOSOPHY
BUSINESS ADMINISTRATION MAJOR
STATISTICS CONCENTRATION

This concentration provides students with a broad knowledge of the field of statistics, the ability to apply statistics in practical situations to problems of business and industry, and the ability to develop new statistical methods; all of which takes place while students are exposed to coursework in the basic functional areas of business.

Minimum course requirements are 592, 662, 663, 664, 691, and two courses chosen from 666, 673, 674, 679.

GRADUATE CERTIFICATE IN APPLIED
STATISTICAL STRATEGIES

The Department of Statistics offers a graduate certificate in applied statistical strategies. The program is designed for the part-time student and several of the courses are offered through distance education.

The 12-hour certificate is available by completing two required courses, 571-572, and two electives selected from 573, 575, 579, and 585 or 566 or other graduate statistics courses as approved by the Statistics Graduate Program Committee Chair.
College of Communication and Information

Michael O. Worth, Dean
Sally J. McMillan, Interim Associate Dean for Academics

http://www.cci.utk.edu

The College of Communication and Information fosters among students and the larger community a sense of the legal and ethical responsibilities of access to information and the exercise of expression in a democratic society. Additionally, the college serves the professional goals of preparing students for careers in the communication and information professions.

The college includes four schools – School of Advertising and Public Relations, School of Communication Studies, School of Information Sciences, and School of Journalism and Electronic Media. These programs came together as a single College of Communication and Information in 2002. The college offers two master’s and one doctoral degree.

The Master of Science with a major in communication and information is a college-wide degree offering multiple concentrations that typically are housed within one of the schools. These concentrations have a core curriculum that focuses on theory and research. Students then take coursework supporting the concentration as well as electives. They also engage in a capstone experience. Concentrations in advertising, journalism and electronic media, and public relations are accredited by the Accrediting Council on Education in Journalism and Mass Communication.

The Master of Science with a major in information sciences is designed primarily for librarians and information professionals. That program is coordinated by the School of Information Sciences and involves both on-campus and distance education coursework. This program is accredited by the American Library Association and the National Council for Accreditation of Teacher Education. More details on this degree are provided in the listing for the School of Information Sciences, which follows information about college-wide degrees.

The Doctor of Philosophy with a major in communication and information builds on core courses that focus on knowledge creation across the disciplines represented by the college. Additional required coursework in a primary and cognate area will be selected by the student and his/her program committee. Communication and information is available as a secondary area for students majoring in other departments.

Facilities for research and service include the Center for Information Studies (CIS).

Academic Standards

A student in the College of Communication and Information whose graduate grade point average, not including incomplete grades, is below 3.00 at any time after the end of 12 hours of graduate credit will be placed on probation. A student on probation will be dropped from the program unless his or her cumulative graduate grade point average is 3.00 or higher at the end of the probationary period. The probationary period is defined as the next 12 semester hours of graduate coursework attempted that is specified in the student’s degree program. Exceptions to this policy may be made only with the approval of the Associate Dean for Academics of the College of Communication and Information on the recommendation of the student’s faculty committee.

Admission and Assistance for College-Wide Degrees

Applicants must meet admission requirements of the Graduate Council. In addition, they must complete the Graduate Record Examination, rating forms, and application forms as required by the College of Communication and Information. All application materials are screened by an admissions committee authorized by the faculty of the College of Communication and Information.

New students normally begin classes in the fall semester. Applications for both admission and financial aid are due on February 1.

Graduate assistantships are available for students in college-wide programs. Assistantships may be for teaching or research. Assistantships are highly competitive and carry a waiver of tuition and fees as well as a stipend and require that recipients work 10-20 hours per week in the college.

For application forms and other information about college-wide graduate programs in Communication and Information, write to Associate Dean for Academics, College of Communication and Information, 302 Communications Building, the University of Tennessee, Knoxville, Tennessee 37996-0332 or go to http://www.cci.utk.edu/gradstudies.
MASTER OF SCIENCE
COMMUNICATION AND INFORMATION MAJOR

The Master of Science with a major in communication and information is intended for students who desire careers related to a variety of communication, information, or media fields, and those who seek a deeper understanding of the role of communication and information in organizations, media, and society. Both thesis and non-thesis options are available. See catalog listings for the School of Advertising and Public Relations, School of Communication Studies, and the School of Journalism and Electronic Media for information about concentrations and the courses offered.

Admission
A bachelor’s degree is required for entry into the master’s program. Students lacking academic or professional experience may be required to take prerequisite courses.

The following are normally minimal requirements for admission to full potential candidate status.
• A 3.00 (4.00 system) grade point average in undergraduate studies.
• At or above the fiftieth percentile in verbal, quantitative and analytical aptitude on the Graduate Record Examination.
• Recommendation letters from at least three former teachers or professional colleagues.
• A statement of the applicant’s goals and reasons for pursuing the degree. Professional experience in some field of communication and/or information is a highly desirable criterion for admission.
• For students whose native language is not English and who have not earned an earlier degree at an American college or university, the Test of English as a Foreign Language is required. Students should show mastery of the English language.

Requirements
The MS program combines a cross-disciplinary core in theory and methods with a concentrated set of courses in a primary area and electives from outside the concentration. Both the thesis and non-thesis options require a minimum of 34 hours of approved graduate work.

Core (7 hours)
- Communication and Information 501 (Orientation, 1 hour).
- Communication and Information 540 (Theory, 3 hours), and a research methods course (Advertising 530, Communication Studies 505, Information Sciences 540, or Journalism and Electronic Media 512) to be taken during the first two semesters of the student’s program, except with the written approval of the Associate Dean of Academics of the college.

Concentration (15 hours)
Concentrations are typically housed within one of the academic units. Students may also construct their own coherent set of courses for a concentration with the approval of the Associate Dean for Academics for the college. At least 6 hours of the concentration must be at the 500 level or above.

Approved Electives
Six hours of electives for students in the thesis option. Nine hours of elective for students in the non-thesis option.

Thesis or Project
Six hours of thesis work or a 3-hour project.

Other Requirements
All students must take courses from at least two of the schools in the College of Communication and Information.

Additional hours may be required for those who do not have academic prerequisites.

Students interested in subsequent entry into a doctoral program are advised to pursue the thesis option and to take additional courses in communication theory and research, subject to advisor’s approval. After completion of the formal program of coursework and research for the thesis option, the student must pass an oral examination conducted by his/her graduate committee.

Students interested in pursuing careers as communication and information practitioners are advised to complete a project. This non-thesis option requires a written comprehensive examination and an oral defense of the project.

DOCTOR OF PHILOSOPHY
COMMUNICATION AND INFORMATION MAJOR

The PhD with a major in communication and information is intended to prepare scholars for teaching, research, administration, and service in the fields of communication and information. The goal of the PhD program is to prepare graduates for positions in research-intensive institutions. This preparation will also enable them to work at other types of educational institutions and industry positions. Doctoral students develop publishable research in their coursework and provide evidence of publishable research prior to taking comprehensive exams. Graduates are expected to be competent in using at least one research method and should be literate in statistics. The program includes training in the foundational origins and contemporary literature of communication and information theories and professions. The program offers the opportunity for students to learn to be good teachers and to participate in service and outreach activities.

The program is interdisciplinary, consisting of a required core curriculum and primary and cognate areas of study. Core courses begin in the fall semester. The first fall and spring semesters must be spent in residence (i.e., enrolled as a full-time student). Attendance at a fall orientation session is required.

Admission
The master’s degree is required for entry into the doctoral program. Students lacking academic or professional experience in communication and information may be required to take prerequisite courses.

The following are normally minimal requirements for admission to full potential candidate status.
• A 3.00 (4.00 system) grade point average in undergraduate studies, and 3.50 for graduate work.
• At or above the fiftieth percentile in verbal, quantitative, and analytical aptitude on the Graduate Record Examination.
• Recommendation letters from at least three former teachers or professional colleagues.
• A statement of the applicant’s goals and reasons for pursuing the doctorate. Personal interviews with members of the PhD Admissions Committee are recommended and may be required. Professional experience in some field of communication and/or information is a highly desirable criterion for admission.
• For students whose native language is not English and who have not earned an earlier degree at an American college or university, the Test of English as a Foreign Language is required. Students should show mastery of the English language.

Requirements
A minimum of 61 hours of approved graduate work is required for the PhD.

Core courses (16-18 hours)
- Communication and Information 610 and 615; 3 hours of statistics; and 1 to 3 hours of Communication and Information 620.
Primary Concentration
Twelve hours in a primary concentration as defined by the student and his/her program committee.

Cognate Area
Nine hours in a cognate area as defined by the student and his/her program committee.

Dissertation
Twenty-four hours of dissertation.

Other Requirements
Within the primary concentration and cognate areas, a total of 6 credit hours must be from theory-intensive courses and 6 hours must be from methods-intensive classes. Courses both inside and outside the college (including graduate-level courses in the schools) may be identified as theory- and/or method-intensive. A list of eligible courses will be provided for students. Students may also submit courses to their program committee for consideration as theory- and/or method-intensive.

All courses require the approval of the student’s program committee. The program committee is assembled in the first semester of the student’s studies. A program plan must be submitted no later than the end of the second semester of study. The program plan may be subsequently revised as needed.

Admission to candidacy must be attained at least two semesters prior to graduation and requires successful completion of a written comprehensive examination.

Each doctoral student’s progress will be reviewed annually by the Graduate Committee of the College of Communication and Information in conjunction with the program committee chair. Results will be reported to the student by his/her program committee chair, who will convey the graduate committee’s recommendation concerning the student’s status in the program and suggestions for improvement in performance.

Planned course offerings in the College of Communication and Information for a full calendar year are available the preceding November. This information is available from the college’s Graduate Studies Office, 302 Communications Building, 865-974-6651. Also see courses listed under the following academic disciplines—advertising, communication studies, information sciences, journalism and electronic media, and public relations.

SCHOOL OF COMMUNICATION STUDIES
http://www.cci.utk.edu/~commstudies/
John W. Haas, Director

Associate Professors
Glenn, R.W., PhD ........................................... Northwestern
Haas, J.W., PhD ........................................... Kentucky
Kupritz, V.W., PhD ........................................... Virginia Tech
Violanti, M.T., PhD ........................................... Kansas

Assistant Professors
Ambler, R.S., PhD ........................................... Ohio State
Levine, K.J., PhD ........................................... Michigan State

Instructors
Kotowski, M., MA ........................................... Michigan State
Tang, L., MA ........................................... Southern California

MAJORS DEGREES
Communication and Information MS, PhD
Communication studies concentration

The School of Communication Studies offers a concentration area for the Master of Science with a major in communication and information and participates in the interdisciplinary doctoral program.

Graduate courses in communication studies also provide opportunities for students in a variety of disciplines to investigate how messages can effect changes in the knowledge, the understanding, the ideas, the attitudes, or the behavior of other human beings.

SCHOOL OF INFORMATION SCIENCES
http://www.sis.utk.edu/
Edwin M. Cortez, Director

Professors
Cortez, E.M., PhD ........................................... Southern California
Pemberton, J.M., PhD ........................................... Tennessee
Tenopir, C., PhD ........................................... Illinois

Associate Professors
Bilal, D., PhD ........................................... Florida State
Robinson, W.C., PhD ........................................... Illinois
Wang, P., PhD ........................................... Maryland
Whitney, G., PhD ........................................... Michigan

Assistant Professors
Allard, S.L., PhD ........................................... Kentucky
Black, K., PhD ........................................... Florida State
Mehra, B., PhD ........................................... Illinois
Normore, L., PhD ........................................... Ohio State
Sandusky, R.J., PhD ........................................... Illinois

MAJORS DEGREE
Information Sciences MS
Communication and Information PhD
Information sciences concentration

The School of Information Sciences provides a program leading to the preparation of librarians and information professionals for work in all types of libraries and information centers. The program of study includes a graduate curriculum leading to the Master of Science degree. The program is accredited by the American Library Association. The School of Information Sciences also participates in the interdisciplinary doctoral program.

Admission
Applicants to the information sciences program must have a minimum undergraduate grade point average of 3.00 or a satisfactory graduate degree grade point average for admission as a potential candidate for the MS.

The verbal, quantitative and analytical aptitude portions of the
The program leading to the Master of Science degree with a major in Information Sciences requires 42 semester hours of graduate courses, including 3 courses required of all students. Either a thesis or a non-thesis option is available, with 6 hours required for thesis credit. At least 33 hours must be taken within the School of Information Sciences curriculum, and up to 9 hours outside of the school can be taken, including a maximum of 6 hours outside the college. No more than 6 hours may be taken from another university.

**Requirements**

Three courses are required of all students – 510, 520, 530. (Students seeking licensure see track requirements below.) These courses address the evolving information environment, organization and representation of information, and information access and retrieval. The courses 510, 520, and 530 are prerequisites to all courses for students enrolled in the MS program.

The faculty regards the following courses as vital to professional success – 540, 550, 560. These courses address research, management and leadership in information organizations, and the concepts of developing and managing collections. One course, 550, serves as a prerequisite to courses in academic, corporate and public library management.

**Individualized Curriculum Approach**

Students, in consultation with their advisor, may wish to pursue a curricular focus to develop an individualized program of study. Graduates of the school have prepared themselves for a variety of careers, including positions as corporate information specialist, public librarian, records manager/archivist, Web page designer, indexer/abstractor, online information retrieval specialist, medical or legal librarian, reference librarian, youth services specialist, and many others. Students are encouraged to take advantage of the individualized curricular approach.

Whatever individualized curriculum is chosen, all students who complete the program receive a MS accredited by the American Library Association (ALA).

For those pursuing Tennessee Department of Education licensure as a school library information specialist, stipulated requirements apply. See the following section.

**Tennessee State Department of Education School Library Information Specialist Requirements**

The Tennessee State Department of Education requires School Library Information Specialists to hold the master’s degree. The School of Information Sciences offers four tracks for school library information specialist endorsement.

**Initial Endorsement for Non-Licensed Teachers with no Master’s Degree in Library or Information Sciences**

For those students who do not have the master’s degree, the requirements for initial endorsement include the three required courses plus 551, 567, 571, 572, 585, 596 and 2 electives (upon approval of faculty advisor). In addition, students must complete two corequisite courses from the College of Education, Health, and Human Sciences (6 credit hours) plus 5 electives (upon approval of the faculty advisor). Upon completion of the requirements, students must earn a Tennessee State Department of Education license as a School Library Information Specialist.

**Additional Endorsement for Licensed Teachers without a Master’s Degree**

The requirements include the three required courses plus 551, 567, 571, 572, 585, and 596 (which must be taken twice). Upon completion of the requirements, students will earn a Tennessee State Department of Education additional endorsement as a School Library Information Specialist.

**Addtional Program Requirements Thesis Option**

Students electing the thesis option will write a master’s thesis under close supervision of a thesis committee. Six hours of Thesis (Information Sciences 500) must be taken within the 42 hours required for graduation. (Students may register for more than 6 hours of 500, but only 6 hours will count toward graduation.) Students must be registered for Information Sciences 500 in the semester they complete and defend their thesis. The oral defense of the thesis (final comprehensive examination) substitutes for the written examination that is taken by non-thesis students. The writing of the master’s thesis serves as the culminating experience.

**Non-Thesis Option**

Upon completion of the program, all students who elect the non-thesis option must take and pass a written comprehensive examination. Students may take no more than a total of 12 hours from 591, 594, 599. The number of satisfactory/no credit courses in a student’s program is limited to one-fourth of the total credit hours required (10 of 42).

**Financial Assistance Opportunities**

Employment with the University of Tennessee Libraries may provide a work-study opportunity for selected students who wish to obtain experience in academic librarianship while pursuing the degree. Such students usually work at least 20 hours each week and thus may extend the period required for the degree. Similar opportunities exist with some other libraries and information agencies in the Knoxville area.

Work opportunities in a scientific-technical environment are available through subcontracts with Oak Ridge National Laboratory and the Department of Energy.

A limited number of graduate teaching assistantships are available through the school. Assistantships of this type carry a waiver of tuition and fees as well as a stipend and require that recipients work 10 hours per week in the school.

For application forms and information about financial aid and other information about the Master of Science with a major in information sciences, write to Admissions, College of Communication and Information, The University of Tennessee, Knoxville, 451 Communications Building, Knoxville, Tennessee 37996.
**SCHOOL OF JOURNALISM AND ELECTRONIC MEDIA**

http://www.cci.utk.edu/~jem/

Peter Gross, Director

**Professors**
- Ashdown, P.G., PhD  ........................................... Bowling Green
- Bates, B.J., PhD ................................................... Michigan
- Bowles, D., PhD ....................................................... Wisconsin
- Caudill, C.E., PhD ................................................... North Carolina
- Gross, P., PhD ........................................................ Iowa
- Littmann, M. (Chair of Excellence), PhD ..................... Northwestern
- Moore, B.A., PhD ................................................... Ohio
- Swan, N.R., PhD ................................................... Missouri
- Teeter, Jr., D.L., PhD .............................................. Wisconsin
- Wirth, M.O. (Dean), PhD ........................................... Michigan State

**Associate Professors**
- Harmon, M., PhD ................................................... Ohio
- Heller, R.B., MA ...................................................... Syracuse
- Kaye, B., PhD .......................................................... Florida State
- Luther, C., PhD ......................................................... Minnesota

**Assistant Professors**
- Clark, N., PhD ......................................................... Florida
- Legg, J.R., PhD ......................................................... Ohio
- Lepre, L., PhD .......................................................... Florida

**Instructor**
- Hufford, B.L., MEd .................................................. Bowling Green

**Emeritus Faculty**
- Leiter, B.K., PhD .................................................... Southern Illinois

**MAJORS DEGREES**

- Communication and Information
  - MS, PhD
  - Journalism and electronic media concentration

The School of Journalism and Electronic Media offers a concentration area with professional and research tracks for the Master of Science with a major in communication and information and participates in the interdisciplinary doctoral program.
The College of Education, Health, and Human Sciences was created in 2002 through a merger of the former College of Education and the former College of Human Ecology. The merger of these two colleges, both with rich histories and exemplary records of achievement, resulted from a recognition of complementary institutional missions and a belief that the two colleges, as one, would become more effective in dealing with the complex challenges facing families, schools, and communities in the 21st century.

The union of Education and Human Ecology to form the College of Education, Health, and Human Sciences honors its past independent accomplishments but is now focused on an interdependent future. The College of Education, Health, and Human Sciences is a people-centered college that is intent on enhancing significant aspects of the human condition and, with its disciplines located at the intersection of many of societies greatest challenges, is positioned to make a significant difference through its programs of study, research, and outreach.

The Teacher Education Program at the University of Tennessee is accredited by the National Council for Accreditation of Teacher Education (NCATE), www.ncate.org. This accreditation covers the initial teacher preparation programs and advanced educator preparation programs.

The College of Education, Health, and Human Sciences holds accreditation with the American Association of Family and Consumer Sciences. Among its accredited academic programs are the following – Mental Health Counseling and School Counseling by the Council for Accreditation of Counseling and Related Educational Programs; Education of the Deaf and Hard of Hearing by the Council on Education of the Deaf; Rehabilitation Counseling by the Council on Rehabilitation Education; School Psychology by the American Psychological Association and the National Association of School Psychologists; Public Health by the Council on Education for Public Health; Sport Management (Graduate Level) by the NASSM/NASPE Sport Management Program Review Council; Dietetics by the American Dietetics Association; Recreation and Tourism Management by the National Recreation and Park Association/American Association for Leisure and Recreation.

Facilities for research and service include the Academic Enrichment Program, the Affymetrix MicroArray Core Facility, the Appalachian Collaborative Center for Learning, the Assessment and Instruction in Mathematics, the Appalachian Rural Systemic Initiative, the Center on Deafness, the Center for Literacy Studies, the Center for Physical Activity and Health, the Early Learning Center for Research and Practice, the Cornerstone, the Educational Interpreting Program, the Educational Opportunity Center, the Family Life Project, the Gerber Grant Project, Gradkids, the High School Equivalency Program, the Institute for Assessment and Evaluation, the Instructional Services Center, the Least Restrictive Environment for Life Project, the Math and Science Regional Center, the Nutrition Institute, the Orientation to Deafness Program, the Pre-College Upward Bound Program, Project Impact, Project Wave, the Reading Center, the Regional Rehabilitation Continuing Education Program, the Rehabilitation Counseling in Deafness Program, the Rehabilitation Counseling Program, the Small Animal Research Lab, the Southeastern Regional Interpreter Training Consortium, the Talent Search Program, the Technology Enhanced Curriculum Lab, the Tennessee Career Information Delivery System, the Tennessee’s Early Intervention System, the THEC Minority Teacher Education Project, the Tourism Institute, the UT-TIE, the Urban Impact Project, and the Veterans’ Pre-College Program.

Teacher Education

Postbaccalaureate students who desire to become teachers (i.e., Pre-Kindergarten-Grade 12) must make application to the College of Education, Health, and Human Sciences’ Teacher Education Program and complete the equivalent of an undergraduate minor in education before enrolling in required graduate courses. Information on admission to teacher education and prerequisite undergraduate courses is available through the Undergraduate Catalog, the college’s Student Services Center (Claxton Complex A332) or at http://cehhs.utk.edu/main.html.
Title II, HEA Compliance Report

Per requirements of Title II of the Higher Education Act, the College of Education, Health, and Human Sciences reports the following pass rates on State required licensure tests for the 2002-2003 Academic Year – the University of Tennessee 97%; State of Tennessee 95%.

Graduate Programs of Study

Graduate study in the College of Education, Health, and Human Sciences prepares students for teaching, research, and public service in schools, colleges, universities, and agencies or managerial positions in government, business, and industry. The college offers programs leading to completion of the Master of Public Health degree, Master of Science degree, Specialist in Education degree, and Doctor of Philosophy degree. Additionally, the college makes available graduate certificate programs and various minors.

DOCTOR OF PHILOSOPHY

EDUCATION MAJOR

Application Process

Individuals seeking admission to the Doctor of Philosophy with a major in education must first be admitted to the University of Tennessee, Knoxville, (see Admission Requirements in the Graduate School section at the front of this catalog) and then admitted to a concentration within the PhD with a major in Education. Prospective students are encouraged to make application at least six months before anticipated matriculation or one year in advance for school psychology (i.e., Deadline January 1.) An online application process is available at http://www.cehhs.utk.edu/departments.html.

Admission Criteria

Admission decisions for applicants to the PhD with a major in education are based on multiple criteria. Applicants are expected to present verbal and quantitative GRE scores equal to or higher than the 50th percentile, based on the norms in effect at the time the test was taken. An applicant with either a verbal or quantitative subtest score that is less than the 50th percentile will be expected to submit a proportionally higher, off-setting second subtest score (e.g., a verbal subtest score at the 60th percentile may off-set a quantitative subtest core at the 40th percentile). Current GRE verbal and quantitative interpretative data are available from Educational Testing Service at http://www.ets.org.

Applicants are expected to earn a minimum score of 4.50 points on the analytic writing subtest (for score interpretation see http://www.gre.org/interpret.html).

Applicants should be aware that departments and/or concentrations may have GRE requirements which exceed those indicated above. Information regarding other admission criteria (e.g., GPA, letters of reference, writing samples, etc.), as well as GRE requirements for non-native English speaking applicants are available through the academic department in which the specific concentration is located.

Residence Requirement

The residence requirement for students in the PhD with a major in education is two consecutive semesters of full-time enrollment.

Contact Information

Additional information on the PhD with a major in education is available in the academic department sections of this catalog, through the college’s Student Services Center, Claxton Complex A332, or at http://web.utk.edu/~ecehhsstu/.

DOCTOR OF PHILOSOPHY

HEALTH AND HUMAN SCIENCES MAJOR

Application Process

Individuals seeking admission to the PhD with a major in health and human sciences must first be admitted to the University of Tennessee, Knoxville, (see the Graduate School Admission Requirements section at the front of this catalog) and then admitted to a concentration within the PhD with a major in health and human sciences. Prospective students are encouraged to make application at least six-months before anticipated matriculation. Applications are reviewed February 1, June 1, and November 1.

Overview of Program

A major challenge of the doctoral program is to draw upon basic research generated by the natural sciences, humanities, and social sciences so as to provide a holistic perspective that contributes to the improvement of both individuals and families. The PhD is a research degree granted only to individuals who demonstrate proficiency in conducting original research. Course requirements are determined by each student’s faculty committee and are based on the needs and interests of that particular student, as well as department and college requirements. Further information is available in the specific department sections of this catalog and online at http://cehhs.utk.edu/.

DEPARTMENT OF CHILD AND FAMILY STUDIES

http://cfs.he.utk.edu

Vey M. Nordquist, Head

Professors

Barber, B., PhD ..........................  Brigham Young
Blanton, P., EdD ..........................  Tennessee
Cunningham, J., PhD ..........................  Michigan State
Fox, G. (UT Distinguished Professor), PhD ..........................  Michigan
Nordquist, V., PhD ..........................  Tennessee
Twardosz, S., PhD ..........................  Kansas

Associate Professors

Brandon, D., PhD ..........................  Tennessee
Malia, J.A., PhD ..........................  Iowa State
Smith, D., PhD ..........................  Oklahoma State

Assistant Professors

Devereaux, M., PhD ..........................  Tennessee
Fouts, H., PhD ..........................  Washington State
Hallam, R., PhD ..........................  Delaware
Moran, M., PhD ..........................  New Hampshire
Stolz, H., PhD ..........................  Brigham Young
Tu, H., PhD ..........................  Purdue

ECE Internship Coordinators

Justice, D., MS ..........................  Tennessee
Stott, A., MS ..........................  Tennessee

Clinical Assistant Professors

Fitzgerald, K., PhD ..........................  Tennessee
Malia, J.E., PhD ..........................  Iowa State

MAJORS

Child and Family Studies  MS
  General-Emphasis concentration
  Teacher Licensure (PreK-3) concentration

Health and Human Sciences  PhD
  Child and family studies concentration

The Department of Child and Family Studies provides both master’s and doctoral degrees. Our graduate programs are based on the model of the empirically-based professional or social scientist. Graduate students learn to conduct research on child development, family studies, and educational environments in accordance with established standards of scientific inquiry and evaluation. Child and family studies graduate programs seek to produce re-
searchers, scholars, and educators who are capable of independent investigation of family and developmental processes. Students also receive training in how to conduct scientifically-based assessments of prevention, intervention and educational strategies. Many opportunities exist in child and family studies for graduate students to become involved in research on children, youth, and families. The central premise of graduate programs in child and family studies is the idea that scientific inquiry provides the most effective means to improve the welfare of children, youth and families.

A cornerstone idea for child and family studies graduate programs is development in context, or the perspective that human development is best understood in terms of interconnections among families, neighborhoods, schools, communities, cultures, and international environments. A more specific focus within this development in context perspective is an emphasis on children, youth, and families at risk. Together, these two themes, development in context and children, youth, and families at risk, are the foundations upon which our graduate curriculum options are structured.

Admission

A completed file for review includes a departmental application, Graduate Record Examination (GRE) scores for the general section, and completion of three Graduate Rating Forms by individuals who can attest to the applicant's potential for graduate education. Forms may be obtained from the department or departmental link on the college Web site. Admission to the program is contingent upon faculty evaluation of GRE scores, undergraduate/graduate GPA, rating forms, work experience, and the match between student's goals and department's focus. Prerequisites for admission to the master's program are 9 semester hours of upper-division undergraduate social science.

Prerequisites to the doctoral program are a master's degree from a regionally accredited institution or equivalent, completion of the 12-hour foundation core in the child and family studies master's program, 3 hours of computationally-based, graduate-level statistics, and completion of a thesis as part of the master's degree.

MASTER OF SCIENCE
CHILD AND FAMILY STUDIES MAJOR

The Master of Science degree with a major in child and family studies provides a broad foundation for understanding how children develop and how families function in today's society. All master's candidates enroll in foundation courses which include theoretical and empirical surveys of the human development, child development, and family science literatures, plus a survey of methods of discovery used in child and family research. All MS studies are expected to engage in productive research culminating in a thesis or project. Students choose to concentrate either in general-emphasis leading to doctoral study or careers in community agencies serving children and families, or teacher-licensure (PreK-3), leading to an educator career in early childhood or school settings. The teacher-licensure (PreK-3) concentration is ordinarily restricted to students currently enrolled in the undergraduate teacher-licensure program at the University of Tennessee, Knoxville.

GENERAL EMPHASIS CONCENTRATION
Requirements

The general-emphasis concentration requires a minimum of 36 hours of coursework – 12 hours in foundation coursework and 24 hours in specialization. The specialization credit hours are selected with guidance of the student's master's committee. Students seeking the MS with a major in child and family studies (general-emphasis concentration) must select a master's committee chair and file a plan of study with the department head after 12 hours of graduate credit.
DEPARTMENT OF
EDUCATIONAL PSYCHOLOGY
AND COUNSELING
http://web.utk.edu/~EdPsych/
R. Steve McCallum, Head
Tricia McClam, Associate Head, Graduate Liaison

Professors
Bogue, E.G., EdD .......................................................Memphis State
Brockett, R., PhD .....................................................Syracuse
George, T. (Associate Dean), EdD .....................................Tennessee
Greenberg, K., PhD ..................................................George Peabody
Huck, S., PhD ..........................................................Northwestern
Kronick, R., PhD ......................................................Tennessee
McCallum, R.S., PhD ..................................................Georgia
McClam, T., PhD ......................................................South Carolina
Mertz, N., EdD .............................................................Columbia
Peters, J., EdD ..............................................................North Carolina State
Skolits, G., EdD ..........................................................ETSU
Paulus, T., PhD ..............................................................Indiana
Gibbons, M., PhD .......................................................North Carolina (Greensboro)
Woods, M., EdD .............................................................Virginia Tech

Associate Professors
Diambra, J., EdD .........................................................William & Mary
Cochran, J., PhD ..........................................................Virginia Tech
Skinner, C., PhD ..........................................................Lehigh
Peters, J., EdD ..............................................................North Carolina State
Williams, R., PhD .......................................................George Peabody
Woodside, M., EdD .......................................................Virginia Tech

Assistants Professors
Gibbons, M., PhD .......................................................North Carolina (Greensboro)
Paulus, T., PhD ..............................................................Indiana
Skolits, G., EdD .............................................................ETSU
Spurgeon, S., PhD .........................................................North Carolina (Greensboro)
Strayhorn, T.L., PhD .....................................................Virginia Tech

Research Professors
Colvin, C., EdD ............................................................Virginia
Grubbs, L.A., PhD ........................................................Tennessee
Mulkey, S., PhD ........................................................Florida State

MAJORS DEGREES
College Student Personnel MS
Counseling MS
Mental health counseling concentration
Rehabilitation counseling concentration
School counseling concentration

Educational Psychology MS
Adult education concentration
Applied educational psychology concentration

School Counseling EdS
School Psychology EdS

Education PhD
Counselor education concentration
(specializations in career development; rehabilitation; group process)
Educational Psychology and Research Concentration
(specializations in adult education; applied educational psychology; collaborative learning; and evaluation and assessment)
Higher education administration concentration
School psychology concentration

EDUCATIONAL PSYCHOLOGY AND RESEARCH

Educational psychology and research offers individuals a choice of two concentrations at the master’s level and four PhD specializations. These options meet the needs of students with varying interests within the broad field of educational psychology. The areas of adult education, applied educational psychology, collaborative learning, and evaluation and assessment are linked by a common interest in human development, teaching and learning, and methods of inquiry. Educational psychology prepares students with diverse backgrounds for leadership roles in education across the life span and in facilitation of improved professional practices. Together, a community of learners is created and students and faculty members regularly share with and learn from one another through collaborative scholarship. Graduates are employed in such areas as higher education, K-12 education, business and industry, nonprofit, and community service agencies.

Adult Education
http://web.utk.edu/~adulted/

The adult education program is designed for those interested in providing learning opportunities for adults. It is intended for educators of adults in a wide range of settings such as adult literacy, continuing higher education, business and industry, government and community-based organizations, volunteer agencies, and professional and staff development programs. The program prepares individuals for such roles as program planner, instructor, trainer, and administrator.

Applied Educational Psychology
http://web.utk.edu/~EdPsych/grad/app_ed_psych/

The applied educational psychology program is designed for individuals who seek to provide professional leadership in the facilitation of learning and development (at the master’s and doctoral levels). It provides an opportunity to focus on the needs of underachieving and nontraditional learners through application of cognitive education and social constructivist approaches and/or applied statistics and measurement (at the doctoral level). It is intended for individuals focused on careers in a wide range of settings such as higher education, K-12 education, community-based agencies, and research institutions.

The master’s program is often used as a stepping stone to a doctoral program in educational or school psychology or as additional preparation for functioning in professional support roles in schools, mental health centers, and business programs devoted to personal and professional development.

The doctoral program addresses the needs of professionals in educational psychology, as well as others who desire in-depth study at an advanced level on one of two areas of emphasis. Many graduates of this specialization work in higher education or research institutes and focus on human learning and development and/or applied statistics/measurement as it relates to teaching and learning.

Collaborative Learning
http://web.utk.edu/~EdPsych/grad/collab_learning/default.html

The collaborative learning program addresses the advanced educational needs of professionals working in a variety of settings including business, government, higher education, and non-profit organizations. Participants study the collaborative learning process and engage in action research in the context of their own professional practices. A cohort of doctoral students is admitted every other year.

Evaluation and Assessment

The evaluation and assessment specialization is designed for students interested in pursuing careers as evaluators of learning needs and outcomes in educational settings. The program encompasses the evaluation requirements and needs of diverse educational settings across the P-16 continuum, as well as educational endeavors conducted under the auspices of private, profit and non-profit organizations. The specialization includes coursework in program (and project) evaluation, classroom assessment, and personnel evaluation systems. This specialization combines elements of evaluation theory, evaluation and assessment methods, and hands-on applications to provide students with relevant knowledge and skills for engaging in research and/or the practice of educational evaluation.
MASTER OF SCIENCE
EDUCATIONAL PSYCHOLOGY MAJOR
ADULT EDUCATION CONCENTRATION

Requirements
The master’s program involves a minimum of 36 hours of coursework (except for the thesis option, which is 33 hours minimum). Programs typically consist of the following.

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Adult Education Core</td>
</tr>
<tr>
<td>3</td>
<td>Research</td>
</tr>
<tr>
<td>6</td>
<td>Courses outside of Educational Psychology</td>
</tr>
<tr>
<td>12+</td>
<td>Departmental Electives</td>
</tr>
</tbody>
</table>

1. Educational Psychology 513, 520, 521, 522, 525.
2. Options could include Educational Psychology 550; Cultural Studies in Education 560, 561; Curriculum, Educational Research, and Evaluation 580; Educational Administration 516; Educational Psychology 530.
3. This category will include coursework outside of educational psychology that provides a more specialized focus to the program or as a complement to current professional competencies. Some examples of possible supporting areas include higher education administration, counseling, educational administration and supervision, cultural studies, sociology, psychology, human resource development, and agricultural and extension education.

Remaining Coursework
Remaining coursework can be taken in a combination of electives within adult education or coursework in related areas. Examples of courses in educational psychology that meet this expectation include Educational Psychology 460, 504 (recent examples have included Multicultural Perspectives in Adult Education, Learning in the Workplace, and Writing for Professional Publication), 509, 510, 514, 515, 516, 523, 524, 527, 528, 529, 573, 574.

Comprehensive Examination/Thesis
Most students opt to write a comprehensive examination. This involves preparing written responses to questions from the student’s graduate committee. Typically, these are done in a take-home format. However, a thesis option is also available.

The thesis is an original piece of research. Students who opt to write a thesis register for 6 hours of Educational Psychology 500. The final document is presented to the student’s graduate committee and discussed in an oral examination with the committee.

APPLIED EDUCATIONAL PSYCHOLOGY CONCENTRATION
This master’s program focuses on concepts, principles, techniques and models of educational psychology as they are used to facilitate teaching and learning and the creation of effective classroom environments for learners of all ages. The program includes traditional themes in educational psychology (e.g., human development, learning principles, assessment, and psychoeducational intervention). It is unique in its focus on meeting the needs of nontraditional and underachieving learners from birth through adulthood through the use of cognitive education interventions.

The master’s program may be used as a stepping stone for entering a doctoral program in educational or school psychology or as an additional preparation for functioning in an educational role in schools, mental health centers, and business programs devoted to personal and professional development. The faculty members in the Department of Educational Psychology and Counseling are committed to the creation and study of environments that enhance learning potential and promote lifelong learning for people of all ages, abilities, and backgrounds.

Requirements
Students complete 36 hours beyond the baccalaureate degree. A minimum of 24 hours must be at the 500 level or higher. At least 6 hours must be taken outside the department. Students must choose between thesis and non-thesis options. Approved courses are listed below. Equivalent courses may be substituted with the consent of the program committee.

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Applied Educational Psychology Core</td>
</tr>
<tr>
<td>6</td>
<td>Human Development</td>
</tr>
<tr>
<td>9</td>
<td>Learning Principles</td>
</tr>
<tr>
<td>3</td>
<td>Research</td>
</tr>
<tr>
<td>3</td>
<td>Assessment</td>
</tr>
<tr>
<td>6</td>
<td>Intervention</td>
</tr>
<tr>
<td>6</td>
<td>Thesis or Electives</td>
</tr>
</tbody>
</table>

Total 36

1. Educational Psychology 507.
2. Courses related to human development help students explore the role of development in learning for more and less successful learners. They include a choice of Educational Psychology 510, 522 and/or Psychology 511.
3. Courses related to learning principles provide an opportunity to compare behavioral and cognitive learning theories in-depth and other theories in comparison. Students may study learning as it relates to adults as well as children. Courses include Educational Psychology 671, and a choice of two of the following courses – Educational Psychology 515, 516, or 522.
5. The assessment course provides an overview of assessment concepts, approaches, and issues. Students take Counselor Education 525.
6. The courses related to intervention include exploration of approaches for meeting the needs of nontraditional and underachieving students, program development and facilitation of adult learning, self-management and reflective practice, and facilitation of group change. Students choose two courses from Educational Psychology 572, 573, and/or 574.
7. Thesis students take 6 thesis hours toward the 36-hour program in lieu of electives. The thesis involves an original research project. A written document of the research is presented to the student’s graduate committee members and discussed in an oral examination regarding the research. Non-thesis students complete a comprehensive examination. This typically involves the writing of scholarly papers in response to questions from each of the student’s graduate committee members. A minimum of 6 hours of non-thesis electives may be chosen from Educational Psychology 460, 513, 522, 525, and/or 529.

DOCTOR OF PHILOSOPHY
EDUCATION MAJOR
EDUCATIONAL PSYCHOLOGY AND RESEARCH CONCENTRATION

Concentration Core (10 hours)
The concentration core in educational psychology reflects the relationships between specializations and their foundation in educational psychology. The core also includes a departmental doctoral seminar that orient new students to doctoral study and scholarly activities. In addition, all students must take as one of their research courses, a departmental course that introduces inquiry through appropriate selection of quantitative and/or qualitative methods. Students may select other research courses according to preference and specialization requirements as described below. Core courses include Educational Psychology 507, 513, 525, 601.
ADULT EDUCATION SPECIALIZATION

Requirements

The PhD specialization in adult education involves a minimum of 79 hours of study beyond the master’s degree. This includes at least 55 hours of coursework and 24 hours of dissertation.

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>1 Concentration</th>
<th>2 Specialization</th>
<th>3 Research</th>
<th>4 Cognate</th>
<th>5 Electives</th>
<th>6 Dissertation</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>18</td>
<td>15</td>
<td>8</td>
<td>3-12</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>79-87</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

1. The concentration core consists of courses as described above.
2. Courses for the specialization are from adult education courses such as those listed under the master’s degree requirements and electives.
3. A departmental course introducing quantitative and qualitative methods is required for all students as a part of the minimum 15 hours of research. To meet the research requirement, students take courses that provide them with knowledge and skills in both quantitative and qualitative research methods.
4. At least 6 hours must be taken in a cognate area outside the College of Education, Health, and Human Sciences.
5. Dissertation hours are taken after all or most coursework is completed. Once a student registers for course 600 (dissertation/research), he/she must continually thereafter register for a minimum of 3 hours every semester until the dissertation is defended and submitted.

APPLIED EDUCATIONAL PSYCHOLOGY SPECIALIZATION

The applied educational psychology program provides study for students with varying interests in the areas of human learning and development or statistics and measurement. Doctoral students selecting the first area of emphasis focus on acquisition and participatory theories of learning and development and the role of the teacher/mediator of learning experiences. Doctoral students selecting the second area of emphasis focus on quantitative methods, research design, and test construction.

This program involves a community of learners in which beginning students, advanced students, and faculty members come together regularly to share with and learn from one another. The cornerstone of this program is a seminar attended by all students (for their first three years), as well as the program’s faculty members. Collaboration on research projects, group trips to professional meetings, and social events also help to create the sense that “I belong; others care about me; and everyone benefits from the group’s array of skills, knowledge, background, and contacts.”

Requirements

The specialization requires a minimum of 88 hours of graduate credit beyond the baccalaureate degree distributed among the following seven categories.

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>1 Concentration Core</th>
<th>2 Applied Educational Psychology Doctoral Seminar</th>
<th>3 Area of Emphasis</th>
<th>4 Research</th>
<th>5 Cognate</th>
<th>6 Professional Preparation</th>
<th>7 Dissertation</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>12</td>
<td>9</td>
<td>15</td>
<td>6</td>
<td>12</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>88</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

1. The concentration core is described above and includes one designated 3-hour course from each specialization in educational psychology and a 1-hour doctoral seminar, which is taken during the student’s first semester.
2. All applied educational psychology students enroll in 2 hours of the applied educational psychology doctoral seminar during every fall and spring semester during their first three years.

3. Applied educational psychology students select an area of emphasis in either applied statistics and measurement, or human learning and development. For students with the learning/development emphasis, course options include (but are not limited to) mediated learning theory, educational applications of cognitive learning theories, educational applications of behavioral learning theories, collaborative learning, and facilitation of group change. For students with the applied statistics and measurement emphasis, course options include (but are not limited to) survey design and analysis, categorical data analysis, applied multivariate methods, and scale construction.
4. A departmental course introducing quantitative and qualitative methods is required for all students as a part of the minimum 15 hours of research. In addition to this course, students can elect to take a set of courses that deal with qualitative methodologies (e.g., experimental design, seminar in applied psychometrics) or they can elect to take a full set of courses that deal with qualitative methodologies (e.g., phenomenology, discourse analysis, or a survey of qualitative methods) or they can elect to take a mix of these courses.
5. The cognate requires a minimum of two courses outside the Department of Educational Psychology and Counseling. Many students choose psychology or statistics, although many other cognates are possible.
6. Toward the end of the program, each student will take 12 hours of courses that involve the refinement of professional skills including technical or scholarly writing, two independent study course experiences, and an internship in educational psychology. Students planning to teach in a college or university setting are encouraged to take an additional course in instructional design for higher education.
7. All students will enroll in a minimum of 24 hours of dissertation. Further details are described elsewhere in this catalog.

COLLABORATIVE LEARNING SPECIALIZATION

The collaborative learning specialization addresses the advanced educational needs of professionals working in a variety of settings including business, government, higher education, and non-profit organizations. Participants study the collaborative learning process and engage in action research in the context of their own professional practices. A cohort of doctoral students is admitted every other year.

Requirements

Doctoral students in the collaborative learning specialization are expected to complete a minimum of 94 hours of graduate credit beyond the baccalaureate degree. Required is a two-year residency, consisting of six consecutive semesters in which the student will enroll in a minimum of 6-9 hours of coursework in each of four semesters and a minimum of 9 hours in each of two consecutive semesters. These hours are distributed among the following categories.

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>1 Concentration Core in Educational Psychology</th>
<th>2 Specialization Core in Collaborative Learning</th>
<th>3 Research Methods</th>
<th>4 Cognate</th>
<th>5 Electives</th>
<th>6 Dissertation Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>24</td>
<td>15</td>
<td>6</td>
<td>15</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>94</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. The concentration consists of courses in each specialization and a departmental seminar course as described in the concentration section above.
2. The specialization core consists of four courses in the area of collaborative learning plus the doctoral seminar. Educational Psychology 630 is taken on a continuous basis beginning with the first semester of the student’s residency and culminating at the end of the second year of residency, excluding summers. Three hours are awarded per semester for a total of 12 hours of credit.
3. This set of courses includes courses in qualitative and quantitative research methods and statistics.
4. Courses taken in an area outside the major area of study.
5. Additional courses of the student’s choice that support his or her professional practice and therefore must involve some form of action research methodology.
6. The focus of the student’s dissertation research is his or her own professional practice and therefore must involve some form of action research methodology.
EVALUATION AND ASSESSMENT SPECIALIZATION

Requirements

The PhD specialization in evaluation and assessment involves a minimum of 82 hours of study beyond the master’s degree distributed among the following categories:

<table>
<thead>
<tr>
<th>Category</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentration Core</td>
<td>.10</td>
</tr>
<tr>
<td>Specialization</td>
<td>.21</td>
</tr>
<tr>
<td>Research</td>
<td>.15</td>
</tr>
<tr>
<td>Electives</td>
<td>6-12</td>
</tr>
<tr>
<td>Cognate</td>
<td>.6</td>
</tr>
<tr>
<td>Dissertation</td>
<td>.24</td>
</tr>
<tr>
<td>Total</td>
<td>82-88</td>
</tr>
</tbody>
</table>

1. The departmental core consists of the following courses: EP 507, 513, 525, and 601. In addition, all students take EP 506 as part of the research requirement.
3. A departmental course introducing quantitative and qualitative methods is required for all students as a part of the minimum 15 hours of research. In addition to a mix of both qualitative and/or quantitative methodologies, at least six hours of statistics are strongly encouraged.
4. Students are to explore other fields related to their areas of interest. The courses may include curriculum, instructional technology, educational administration/higher education or other courses within and beyond education.
5. At least 6 hours must be taken in a cognate area outside the program.
6. All students will enroll in a minimum of 24 hours of dissertation. Further details are described elsewhere in the catalog.

COUNSELING

The programs within the counseling area prepare individuals as professional counselors and counselor educators in community mental health, human service, and rehabilitation agencies; educational institutions; private practice; government; business; and industrial settings. The courses of study focus on professional identity, social and cultural diversity, human growth and development, career development, helping relationships, group work, assessment, and research and program evaluation. The degrees offered are Master of Science with a major in counseling (concentrations in mental health counseling, rehabilitation counseling, and school counseling); Specialist in Education with a major in school counseling; Doctor of Philosophy with a major in education (concentration in counselor education). The MS and EdS programs provide coursework required to obtain licensure. The mental health counseling, school counseling, and doctoral programs are accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP). The graduate program in rehabilitation counseling is service oriented and is accredited by the Council on Rehabilitation Education, Inc. (CORE). It leads to certification from the Commission on Rehabilitation Counselor Education (CRCC).

MASTER OF SCIENCE COUNSELING MAJOR

MENTAL HEALTH COUNSELING CONCENTRATION

The master’s program in mental health counseling (60 hours) is accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP). The program requires a 300-hour internship in the community during the second year to prepare students for practice. Students in the mental health counseling concentration complete a program of study, which includes core courses, clinical courses, and electives. A thesis option is available. Through careful selection of electives and individualized programming, students are able to develop the skills to work in settings that emphasize alcohol and drug abuse; services to children, youth, families, and the elderly; and career development, employment, and correctional counseling. Graduates of the program will receive endorsement for licensure as a licensed professional counselor with mental health service provider designation (LPC) and for board certification by the National Board of Certified Counselors (NBCC).

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counselor Education 431, 480, 525, 551, 554, 555, 556</td>
<td>21</td>
</tr>
<tr>
<td>Educational Psychology 550</td>
<td>3</td>
</tr>
<tr>
<td>Psychology 512 or Educational Psychology 510</td>
<td>3</td>
</tr>
<tr>
<td>Counselor Education 500 or electives</td>
<td>3</td>
</tr>
<tr>
<td>Total Year 1</td>
<td>30</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 2</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counselor Education 521, 535, 552</td>
<td>9</td>
</tr>
<tr>
<td>Counselor Education 559</td>
<td>9</td>
</tr>
<tr>
<td>Counselor Education 570</td>
<td>3</td>
</tr>
<tr>
<td>Psychology 573 or Social Work 524</td>
<td>3</td>
</tr>
<tr>
<td>Counselor Education 500 or electives</td>
<td>6</td>
</tr>
<tr>
<td>Total Year 2</td>
<td>30</td>
</tr>
</tbody>
</table>

Total program hours 60

REHABILITATION COUNSELING CONCENTRATION

The purpose of rehabilitation training programs is to ensure that skilled personnel are available to serve the rehabilitation needs of individuals with disabilities assisted through vocational rehabilitation (VR), supported employment, and independent living programs. The University of Tennessee, Knoxville, graduate concentration in rehabilitation counseling is designed to prepare students for professional careers as clinicians in the field of rehabilitation counseling. The rehabilitation counseling concentration is service-oriented and includes practica and internship experiences. The program is fully accredited by the Council on Rehabilitation Education, Inc. (CORE).

Students may complete the 48 hour program in four academic semesters (two fall terms, one spring term, and one summer term). Students may be admitted to the program either full- or part-time. Full-time students admitted to the program follow a sequence of courses that facilitates degree completion in 16 months. The first (fall) and third (summer) semesters are didactic in nature, but the second semester adds an experiential component under Rehabilitation Counseling 547. The final (second) fall semester is experiential, with students working full-time to fulfill the 600-hour requirement of Rehabilitation Counseling 549. The internship is considered the culminating experience to the program and students must complete internship in the final term of study prior to graduation. Upon completion of the 48-hour program students are eligible to participate in the Certified Rehabilitation Counselor (CRC) examination, administered by the Commission on Rehabilitation Counselor Certification (CRCC). Upon successful completion of this examination students earn the credential of Certified Rehabilitation Counselor (CRC). Students are also required to demonstrate satisfactory performance through written comprehensive examination as a requirement for graduation.

Students also have the option of completing a 60-hour psychosocial rehabilitation track. This track is intended for students who have career goals that include working with individuals with disabilities in hospital settings, proprietary rehabilitation, community rehabilitation programs, and other such settings. Students wishing to practice in mental health agencies or similar settings
should consider the mental health counseling track. Students in both 48 and 60 hour tracks are required to demonstrate satisfactory performance in a written comprehensive examination as a requirement for graduation. Contact Dr. Patrick Dunn for details (865) 974-8013 or by email at pdunn4@utk.edu.

Requirements
For students pursuing the 48-hour program of study the following course sequence is recommended. All courses are three-credit hours, except where indicated.

**Fall 1**
- Counselor Education 551
- Rehabilitation Counseling 530, 538, 543, 545

**Spring 1**
- Educational Psychology 550
- Rehabilitation Counseling 532, 537, 544, 547

**Summer 1**
- Counselor Education 552, 554
- Rehabilitation Counseling 533, 541

**Fall 2**
- Rehabilitation Counseling 549 (6 credit hours)

Students pursuing the 60-hour psychosocial rehabilitation track are required to complete the following courses in addition to those indicated above – Counselor Education 525, Elective (Approved by Academic Advisor), Educational Psychology 510 or Psychology 512, Rehabilitation Counseling 549 (3 additional credit hours). The additional three hours of internship in the psychosocial track must be completed in a rehabilitation setting serving individuals with cognitive, emotional or psychiatric disorders.

Students are admitted to rehabilitation counseling courses upon program admission only. All rehabilitation counseling courses, with the exception of Rehabilitation Counseling 549, are offered only one semester per year. Students who are admitted to the program must meet with an advisor each semester to plan their studies.

Program Contacts
Patrick L. Dunn, Ph.D., CRC, Program Coordinator, pdunn4@utk.edu.

**MASTER OF SCIENCE COUNSELING MAJOR**

**SCHOOL COUNSELING CONCENTRATION**
The master’s program in school counseling (48 hours) is accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP). The purpose of the program is to develop graduates who will assume the major responsibilities of a counselor within elementary and secondary schools. Applicants for degrees in this field must present satisfactory evidence of academic ability and adequacy of personal characteristics and goals as determined by recommendations of employers, instructors, and colleagues, and by scores of the aptitude portion of the Graduate Record Examination. The program requires a 600-hour internship in a school site during the second year to prepare students for practice. Students enrolled complete a program that includes core courses, clinical courses, and electives. Those applicants who have not had teaching experience may be required to complete additional classes. Graduates will fulfill the license requirements for PreK-12 School Counseling in Tennessee and in most states of the United States although some states may have additional experience and testing requirements.

**Requirements**

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counselor Education 431, 480, 525, 550, 551, 552, 554</td>
<td>21</td>
</tr>
<tr>
<td>Educational Psychology 550</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>*Total Program Hours 48</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 2</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counselor Education 555</td>
<td>3</td>
</tr>
<tr>
<td>Counselor Education 558</td>
<td>6</td>
</tr>
<tr>
<td>Counselor Education 561, 570</td>
<td>6</td>
</tr>
<tr>
<td>Educational Psychology 510</td>
<td>3</td>
</tr>
<tr>
<td>*Special Education 470</td>
<td>3</td>
</tr>
<tr>
<td>*Total Program Hours 21</td>
<td></td>
</tr>
</tbody>
</table>

* Individuals with teaching license can substitute an elective for this course.

**SPECIALIST IN EDUCATION SCHOOL COUNSELING MAJOR**
The Specialist in Education with a major in school counseling is a post-master’s program designed to provide advanced training for school counselors and others with a master’s degree in a related area. Graduates must complete at least 60 semester hours beyond the bachelor’s degree. Applicants for a degree in this field must present satisfactory evidence of academic ability, adequacy of personal characteristics and goals as determined by recommendations of employers, instructors, and colleagues, and by scores of the aptitude portion of the Graduate Record Examination. The program can serve the educational needs of experienced counselors whose original training predated many recent advancements in counseling; students holding a master’s degree in guidance but wanting additional training; individuals who wish to shift from one setting or level of counseling to another; and students from related areas who want to enter the school counseling profession.

Those applicants who have not had teaching experience may be required to complete additional classes. Graduates who desire to fulfill the licensure requirements for K-12 School Counseling in Tennessee and in most states of the United States are required to fulfill all the requirements for a licensure endorsement. (Students without a license in school counseling are required to complete those requirements before obtaining the EdS with a major in school counseling.)

For a student with a School Counselor License, the Specialist in Education program requires 22 hours beyond the master’s. The program is individualized and planned by the student and a faculty committee. A minimum of 6 hours is required from outside the counselor education program.

**Requirements**

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1School Counseling Core</td>
<td>13</td>
</tr>
<tr>
<td>Courses outside the program area (6 hours of electives)</td>
<td>6</td>
</tr>
<tr>
<td>General Elective</td>
<td>3</td>
</tr>
<tr>
<td>*Total program hours 22</td>
<td></td>
</tr>
</tbody>
</table>

1 Counselor Education 504, 555, 570, 650, 659.
DOCTOR OF PHILOSOPHY
EDUCATION MAJOR
COUNSELOR EDUCATION CONCENTRATION

The doctoral concentration in counselor education at the University of Tennessee is designed to prepare experienced counseling professionals to advance their careers in the education, supervision, and research of counselors. The doctoral program is for those students who have completed a master’s degree in counseling or counseling-related fields who aspire to careers in areas such as college, university, or community college teaching positions in counselor education or related fields; supervisory positions in schools, community agencies, state departments of education; counseling positions in student development programs and counseling centers in higher education; and/or private mental health counseling/consultation practice employee assistance programs.

The doctoral program requires advanced coursework, internship, and dissertation hours of study beyond the master’s degree. Students in the PhD concentration in counselor education will work toward endorsement for counseling licensure, if licensure has not been received prior to entering the doctoral program. During the program doctoral students will review the necessary criteria for the license they seek and will plan to meet those criteria. Preference is given to those with a 3.50 GPA on any graduate work completed prior to application. Preference is also given to students who score equal to or higher than the 70th percentile on the verbal area and the 50th percentile on the quantitative area of the GRE, based on the norms that were in effect when the test was taken, and a 4.50 on the analytic writing subtest. To be considered for acceptance, the applicant must have

- Master’s degree in counseling or counselor-related field.
- Minimum of two years of work experience in counseling or counseling-related field.
- Fitness for the program, including self-awareness and emotional stability as indicated by references and interview.
- Potential for leadership and advocacy as indicated by references, publications, presentations, and other professional activities.
- Expertise in technological applications.

In addition, general graduate admission standards for international students require a transcript from the home country indicating an equivalent of the University of Tennessee grade point average of 3.00 or higher. Official results of TOEFL must be submitted. A minimum score of 213 on the computer-based test, 550 on the paper test, or 80 on the Internet-based Test typically with a score of 20 on each of the sections of the test (reading, listening, writing, and speaking), and scores on the GRE that meet the admission requirements.

Requirements

Coursework for the program in counselor education includes the following.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentration</td>
<td>33</td>
</tr>
<tr>
<td>Specialization (not counselor education)</td>
<td>9</td>
</tr>
<tr>
<td>Cognate</td>
<td>6</td>
</tr>
<tr>
<td>Core</td>
<td>10</td>
</tr>
<tr>
<td>Research</td>
<td>15</td>
</tr>
<tr>
<td>Dissertation</td>
<td>24</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>97</strong></td>
</tr>
</tbody>
</table>

More detailed information about coursework is available in the program handbook and through the advising process.

HIGHER EDUCATION ADMINISTRATION

Under Higher Education Administration, two programs are offered – a major in college student personnel and a concentration in higher education administration with a major in education under the PhD.

MASTER OF SCIENCE
COLLEGE STUDENT PERSONNEL MAJOR

The college student personnel program is a two-year, practitioner-oriented master’s degree designed to prepare student personnel administrators and administrative needs of colleges and universities. Philosophically based in college and university administration and resting on standards articulated by the Council for Advancement of Standards for Student Services/Student Development programs, the program prepares individuals for a wide and growing variety of student and university service positions in post-secondary institutions including admissions, orientation, records, financial aid, academic advising, housing, athletics, disability services, career services, student activities and leadership development, institutional research and assessment, advancement and alumni relations, Greek life, and international education.

Admission

Students are admitted to the college student personnel program each spring for matriculation in the fall. Prospective students must submit current GRE scores (within the past five years). In addition, the following information must be submitted to the department office (program coordinator) by March 1st – College Student Personnel Program Application form and 3 rating/reference forms. An admission application must also be submitted to the Office of Graduate and International Admissions. It is recommended that all materials be submitted by February 15.

Requirements

The college student personnel program requires a minimum of 36 hours, including 6 hours of practicum experience. Students are required to complete either a thesis or problems-in-lieu of thesis as a culminating activity.

DOCTOR OF PHILOSOPHY
EDUCATION MAJOR
HIGHER EDUCATION ADMINISTRATION CONCENTRATION

The concentration in higher education administration under the PhD with a major in education offers advanced graduate study to those students aspiring to enhance their leadership knowledge and skill for service in their current positions, to establish knowledge and skill bases for a more responsible executive leadership appointment, to build the capacity and inclination for active participation in policy dialogue related to the purpose and performance of higher education, and to prepare selected scholars for service in faculty and policy scholar roles. Interdisciplinary in design, the program features core coursework in higher education foundations, leadership and organizational theory, research foundations, and specialization interests. The program also features forum and seminar experiences for all students in a humanities and research seminar in the first year of the program and an issues and inquiry seminar in the second year of the program.
Admission
Applicants must submit current (taken within the past 5 years) GRE scores that equal or exceed the minimums expected for applications to the PhD with a major in Education (see the PhD in Education section of this catalog for those details). Applicant must also submit three letters of recommendation, Graduate Application for Admission, Application for PhD study for the college and department, official transcripts of all previous undergraduate and graduate work, and a writing sample. An overall GPA of 3.30 in previous graduate study is required, and an interview may be requested of applicants to ascertain match of an applicant’s goals with resources and goals of the program.

Requirements
The program requires completion of approximately 48-57 hours of coursework (exclusive of dissertation enrollment), completion of a written and oral comprehensive examination (an overall GPA of 3.50 is required to take the comprehensive examination), and successful completion and defense of dissertation. The doctoral residence requirement is met by two consecutive terms of full-time enrollment.

SCHOOL PSYCHOLOGY
http://web.utk.edu/~edpsych/school_psychology/

The school psychology programs are based on a data-based decision-making model and offer advanced training in psychological, educational, and professional foundations including training in assessment, research, consultation, and intervention. Two degree programs are offered – the Specialist in Education (EdS) and the Doctor of Philosophy (PhD). The school psychology programs are designed to meet accreditation requirements of relevant bodies including the American Psychological Association (APA), the National Association of School Psychologists (NASP), the National Council for Accreditation of Teacher Education (NCATE), and the Tennessee Department of Education. Information about current accreditation status can be obtained from the website. Admission occurs once a year and materials are due by January 15.

SPECIALIST IN EDUCATION

SCHOOL PSYCHOLOGY MAJOR
Every EdS school psychology student is expected to meet the University of Tennessee school psychology training program’s knowledge and skill requirements. Opportunities for students to meet these requirements will occur in the classroom and during field experiences. The school psychology faculty, along with current and previous students, practicum and internship supervisors, and various other groups who help ensure quality control within our training programs, have contributed to the development of our curricula. Various accrediting and curricula oversight agencies (i.e., APA, NASP, SDE-Tennessee) have their own specific goals and objectives. The School Psychology Handbook, published by the Educational Psychology and Counseling Department, describes how the University of Tennessee school psychology training program attempts to meet the goals and objectives of these various training groups.

The University of Tennessee PhD program is designed to provide graded, sequential, and hierarchical training across the following areas.

• Professional school psychology.
• Consultation and intervention.
• Assessment.
• Research and statistics.
• Psychoeducational core.
• Field experience and professional practice.

Requirements
The program typically requires five years to complete and requires a minimum of 113 total hours. Students must complete 24 hours of dissertation work and a minimum of 89 graduate course hours, which includes coursework, field experiences, and an internship completed in the final academic year. The internship requires 2000 clock hours with a minimum of 600 clock hours in school settings. A comprehensive description of requirements and our recommended sequence of course and field experience work are provided in the School Psychology Handbook.

DOCTOR OF PHILOSOPHY
EDUCATION MAJOR

SCHOOL PSYCHOLOGY CONCENTRATION
Every PhD school psychology student is expected to meet the University of Tennessee school psychology training program's knowledge and skill requirements. Opportunities for students to meet these requirements will occur in the classroom and during field experiences. The school psychology faculty, along with current and previous students, practicum and internship supervisors, and various other groups who help ensure quality control within our training programs, have contributed to the development of our curricula. Various accrediting and curricula oversight agencies (i.e., APA, NASP, SDE-Tennessee) have their own specific goals and objectives. The School Psychology Handbook, published by the Educational Psychology and Counseling Department, describes how the University of Tennessee school psychology training program attempts to meet the goals and objectives of these various training groups.

The University of Tennessee PhD program is designed to provide graded, sequential, and hierarchical training across the following areas.

• Professional school psychology.
• Consultation and intervention.
• Assessment.
• Research and statistics.
• Psychoeducational core.
• Field experience and professional practice.

Requirements
The program typically requires four years to complete and requires a minimum of 79 graduate credit hours, which includes course work, field experiences, and an internship completed in the final academic year. The internship requires 1200-1500 clock hours with a minimum of 600 clock hours in school settings. A comprehensive description of requirements and our recommended sequence of course and field experience work are provided in the School Psychology Handbook.

DEPARTMENT OF EXERCISE, SPORT, AND LEISURE STUDIES
http://web.utk.edu/~sals/

Joy T. DeSensi, Head

Professors
Bassett, Jr., D.R., PhD ........................................... Wisconsin
DeSensi, J.T., EdD ........................................... North Carolina (Greensboro)
Hayes, G.A., PhD ........................................... North Texas State
Thompson, D., PhD ........................................... Virginia
Wissberg, C.A., PhD ......................................... Michigan

Associate Professors
Fisher, L.A., PhD ............................................... California (Berkeley)
Kelley, D.R., PhD ........................................... Georgia State
Zhang, S., PhD ................................................ Oregon

Assistant Professors
Andrew, D., PhD ............................................. Florida State
Bemiller, J., JD ................................................... Tennessee
Dzikus, L., PhD ........................................... Ohio State
Fairbrother, J., PhD ........................................... Florida State
Fitzhugh, E., PhD ........................................... Alabama
Hardin, R.L., PhD ........................................... Tennessee
Klein, D., PhD ........................................... Arizona State
Koo, G., PhD ........................................... Florida State
McCutchens, M.G., EdD ........................................... North Carolina (Greensboro)
Milner, C.E., PhD ........................................... Leeds (UK)
Polite, F., PhD ........................................... Florida State
Waller, S.N., PhD ........................................... Michigan State

Faculty Associate
Wirtz, M., MS ........................................... Florida

Internship Coordinator
Brown, L.Y., MS ........................................... Tennessee

PEAP Program Coordinator
Catignani, E., MS ........................................... Tennessee

MAJORS DEGREES
Exercise Science  MS
Biomechanics/sports medicine concentration
Exercise physiology concentration

Recreation and Leisure Studies  MS
Recreation and leisure administration concentration
Therapeutic recreation concentration

Sport Studies  MS
Sport management concentration

Sport Studies concentration  MS-MBA

Education  PhD
Exercise science concentration
(specializations in biomechanics/sport medicine; exercise physiology; physical activity and population health)

Sport studies concentration
(specializations in motor behavior; sport sociology; sport psychology)

The Department of Exercise, Sport, and Leisure Studies is committed to excellence in research, teaching, practice, and service within the multifaceted context of sport, leisure, and recreation. We are dedicated to providing superior and innovative programs of study and applied experiences that will enable students to become effective and imaginative professionals, scholars, and citizens. The department is also committed to the principles of diversity and social justice and to the provision of positive sport and leisure experiences for all people.

Graduate Assistantships
A limited number of graduate assistantships are available for qualified students who are graduates of accredited colleges or universities. These assistantships are open to students in the master’s and doctoral programs. Students interested in these opportunities should file their applications before February. For information please contact Margy Wirtz, Department of Exercise, Sport and Leisure Studies, The University of Tennessee, 1914 Andy Holt Ave., 322 HPER Building, Knoxville, Tennessee 37996-2700, mwirtz@utk.edu or (865) 974-7154.

Admission
Applicants are required to complete the departmental application that is sent to all persons upon their initial inquiry about the program. This is in addition to the Graduate Application for Admission submitted to the Office of Graduate and International Admissions. Applications from persons who have less than a 3.00 GPA will, in general, not be considered.

The following retention policy applies to all graduate students seeking a degree in the department.

• Graduate students are required to maintain an overall 3.00 GPA.

• Any student who falls below this standard will be advised in writing by the department head of the need to discuss the matter with his/her advisor.

EXERCISE SCIENCE
Exercise Science is dedicated to promoting and integrating scientific research and education on the health benefits of exercise. Through a program of interdisciplinary graduate study, using both experimental and epidemiological methods, students gain a greater understanding of the role of exercise in the prevention of various cardiovascular, metabolic, and musculoskeletal disorders. The department offers two Master of Science concentrations and three doctoral specializations.

The biomechanics/sports medicine concentration (Master of Science) and specialization (doctoral) involves the study of biomechanical implications to exercise and rehabilitation. This program area focuses on the mechanism, prevention, and rehabilitation of musculoskeletal injuries. The emphases in courses taught in this area include biomechanical as well as medical considerations related to exercise and/or rehabilitation. The Doctor of Philosophy program requires coursework in engineering mechanics, numerical analysis, statistics, and advanced topics in biomechanics. Graduate students work with biomechanics/sports medicine faculty to pursue research in the areas of biomechanics of lower extremity function, footwear biomechanics, core stability, flexibility, and the biomechanics of injury mechanism and prevention.

The exercise physiology concentration (Master of Science) and specialization (doctoral) involves the study of the acute and chronic effects of exercise on the human body. At the master’s level, students may choose from two tracks – adult fitness/cardiovascular rehabilitation or applied physiology research. Students may elect to do internships in cardiac rehabilitation at several area hospitals and are encouraged to take the ACSM Exercise Specialist exam upon graduation. The doctoral program requires coursework in the life sciences, physiological chemistry, statistics and advanced topics in exercise physiology. Graduate students collaborate with an exercise physiology faculty member to perform research in the areas of physical activity assessment, metabolism, the health benefits of exercise, and body composition assessment.

The physical activity and population health specialization (doctoral) involves an in-depth examination of the impact of regular physical activity on a variety of health outcomes. Students who pursue this specialization will explore various aspects of these relationships including epidemiological and statistical methodologies, mechanisms of action, and issues related to exercise adherence. Students will be expected to collaborate with faculty mentors on questions exploring the health and exercise relationship. Supporting coursework in other departments (e.g., sport studies, nursing, statistics) may be required.

MASTER OF SCIENCE
EXERCISE SCIENCE MAJOR

BIOMECHANICS/SPORTS MEDICINE CONCENTRATION

Requirements
Exercise Science 508, 513, 531, 533, 633, 601 (1 hour seminar, 2 enrollments), 635. Either Exercise Science 501 (project) or 500 (thesis – must also take a statistics course approved by advisor). Electives approved by advisor from exercise science, sport studies, or biomedical engineering.
EXERCISE PHYSIOLOGY CONCENTRATION

Requirements
Exercise Science 508, 531, 533, 565, 567, 601 (1 hour seminar, 2 enrollments) 635. Either Exercise Science 501 (project) or 500 (thesis – must also take a statistics course approved by advisor). Electives approved by advisor from exercise science, nursing, nutrition, or sport studies.

DOCTOR OF PHILOSOPHY

EDUCATION MAJOR

EXERCISE SCIENCE CONCENTRATION

Requirements
- 15 hours in exercise science.
- 9 hours in an exercise science specialization: biomechanics/sports medicine, exercise physiology, physical activity and population health, or other area approved by committee.
- Three registrations in Exercise Science 601.
- 6 hours in a cognate selected from outside the student’s major field. The cognate must be related to and supportive of the concentration and specialization.
- 15 hours in research methodologies or research experience.
- 24 dissertation hours.

NOTE: The above are viewed as minimum requirements and are subject to modification by the student’s committee.

Exercise Physiology Minor
The graduate minor consists of Exercise Science 533, 567, 601, and one other exercise science 500-level or above 3-hour course.

GERONTOLOGY

Intercollegiate/Interdisciplinary Gerontology Minor
An intercollegiate/interdisciplinary minor in gerontology gives the graduate student an opportunity for combining the knowledge and experience about aging in American society with his/her own major concentration. Core courses and a practicum are offered by the College of Nursing, College of Social Work and selected departments within the College of Education, Health, and Human Sciences.

Requirements
Prior to earning more than one-half the total hours required for this minor, students must complete a Declaration of a Gerontology Minor form found in the advising offices in each of the participating colleges, and in the office of the current Gerontology Coordinator identified by the interdisciplinary Gerontology Colloquy.

Core Experience
Students must complete a core experience of 12 semester hours. This requires one 3-hour course in each of the primary disciplines (health science, social science, behavioral science) as identified on the Declaration of a Gerontology Minor form.

Coursework (9 hours). A variety of coursework may be taken toward satisfaction of this requirement. Courses which are offered include Health 406, 465; Health/Public Health 650; Nutrition 518; Public Health 523; Social Work 566; Educational Psychology 504, 522, 525, 528; and other courses approved by the interdisciplinary gerontology colloquy member coordinating the minor.

Applied Practicum (3 hours). Students should register under practicum experiences in the home department of the supervising faculty.

Graduate Committee
At least one faculty member from the interdisciplinary Gerontology Colloquy who is qualified to work with graduate students, must serve on the graduate committee of each student who declares a gerontology minor.

Admission to Candidacy
When application is made for admission to candidacy, indication of the minor must be noted on the Admission to Candidacy form.

GRADUATE CERTIFICATE IN GERONTOLOGY
The graduate certificate in gerontology is intended for pre and in-service workers in gerontology. The program of study follows the guidelines of the Association of Gerontology in Higher Education and is offered under the purview of the University’s Gerontology Colloquy.

The completed “Request for Change of Graduate Program” and the completed “Post-Bac/Graduate Certificate Admission Application” must be submitted and signed off by the Colloquy representatives. Contact one of the three college representatives (Education, Health, and Human Sciences; Nursing; or Social Work) for assistance.

Requirements

| Hours Credit | English (must be taken) | Total
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>1 Physical ...............</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Social – Social Work 566</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Behavioral – Educational Psychology 523</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Internship or practicum</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Electives ................</td>
<td>6</td>
</tr>
</tbody>
</table>

1 Select one from Health/Public Health 650; Nutrition 518; other courses approved by the interdisciplinary gerontology colloquy member coordinating the gerontology minor.

2 At least 6 hours from Educational Psychology 504; Exercise Science/Public Health 635; Health 406, 570, Health 585 (cross-listed with several disciplines; may be repeated, 3 hours maximum); Public Health 523; Nursing 400; Social Work 540; other courses as approved by the interdisciplinary gerontology colloquy member coordinating the gerontology minor.

RECREATION AND LEISURE STUDIES

MASTER OF SCIENCE

RECREATION AND LEISURE STUDIES MAJOR
The recreation and leisure studies program at the University of Tennessee is one of 100 programs in the nation and one of two undergraduate programs in the state of Tennessee that is accredited. Graduation from an accredited program or from an institution where there is an association with an accredited program may potentially increase opportunities for our graduates. One of the unique features of the program is a heavy emphasis on an experiential education approach to academic preparation. Students graduating from this program will gain a tremendous amount of practical experience to accompany their academic degree.

Professional Certification
Students enrolled in the recreation and leisure studies program are urged to prepare for and take the professional certification examinations offered by the National Recreation and Park Association and The National Council For Therapeutic Recre-
able in gaining employment in physical rehabilitation hospitals, children’s programs, drug and alcohol rehabilitation and treatment centers, programs serving individuals with developmental disabilities, long-term care and assisted living facilities, and in community, outdoor and school-based therapeutic recreation programs. Graduates of the program fulfill the requirements for national certification by the National Council for Therapeutic Recreation Certification (NCTRC) and have been successful in completing the national exam.

**Requirements**

**Recreation and Leisure Administration Concentration (Thesis Option)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreation and Leisure Studies 415, 511, 515, 540, 541</td>
<td>15</td>
</tr>
<tr>
<td>Safety 443 or Sport Management 512</td>
<td>3</td>
</tr>
<tr>
<td>Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>Thesis</td>
<td>6</td>
</tr>
<tr>
<td>Recreation and Leisure Studies 590 Graduate Internship</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>33</strong></td>
</tr>
</tbody>
</table>

**Recreation and Leisure Administration Concentration (Non-Thesis Option)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreation and Leisure Studies 415, 511, 515, 540, 541</td>
<td>15</td>
</tr>
<tr>
<td>Safety 443 or Sport Management 512</td>
<td>3</td>
</tr>
<tr>
<td>Sport Management 512</td>
<td>3</td>
</tr>
<tr>
<td>Recreation and Leisure Studies 590</td>
<td>6</td>
</tr>
<tr>
<td>Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>Statistics</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>36</strong></td>
</tr>
</tbody>
</table>

**Therapeutic Recreation Concentration (Thesis Option)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreation and Leisure Studies 511, 515, 520, 521, 522</td>
<td>15</td>
</tr>
<tr>
<td>*Recreation and Leisure Studies 590 (Internship)</td>
<td>6</td>
</tr>
<tr>
<td>Research Methods</td>
<td>3</td>
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<tr>
<td>Statistics</td>
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</tr>
<tr>
<td>Thesis</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>33</strong></td>
</tr>
</tbody>
</table>

* Must meet national certification requirements

**Therapeutic Recreation Concentration (Non-Thesis Option)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreation and Leisure Studies 511, 515, 520, 521, 522</td>
<td>15</td>
</tr>
<tr>
<td>*Recreation and Leisure Studies 590 (Internship)</td>
<td>6</td>
</tr>
<tr>
<td>Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>Recreation and Leisure Studies 591 or 592</td>
<td>3</td>
</tr>
<tr>
<td>Statistics</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>36</strong></td>
</tr>
</tbody>
</table>

* Must meet national certification requirements

**SPORT STUDIES**

**MASTER OF SCIENCE**

**SPORT STUDIES MAJOR**

**Graduate Assistantships**

Graduate Assistantships are available to qualified candidates. Students should contact directly the area in which they are pursuing an assistantship. A limited number of graduate assistantships are available in the Physical Education and Activity Program for students who qualify. Please contact Margy Wirtz at mwirtz@utk.edu for more information. Assistantships may also be available for qualified candidates in the recreation and leisure studies program, in recreation sports on campus and in men’s and women’s athletics.

**Admission**

Applications to the program are taken on a year round basis. A minimum grade point average of 3.00 on a 4.00 scale or a 3.00 GPA during the senior year of undergraduate study is required for admission. Applicants must first be admitted to the University of Tennessee as a graduate student, and then be admitted to the recreation and leisure studies graduate program. Applicants must submit all college transcripts, a university application, a Department of Exercise, Sport, and Leisure Studies application, three rating forms and a writing sample.

**RECREATION AND LEISURE ADMINISTRATION CONCENTRATION**

The professional discipline that comprises recreation and leisure studies prepares students for management and leadership positions in many public and private recreation and leisure related enterprises. The core curriculum provides an understanding of the role and impact of leisure in achieving and sustaining socio-economic growth and political order in an increasingly culturally diverse society. Leisure is central to balancing physical and mental health and sustaining economic growth. Some sectors of the leisure industry have outperformed the market as a whole and are positioned to flourish as the economy becomes more leisure service-oriented.

**THERAPEUTIC RECREATION CONCENTRATION**

The therapeutic recreation concentration prepares students for employment in management and leadership positions with agencies that deliver health care services. Students are success-
SPORT MANAGEMENT CONCENTRATION

The sport management concentration provides the opportunity for students to have a quality academic experience and to gain professional experience as they prepare for careers in the sports industry.

Requirements

Sport Management Concentration (Project Option)

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sport Management 511, 532, 535</td>
<td>9</td>
</tr>
<tr>
<td>Sport Management Electives</td>
<td>6</td>
</tr>
<tr>
<td>Sport Studies Elective</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>12</td>
</tr>
<tr>
<td>Sport Management 501 (Project)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>33</strong></td>
</tr>
</tbody>
</table>

Sport Management Concentration (Thesis Option)

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sport Management 511, 532, 535</td>
<td>9</td>
</tr>
<tr>
<td>Sport Management Electives</td>
<td>6</td>
</tr>
<tr>
<td>Sport Studies Elective</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>6</td>
</tr>
<tr>
<td>Thesis</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>30</strong></td>
</tr>
</tbody>
</table>

Notes:
2. These courses can be taken within Exercise, Sport, and Leisure Studies or outside the department. A total of 6 hours may be earned in Sport Management 590 and 595 combined.

DUAL MS-MBA

The College of Education, Health, and Human Sciences and the College of Business Administration offer an integrated program leading to the conferral of the Master of Science with a major in sport studies (concentration in sport management) and the Master of Business Administration.

Increasingly, sports and sports-related companies are represented by significant business enterprises. Success in these enterprises requires the application of business fundamentals, analytical techniques, and management skills within the specific context of the sports industry. The objective of the dual degree program is to train individuals in sport management and business management to integrate both sport and management and to prepare them to undertake leadership roles in this growing, dynamic, and competitive industry.

Admission

Applications are accepted for fall semester only. Applicants for the MS-MBA program must make separate applications, and be accepted by Graduate and International Admissions for the Master of Business Administration program and the Master of Science with a major in sport studies (sport management concentration).

Students will initially apply for the MBA program, indicating on their application the intent to pursue the dual MS-MBA program. Students accepted for both the MS and MBA programs will be assigned to Dual Program Committee advisors, who will be responsible for course approval and supervision of the students’ progress through the dual program.

Applications by U.S. citizens and permanent residents received after the application deadline (March 1) will be considered as space allows. Additional information is required and different application dates are established by Graduate and International Admissions for international students.

Requirements

The MBA curriculum consists of 31 hours of common coursework in the College of Business Administration. Dual degree candidates enrolled in the sport management concentration are required to take 30 hours of graduate level sport management courses and internship.

The dual degree candidate must satisfy the curriculum and graduation requirements of the sport management concentration and the College of Business Administration. Students withdrawing from the dual degree program before completing both degrees will not receive credit toward graduation in either degree program for courses taken in the other degree program, except as such courses qualify for credit without regard to the dual degree program.

The MBA and MS will be awarded upon successful completion of the requirements of the dual program.

Sport Management Concentration (MS-MBA)

<table>
<thead>
<tr>
<th>Term</th>
<th>Course</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Year</strong></td>
<td><strong>Sport Management Concentration</strong></td>
<td></td>
</tr>
<tr>
<td>August</td>
<td>Business Administration 511</td>
<td>3</td>
</tr>
<tr>
<td>Fall</td>
<td>Business Administration 501</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Business Administration 512</td>
<td>15</td>
</tr>
<tr>
<td><strong>Spring</strong></td>
<td><strong>Business Administration 513</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MBA Elective – Recommend: Marketing 520</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Sport Management 554</td>
<td>3</td>
</tr>
<tr>
<td><strong>Summer</strong></td>
<td><strong>Sport Management 511</strong></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Sport Management 535</td>
<td>3</td>
</tr>
<tr>
<td><strong>Second Year</strong></td>
<td><strong>Fall</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sport Management 532</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Sport Studies 542</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Sport Management Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Sport Management, Sport Studies, or Recreation and Leisure Studies Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Spring</strong></td>
<td><strong>Sport Management 595</strong></td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Sport Management 501</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>61</strong></td>
<td></td>
</tr>
</tbody>
</table>

* Can also be taken in the fall with an elective being taken in the summer.

SPORTS STUDIES CONCENTRATION

Requirements

Thesis and Non-Thesis Options

Two specializations are available in the sports studies concentration: sport psychology and sport sociology. Most students focusing on sport psychology choose the non-thesis option. Students who choose the non-thesis option are required to take a written comprehensive examination. The thesis option is available only upon consultation with and approval of the student’s advisor. Thesis students sign up for 6 hours of thesis. Master’s students, focusing on sport sociology, may elect the thesis or non-thesis option.

All students must complete a minimum of 30 semester hours. Students must select a minimum of 15 hours from the following courses. Sport Studies 505, 507, 514, 533, 534, 535, 542, 543, *593 (1-3), *594 (1-3), *595 (1-3), *601 (1-3), *633. Students may select additional courses relevant to their professional and career goals from sport studies or from other departments.

*These courses may be repeated.

DOCTOR OF PHILOSOPHY

EDUCATION MAJOR

SPORT STUDIES CONCENTRATION

The PhD with a major in education offers a concentration in sport studies with areas of specialization in motor behavior, sport psychology and sport sociology. The program stresses an interdisciplinary approach to coursework and research and expects its students to become proficient in qualitative and quantitative research methods. Students are expected to obtain a significant grounding in the allied, parent disciplines. The program prepares students to...
teach in higher education and/or to conduct work within applied educational and sport settings. Students must have completed all requirements for a master’s degree in kinesiology, physical education, psychology, sociology, sport studies, or a related field prior to beginning the doctoral program. The program usually takes 3 years (2 years of coursework and 1 year for the dissertation).

Requirements
The program usually takes 3 years (2 years of coursework and 1 year for the dissertation) and includes the following.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentration</td>
<td>15 hours</td>
</tr>
<tr>
<td>Research (3 hours of Sports Studies 601 included)</td>
<td>15 hours</td>
</tr>
<tr>
<td>Specialization</td>
<td>9 hours</td>
</tr>
<tr>
<td>Cognate</td>
<td>6 hours</td>
</tr>
<tr>
<td>Dissertation</td>
<td>24 hours</td>
</tr>
</tbody>
</table>

**DEPARTMENT OF INSTRUCTIONAL TECHNOLOGY, HEALTH, AND CULTURAL STUDIES**

http://ites.tennessee.edu/

Barbara Thayer-Bacon, Head

Professors
Counts, E., EdD ........................................ Texas A&M
Gorski, J., DrPH ........................................... UCLA
Hamilton, C., DrPH ......................................... Oklahoma
Petty, G., PhD .............................................. Missouri
Thayer-Bacon, B., PhD ..................................... Indiana
Waugh, M., EdD ............................................... Georgia

Associate Professors
Connelly, M., EdD ........................................... Virginia Tech
O’Bannon, B., EdD ............................................ Memphis
Smith, S., EdD ............................................... Tennessee

Assistant Professors
Anders, A., PhD .............................................. UNC
Bates, D.R., PhD ............................................ Texas Woman’s University
Moyer, D., PhD ............................................... Ohio State
Pfaffman, J., PhD ............................................ Vanderbilt
Siddiqi, A., ScD ............................................... Harvard

MAJORS DEGREES

**Education**

- Cultural studies of educational foundations concentration
- Instructional technology concentration

**Health and Human Sciences**

- PhD
- Community health concentration

**Instructional Technology and Cultural Studies**

- MS
- Cultural studies of educational foundations concentration
- Instructional technology concentration

**Instructional Technology and Cultural Studies**

- EdS
- Instructional technology concentration

**Public Health**

- MPH
- Community health education concentration
- Health planning/administration concentration
- Veterinary public health concentration

**Public Health (Dual program with Nutrition major)**

- MS-MPH

**Safety**

- MS
- Emergency management concentration
- Safety management concentration

**Graduate Certificate Programs**

- Applied epidemiology
- Public health leadership

The mission of the Instructional Technology, Health, and Cultural Studies Department is to prepare teachers, instructors, curriculum planners, educational technologists, instructional designers, theorists, and researchers. The department also fosters development of those with career interests in community health education promotion, public health, and safety. For additional information, please visit our Web site.

**Admission**

Individuals seeking admission to any of the degree programs in the Department of Instructional Technology, Health, and Cultural Studies must first be admitted to the University of Tennessee, Knoxville, (see the Graduate School Admission Requirements section at the front of this catalog). Following the submission of an application for graduate study to the Office of Graduate and International Admissions, individuals must also make application to a specific degree program within the Instructional Technology, Health, and Cultural Studies Department.

Applicants seeking the master’s or Specialist in Education degrees may apply for admission at any time. Admission decisions related to these programs will occur throughout the calendar year and students may begin their coursework during any semester.

Applicants seeking admission to one of the PhD program concentrations in the department may apply at any time during the calendar year. However, admission decisions for PhD with a major in education applicants will be made only once per year, during the spring semester. Doctoral applicants admitted in the spring semester must matriculate during the fall semester of the same calendar year. Any PhD applicant who is unable to meet these expectations will be required to re-apply for admission at a later date.

For concentrations within the PhD with a major in education, an application must be submitted to the department no later than February 1 in the calendar year in which the student intends to matriculate. PhD applicants admitted through this process will be notified by April 1. The PhD with a major in health and human sciences (community health concentration) accepts applications for Fall and Spring Semesters.

**Department-Specific Admissions Criteria**

Each PhD applicant in the Department of Instructional Technology, Health, and Cultural Studies is required to submit a current set of GRE scores as part of his/her application. However, the department does not require MS or EdS applicants to submit GRE scores.

**HEALTH**

**DOCTOR OF PHILOSOPHY**

**HEALTH AND HUMAN SCIENCES MAJOR**

**COMMUNITY HEALTH CONCENTRATION**

The community health concentration integrates the behavioral and natural sciences with public health, community health education, health promotion and the safety sciences to prepare scholars with an interest in improving the health of the nation.

**Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research and Foundations</td>
<td>12</td>
</tr>
<tr>
<td>Community Health Specialization</td>
<td>30</td>
</tr>
<tr>
<td>Supportive Specialization (Public Health, Safety, or Gerontology)</td>
<td>12</td>
</tr>
<tr>
<td>Cognate</td>
<td>6</td>
</tr>
<tr>
<td>Dissertation (Health 600)</td>
<td>24</td>
</tr>
</tbody>
</table>

Total 84

1 Health 590; Statistics 531, 532 or a two-course 500-level statistics sequence approved by doctoral chair. Three hours of natural or behavioral sciences approved by doctoral chair.
2 Health 610, 620, 530, 540, 655, 660, and Public Health 550 (required) and 9 additional hours of graduate health electives. A list of recommended health electives for the community health doctoral program is available in the program office.
3 A block of 12 hours must be taken from one of the following areas: public health, safety/emergency management, or gerontology.
4 Courses must be approved by cognate professor outside the department.
NOTE: To meet program requirements, students must select courses in consultation with a program advisor. Program totals are minimums and some students may be required to complete additional coursework to overcome background deficiencies or to increase skill in an area of identified specialization.

PUBLIC HEALTH

Graduate study with a major in public health leads to the Master of Public Health (MPH). Three professional preparation concentrations are available — community health education, health planning/administration, and veterinary public health. The veterinary public health concentration is open to graduate veterinarians or students enrolled in the College of Veterinary Medicine. Preparation for professional practice in improving community health emphasizes a population perspective, service-learning, and application opportunities through rigorous internships. The MPH program is accredited by the Council on Education for Public Health. A minor in statistics is available to interested MPH students due to public health affiliation with the Intercollegiate Graduate Statistics Program.

Non-degree students must obtain permission from the MPH program director to register for 500-level public health courses. Prerequisite coursework assigned as a condition of admission to the MPH program must be completed promptly, with a grade of B or better, typically within the first semester or two of enrollment in graduate studies.

Admission

A statement of the applicant’s educational and career goals and three rating forms are required. Preferential consideration for admission to degree status shall be given to those with a minimum undergraduate grade point average of 2.80 and with at least one year of professional experience in a health-related occupation. As a restricted program, non-degree admission requires department recommendation. Deadlines for completed applications are 1 February for summer term, 1 April for fall semester, and 1 October for spring semester.

MASTER OF PUBLIC HEALTH

PUBLIC HEALTH MAJOR

The MPH is a non-thesis program requiring completion of 42 hours of coursework including nine weeks of field practice. The field internship provides a full-time experience with an affiliated health agency or organization offering one or more health programs. Of importance, field practice allows the student to apply academic theories, concepts, and skills in an actual work setting.

Requirements

<table>
<thead>
<tr>
<th>Courses</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Public Health Foundation</td>
<td>17</td>
</tr>
<tr>
<td>2 Concentration of Study (Community Health Education)</td>
<td>10</td>
</tr>
<tr>
<td>Health Planning/Administration, or Veterinary Public Health)</td>
<td>10</td>
</tr>
<tr>
<td>3 Electives</td>
<td>9</td>
</tr>
<tr>
<td>4 Internship</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>42</td>
</tr>
</tbody>
</table>

1 Public Health Foundation courses: Public Health 509 (2 hrs.) 510, 520, 530, 540, 555.
3 Listings of electives specific for each concentration are available in MPH program office.
4 Internship: Public Health 587, 588 (field practice with an affiliated health agency or completion of a master's essay). Written guidelines stipulating eligibility criteria and expectations are available.

DUAL MS-MPH PROGRAM

Also offered is a coordinated dual program leading to the conferral of both the Master of Science with a major in nutrition (public health nutrition concentration) and the Master of Public Health. The dual program allows students to complete both degrees in less time than would be required to earn both degrees independently.

The program is designed to meet the needs of students who are interested in the benefits of majors in both nutrition and public health. Therefore, it accommodates the interests of students who

- plan a career in public health nutrition and want to acquire the knowledge and skills of the nutritionist and public health professional;
- plan a career in nutrition and want to acquire the knowledge and skills and the perspective of the public health professional;
- plan a career in public health and want to acquire the knowledge, skills and perspective of the nutritionist.

Admission

Applicants for the MS-MPH program must make separate applications to and be accepted by the Department of Nutrition for the MS, and the Department of Instructional Technology, Health, and Cultural Studies for the MPH, and also the Public Health Academic Program Committee.

Students who have been accepted by both departments may apply for approval to pursue the dual program anytime prior to, or after, matriculation in either or both departments. Such approval will be granted, provided that dual program studies are started prior to entry into the fourth semester of the MS and MPH programs.

Requirements

A dual-degree candidate must satisfy the requirements for both the MS (public health nutrition concentration) and the MPH degrees, as well as the requirements for the dual program. All candidates for the dual degree must successfully complete Public Health 555; Public Health 509 (2 hours); and a minimum of 60 hours. The Department of Nutrition will award a maximum of 9 hours of credit toward the MS for successful completion of approved graduate level courses offered in the Department of Instructional Technology, Health, and Cultural Studies. The department will award a maximum of 11 hours of credit toward the MPH for successful completion of approved courses offered in the Department of Nutrition. All courses for which such cross-credit is awarded must be approved by the Public Health Academic Program Committee and the student's graduate committee. A single block field experience (or public health internship) is required of all students and the analytical field paper incorporates public health nutrition and the student's public health concentration.

Dual-degree students who withdraw from the program before completion of the requirements for both degrees will not receive credit towards the MS or MPH for courses taken in the other program, except as such courses qualify for credit without regard to the dual program.

Approved Dual Credit

Courses in the MS to be counted toward the MPH program must include 10 hours of Nutrition 515 and one hour of Nutrition 509. MPH courses to be counted toward the Master of Science include Public Health 520, 530, and 540.

GRADUATE CERTIFICATE IN APPLIED EPIDEMIOLOGY

The University of Tennessee MPH program, in a consortium arrangement with East Tennessee State University, the University of Tennessee Health Science Center, and the Tennessee Department of Health, offers a graduate certificate in applied epidemiology for Health Department staff seeking continuing education and career advancement opportunities in the public health area of epidemiology. Delivered exclusively through electronic-
ly-mediated courses, the certificate is focused on the application of state-of-the-art epidemiological approaches to the prevention, detection and management of diseases in the population.

The 15-hour certificate is available by completing Public Health 520, 530, 540, 542, and 580, which may be satisfied by taking equivalent courses offered by East Tennessee State University and the University of Tennessee Health Science Center. For certificate students holding the MPH degree, other identified elective coursework may be used to satisfy certificate requirements, by petition.

GRADUATE CERTIFICATE IN PUBLIC HEALTH LEADERSHIP

The University of Tennessee MPH program, in a consortium arrangement with East Tennessee State University, the University of Tennessee Health Science Center, and the Tennessee Department of Health, offers a graduate certificate in public health leadership for Health Department staff seeking continuing education and career advancement opportunities in the public health practice arena. Delivered exclusively through electronically mediated courses, the program is focused on leadership principles and skills as applied in public health and community settings.

The 15-hour certificate is available by completing Public Health 520, 522, 525, 580 and an elective, which may be satisfied by taking equivalent courses offered by East Tennessee State University and the University of Tennessee Health Science Center. For those holding the MPH, other identified elective coursework may be used to satisfy certificate requirements, by petition.

INSTRUCTIONAL TECHNOLOGY AND CULTURAL STUDIES

MASTER OF SCIENCE

INSTRUCTIONAL TECHNOLOGY AND CULTURAL STUDIES MAJOR

Requirements

Cultural Studies of Educational Foundations Concentration

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentration</td>
<td>6</td>
</tr>
<tr>
<td>Specialization (choose one)</td>
<td>9</td>
</tr>
<tr>
<td>Research</td>
<td>6</td>
</tr>
<tr>
<td>Thesis or Problems in Lieu of Thesis</td>
<td>6</td>
</tr>
</tbody>
</table>

Total 35

1 Cultural Studies in Education 590 (2), 591, 592. Select two from Cultural Studies in Education 511, 539, 544, 545, 549, or 550.
2 Select three courses in one of the following areas – Philosophy of Education (Cultural Studies in Education 526, 539, 544, 548, 608, or 609); Sociology of Education (Cultural Studies in Education 545, 549); History of Education (Cultural Studies in Education 511, 539, 609, or 625).
3 Select two courses from Cultural Studies in Education 526, 560, 561, 625, or 660.
4 Instructional Technology and Educational Studies 500 or Instructional Technology and Educational Studies 503.

NOTE: To meet program requirements, students must select courses in consultation with a program advisor. Program totals are minimums and some students may be required to complete additional coursework to overcome background deficiencies.

Instructional Technology Concentration (Thesis Option)

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core</td>
<td>6</td>
</tr>
<tr>
<td>Concentration</td>
<td>12</td>
</tr>
<tr>
<td>Electives</td>
<td>6</td>
</tr>
<tr>
<td>Research</td>
<td>3</td>
</tr>
<tr>
<td>Instructional Technology, Health, and Cultural Studies 500 (Thesis)</td>
<td>6</td>
</tr>
</tbody>
</table>

Total 33

1 Students entering the PhD program with a concentration in cultural studies must possess a master’s degree in a related field of study.

1 Select two courses in educational issues and/or theory (e.g., Theory and Practice in Teacher Education 517; Cultural Studies 511, 550; Ed Psychology 515, 516).
2 Instructional Technology 521, 570, 573, 575.
3 Research Elective.

NOTE: To meet program requirements, students must select courses in consultation with a program advisor. Program totals are minimums and some students may be required to complete additional coursework to overcome background deficiencies.

Instructional Technology Concentration (Non-Thesis Option)

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core</td>
<td>6</td>
</tr>
<tr>
<td>Concentration</td>
<td>12</td>
</tr>
<tr>
<td>Electives</td>
<td>3</td>
</tr>
</tbody>
</table>

Total 33

1 Select two courses in educational issues and/or theory, (e.g., Theory and Practice in Teacher Education 517; Cultural Studies 511, 550; Ed Psychology 515, 516).
2 Instructional Technology 521, 570, 573, 575.
3 Research Elective.

NOTE: To meet program requirements, students must select courses in consultation with a program advisor. Program totals are minimums and some students may be required to complete additional coursework to overcome background deficiencies.

SPECIALIST IN EDUCATION

INSTRUCTIONAL TECHNOLOGY AND CULTURAL STUDIES MAJOR

Requirements

Instructional Technology Concentration

Thesis/Non-Thesis

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Prerequisites</td>
<td>6</td>
</tr>
<tr>
<td>Concentration</td>
<td>15</td>
</tr>
<tr>
<td>Electives</td>
<td>9</td>
</tr>
<tr>
<td>Research (maximum 3 hours per semester)</td>
<td>6</td>
</tr>
</tbody>
</table>

Total 30

1 Must hold master’s degree in education or related field.
2 A student without prior coursework in IT must take 521, 570, 573, 575 and one elective (3 hours).
3 Two courses (6 hours) must be taken outside the IT program area.
4 Thesis students must take Instructional Technology, Health, and Cultural Studies 518; Problems students must take Instructional Technology, Health, and Cultural Studies 503; Non-thesis students must take research electives (6 hours).

NOTE: To meet program requirements, students must select all courses in consultation with a program advisor. Program totals are minimums and some students may be required to complete additional coursework to overcome background deficiencies.

DOCTOR OF PHILOSOPHY

EDUCATION MAJOR

Requirements

Cultural Studies of Educational Foundations Concentration

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Prerequisites</td>
<td>6</td>
</tr>
<tr>
<td>Concentration</td>
<td>16</td>
</tr>
<tr>
<td>Specialization</td>
<td>9</td>
</tr>
<tr>
<td>Research</td>
<td>15</td>
</tr>
<tr>
<td>Cognate</td>
<td>6</td>
</tr>
<tr>
<td>Dissertation (Instructional Technology and Educational Studies 600)</td>
<td>24</td>
</tr>
</tbody>
</table>

Total 82

1 Students entering the PhD program with a concentration in cultural studies must possess a master’s degree in a related field of study.
2 Instructional Technology and two courses in educational theory (e.g., Ed Psychology 510, 523, Theory and Practice in Teacher Education 517, 617, 640). (3). Select one course in each of the following areas – Cultural Studies in Education 607; Instructional Technology 521, 679, or advisor approved substitute.

3 Cultural Studies in Education 550, 590 (4), 591, 592, 609.

4 Select three courses in one of the following areas – philosophy of education (Cultural Studies in Education 526, 539, 544, 548, or 608); sociology of education (Cultural Studies in Education 545, 549); history of education (Cultural Studies in Education 511, 512, 539, 609, or 625).

5 Both qualitative and quantitative research methodologies must be included. Curriculum, Educational Research and Evaluation 520; Research Methods Elective (12).

NOTE: To meet program requirements, students must select courses in consultation with a program advisor. Program totals are minimums and some students may be required to complete additional coursework to overcome background deficiencies.

### Instructional Technology Concentration

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>1Core</th>
<th>2Concentration</th>
<th>3Cognate</th>
<th>4Electives</th>
<th>5Research</th>
<th>Dissertation (Instructional Technology, Health, and Cultural Studies 600)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>24</td>
</tr>
</tbody>
</table>

Total 81

1 Instructional Technology, Health, and Cultural Studies 679 (3 hours). Select two courses (6 hours) from Educational Issues (Cultural Studies in Education 550, 592, or others); Learning Theory (Educational Psychology 515, 516, 525, 529, 572 or others).

2 Instructional Technology 678 (3 hours); other instructional technology electives (15 hours). Three of these elective courses must be numbered at the 600-level.

3 Three related courses from an area outside the field of instructional technology (9 hours).

4 Two open-electives from areas that support the concentration (6 hours).

5 Five courses in research methods (15 hours): two courses in statistical analysis (Educational Psychology 577, 677 or others), one course in qualitative research methods (Educational Psychology 577 or others), one course in qualitative research methods (Cultural Studies in Education 560, 561 or others), and one research design elective (Educational Psychology 505, 550 or others).

### SAFETY

#### MASTER OF SCIENCE

#### SAFETY MAJOR

Graduate study with a major in safety (thesis and non-thesis options) leads to the Master of Science. Graduate students may concentrate in emergency management or in safety management.

The graduate program contributes to the University of Tennessee, Knoxville’s, mission of health protection by preparing safety professionals with the knowledge and skills necessary to create and maintain safer human environments in the workplace (industrial and commercial), home, school, and community. The offering of all core classes and required concentration courses on an evening class schedule enables those working full-time in a safety-related field to pursue the MS with a major in safety on a part-time basis.

### Requirements

#### Emergency Management Concentration (Thesis Option)

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Core</td>
</tr>
<tr>
<td>2Required Concentration Courses</td>
</tr>
<tr>
<td>Thesis (Safety 500)</td>
</tr>
<tr>
<td>Total 33</td>
</tr>
</tbody>
</table>

1 Safety 532, 533, 534, 535, 592, and a 500-level graduate statistics course.

2 Safety 560, 537, Political Science 539 or Political Science 550.

NOTE: To meet program requirements, students must select courses in consultation with a program advisor. Program totals are minimums and some students may be required to complete additional coursework depending upon academic background.

#### Emergency Management Concentration (Non-Thesis Option)

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Core</td>
</tr>
<tr>
<td>2Required Concentration Courses</td>
</tr>
<tr>
<td>3Concentration Electives</td>
</tr>
<tr>
<td>Total 33</td>
</tr>
</tbody>
</table>

1 Safety 452, 532, 533, 534, 535, and 592.

2 Safety 560, 537, Political Science 539 or Political Science 550, and Safety 601 or 593.

3 A list of recommended safety electives for each concentration is available in the program office.

4 Non-thesis safety students are also required to complete a culminating experience and a written comprehensive exam prior to graduation. A list of options to achieve completion of the culminating experience is available in the safety program office.

NOTE: To meet program requirements, students must select courses in consultation with a program advisor. Program totals are minimums and some students may be required to complete additional coursework depending upon academic background.

#### Safety Management Concentration (Thesis Option)

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Core</td>
</tr>
<tr>
<td>2Required Concentration Courses</td>
</tr>
<tr>
<td>3Concentration Elective Select</td>
</tr>
<tr>
<td>Thesis (Safety 500)</td>
</tr>
<tr>
<td>Total 33</td>
</tr>
</tbody>
</table>

1 Safety 532, 533, 534, 535, 592, and a 500-level graduate statistics course.

2 Safety 536, 564.

3 A list of recommended safety electives for each concentration is available in the program office.

NOTE: To meet program requirements, students must select courses in consultation with a program advisor. Program totals are minimums and some students may be required to complete additional coursework to overcome background deficiencies.

#### Safety Management Concentration (Non-Thesis Option)

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Core</td>
</tr>
<tr>
<td>2Required Concentration Courses</td>
</tr>
<tr>
<td>3Concentration Electives</td>
</tr>
<tr>
<td>Total 33</td>
</tr>
</tbody>
</table>

1 Safety 452, 532, 533, 534, 535, and 592.

2 Safety 536, 564.

3 A list of recommended electives for each safety concentration is available in the program office. Elective hours may include a 3-hour internship or a 3-hour research project, if approved by advisor.

4 Non-thesis safety students are also required to complete a culminating experience, as well as a written comprehensive exam, prior to graduation. A list of options to achieve completion of the culminating experience is available in the safety program office.
NOTE: To meet program requirements, students must select courses in consultation with a program advisor. Program totals are minimums and some students may be required to complete additional coursework depending on academic background.

DEPARTMENT OF NUTRITION
http://nutrition.utk.edu
Jay Whelan, Head
Michael Zemel, Graduate Liaison

Professors
Greer, B., PhD ........................................ Tennessee
Haughton, B., EdD ...................................... Columbia
Karlstad, M., PhD ...................................... Loyola
Moussa, N., PhD ....................................... Paris
Whelan, J., PhD ........................................ Penn State
Zemel, M., PhD ......................................... Wisconsin

Associate Professors
Bailey, J., PhD ....................................... Iowa State
Burney, J., PhD ....................................... Tennessee

Assistant Professors
Bittle, J., PhD ........................................ Tennessee
Hansen-Petrik, M., PhD ............................... Tennessee
Jahns, L., PhD ........................................ North Carolina
Kim, J., PhD .......................................... Tennessee
Truett, G., PhD ....................................... Georgia

Lecturer
Wetherall, K., MS ...................................... Boston

EmeritI Faculty
Sachan, D., PhD ....................................... Illinois
Skinner, J., PhD ....................................... Oregon State

MAJORS
Nutrition
DEGREES
Nutrition science concentration
PhD
Public health nutrition concentration
MS

Health and Human Sciences
MS-MPH
Nutrition science concentration
PhD

The Master of Science program is available with a major in nutrition and concentrations in nutrition science or public health nutrition.

A graduate degree combined with a Dietetic Internship (DI) beyond the baccalaureate degree qualifies the graduate to apply for the Registration Examination to become a Registered Dietitian (RD). Students may learn more from the department about the Dietetic Internship from the departmental Web site. The Dietetic Internship is currently granted accreditation by the Commission on Accreditation for Dietetics Education of the American Dietetic Association; 120 South Riverside Plaza; Chicago, Illinois 60606-6995; telephone (312) 899-0040. Students may also select an interdisciplinary minor in gerontology.

Admission
A complete file for review includes the Graduate Application for Admission, completed departmental application form, Graduate Record Examination (GRE) scores for the general section, and three Graduate Rating Forms completed by individuals who can attest to the applicant’s potential for graduate education. Forms may be obtained from the departmental office at 229 Jessie Harris Building, The University of Tennessee, Knoxville, 37996-1920. Forms may also be obtained from the department’s Web site.

Admission into the graduate program in the department is dependent on completion of undergraduate courses that give the necessary background for success in the graduate program. Required undergraduate courses include general and organic chemistry, physiological chemistry/biochemistry, physiology, statistics and advanced nutrition. Applicants to all programs with related experience may be given preference.

MASTER OF SCIENCE
NUTRITION MAJOR

Requirements
Students may choose a thesis or non-thesis option in nutrition. Attendance of Nutrition 540 is required every semester.

Thesis Option
The program consists of a minimum of 33 hours with at least 16 hours of coursework in the department.

- Nutrition 511, 512, 540, 541, and 3 hours of graduate-level statistics are required of nutrition science students.
- Students in public health nutrition must take 511, 512, 513, 514, 515, 541, and the minor in public health.
- 6 hours of Thesis 500 and 6 hours outside the department are required.
- A minimum of 22 hours at the 500 or 600 level is required.
- An oral comprehensive examination is required upon completion of the thesis.

Non-Thesis Option
The program consists of a minimum of 36 hours with at least 20 hours of coursework in the department.

- Nutrition 511, 512, 540, 541, 544, and 3 hours of graduate level statistics are required of nutrition science students.
- Students in public health nutrition must take 511, 512, 513, 514, 515, and the minor in public health.
- 6 hours in one area outside the department are required.
- A minimum of 24 hours at the 500 and 600 level is required.
- A written comprehensive examination is required for completion of the program.

DUAL MS-MPH PROGRAM

The College of Education, Health, and Human Sciences offers a coordinated dual program leading to the conferral of both the Master of Science with a major in nutrition (public health nutrition concentration) and the Master of Public Health. The dual program allows students to complete both degrees in less time than would be required to earn both degrees independently.

The program is designed to meet the needs of students who are interested in the benefits of majors in both nutrition and public health. Therefore, it accommodates the interests of students who

- Plan a career in public health nutrition and want to acquire the knowledge and skills of the nutritionist and public health professional.
- Plan a career in nutrition and want to acquire the knowledge, skills and perspective of the public health professional.
- Plan a career in public health and want to acquire the knowledge, skills and perspective of the nutritionist.

Admission
Applicants for the MS-MPH program must make separate applications to and be accepted by the Department of Nutrition for the Master of Science degree and the Department of Instructional Technology, Health, and Cultural Studies for the Master of Public Health degree.

Students who have been accepted by both departments may apply for approval to pursue the dual program anytime prior to, or after, matriculation in either or both departments. Such approval will be granted provided that dual program studies are started prior to entry into the fourth semester of the MS and MPH programs.

Requirements
A dual degree candidate must satisfy the requirements for both the Master of Science degree (public health nutrition concentration)
and the Master of Public Health degree, as well as the requirements for the dual program. All candidates for the dual degree must successfully complete Public Health 555; 2 hours (1 hour each) of Public Health 509 and Nutrition 509; and a minimum of 60 hours. The Department of Nutrition will award a maximum of 9 hours of credit toward the Master of Science degree for successful completion of approved graduate-level courses offered by the Department of Instructional Technology, Health, and Cultural Studies.

The Department of Instructional Technology, Health, and Cultural Studies will award a maximum of 11 hours of credit toward the MPH for successful completion of approved courses offered in the Department of Nutrition.

All courses for which such cross-credit is awarded must be approved by the Public Health Academic Program Committee and the student's graduate committee. A single block field experience (or public health internship) is required of all students and the analytical field paper incorporates public health nutrition and the student's public health concentration.

Dual degree students who withdraw from the program before completion of the requirements for both degrees will not receive credit toward the MS or MPH for courses taken in the other program except as such courses qualify for credit without regard to the dual program.

Approved Dual Credit

MS courses to be counted toward the MPH program must include 10 hours of Nutrition 515 and 1 hour of Nutrition 509. MPH courses to be counted toward the MS include Public Health 520, 530 and 540.

DOCTOR OF PHILOSOPHY

HEALTH AND HUMAN SCIENCES MAJOR

NUTRITION SCIENCE CONCENTRATION

The PhD enables students to study the science of nutrition from the cellular/molecular level to the application of nutrition principles by people in a changing environment.

The doctoral program emphasizes cellular/molecular nutrition, human nutrition, nutritional epidemiology, and experimental nutrition. Cognate areas may include anthropology, biochemistry, chemistry, communications, education, food technology, human development, physiology, public health, sociology, statistics, and/or toxicology.

Requirements

- 16 hours in nutrition including 4 hours at the 600 level (exclusive of dissertation).
- Nutrition 511, 512, 541, and 544.
- 4 hours of Nutrition 540, attendance required every semester.
- 6 hours of statistics.
- 6 hours in a cognate area.
- 9 hours at the 600 level.
- Students without college teaching experience are required to take the fall semester teaching seminar for GTAs.

Nutrition Minor

The graduate minor consists of Nutrition 511 and 512, plus at least 3 hours from any letter-graded 500-level or above nutrition courses.

DEPARTMENT OF RETAIL, HOSPITALITY, AND TOURISM MANAGEMENT

http://csm.utk.edu

Nancy B. Fair, Head
Laura Jolly, RCS Graduate Liaison
Rachel Chen, HRT Graduate Liaison

Professors

Costello, C., PhD .................................. Tennessee
Fair, N., PhD ....................................... North Carolina State
Fairhurst, A., PhD ................................. Oklahoma State
Jolly, L., PhD ....................................... Oklahoma State
Kim, Y., PhD ....................................... North Carolina

Associate Professors

Chen, R., PhD ....................................... North Carolina State
Morse, Steve, PhD ................................ Tennessee
Wise, D., PhD ....................................... Texas A&M

Assistant Professors

Antun, J., PhD ...................................... South Carolina
Costen, W., PhD .................................. Washington State
Lim, H., PhD ....................................... Purdue

Internship Coordinators

Aaser, D., MS ........................................ Wisconsin (Stout)
Simpson, L., MS ...................................... Tennessee

Executive-in-Residence

Piper, C., BA ....................................... Maryville College

MAJORS

DEGREES

Consumer Services Management

MS
- Hospitality and tourism management concentration
- Retail and consumer sciences concentration

Health and Human Sciences

PhD
- Hospitality and tourism management concentration
- Retail and consumer sciences concentration

Graduate Certificate Programs

Services management
- Tourism development

The Department of Retail, Hospitality, and Tourism Management offers the master’s degree with a major in consumer services management and concentrations in hospitality and tourism management and retail and consumer sciences.

The programs in consumer services management prepare students for careers in industry and business, public and private agencies, and educational institutions. Master’s level work develops students’ technical skills in retail management, merchandising, hospitality management, tourism, and related consumer services.

Interested students should contact the department for more information or visit the department link on the college Web site.

Admission

A complete file for review includes the Graduate Application for Admission file, Department of Retail, Hospitality, and Tourism Management application, Graduate Record Examination (GRE) scores for the general section, and three Graduate Rating Forms completed by individuals who can attest to the potential for graduate education.

In addition to specified entrance requirements stipulated by the Graduate Council, admission to the master’s program with a major in consumer services management is dependent on completion of undergraduate courses that give the necessary background for success in the graduate program. For the concentration in hospitality and tourism management, students should have an adequate background in hotel and/or restaurant management and/or tourism management supported by coursework in food production, cost control, or lodging management. For the concentration in retail and consumer sciences, students should have an adequate background in retailing and/or consumer science sup-
ported by coursework in marketing and statistics. Superior students deficient in one or more of the above requirements may be admitted at the discretion of the department's graduate faculty. Deficiencies may need to be addressed through undergraduate coursework.

**Academic Standards**

Evaluation of student progress will normally occur prior to enrollment for thesis hours (or the non-thesis option) and during the second semester of full-time enrollment in the program. The review of the student will be undertaken by the faculty with consideration given to factors such as GPA (minimum 3.00), portfolio evaluation, and demonstrated research capability.

If progress or performance is deemed insufficient, the faculty may recommend probation with specific goals set for a specified time or termination.

**MASTER OF SCIENCE CONSUMER SERVICES MANAGEMENT MAJOR**

**Requirements**

The requirements for the major in consumer services management are listed below by concentration.

**Hospitality and Tourism Management Concentration (Thesis)**

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Services Management</td>
<td>.12</td>
</tr>
<tr>
<td>Tourism</td>
<td>.3</td>
</tr>
<tr>
<td>Research Methods</td>
<td>.3</td>
</tr>
<tr>
<td>Statistical Methods</td>
<td>.6</td>
</tr>
<tr>
<td>Cognate Area</td>
<td>.6</td>
</tr>
<tr>
<td>Hotel, Restaurant, and Tourism 547</td>
<td>.3</td>
</tr>
<tr>
<td>Thesis</td>
<td>.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>39</strong></td>
</tr>
</tbody>
</table>

1. Retail and Consumer Sciences 538, 541; Hotel, Restaurant, and Tourism 510, 532.
2. Select from Hotel, Restaurant, and Tourism 423, 435, 523, 524.
3. Retail and Consumer Sciences 562.

**Hospitality and Tourism Management Concentration (Non-Thesis)**

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Services Management</td>
<td>.12</td>
</tr>
<tr>
<td>Tourism</td>
<td>.6</td>
</tr>
<tr>
<td>Research Methods</td>
<td>.3</td>
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<td>.3</td>
</tr>
<tr>
<td>Cognate Area</td>
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<tr>
<td>Hotel, Restaurant, and Tourism 547</td>
<td>.3</td>
</tr>
<tr>
<td>Professional Paper/Project</td>
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</tr>
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<td><strong>Total</strong></td>
<td><strong>36</strong></td>
</tr>
</tbody>
</table>

1. Retail and Consumer Sciences 538, 541; Hotel, Restaurant, and Tourism 510, 532.
2. Select either Hotel, Restaurant, and Tourism 523 or 524.
3. Retail and Consumer Sciences 562.

**Retail and Consumer Sciences Concentration (Thesis)**

<table>
<thead>
<tr>
<th>Hours Credit</th>
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<tbody>
<tr>
<td>Services Management</td>
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<td>Research Methods</td>
<td>.3</td>
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1. Retail and Consumer Sciences 538, 541; Hotel, Restaurant, and Tourism 510, 532.
2. Retail and Consumer Sciences 562.

**Retail and Consumer Sciences Concentration (Non-Thesis)**

<table>
<thead>
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<th>Hours Credit</th>
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</thead>
<tbody>
<tr>
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<td>.12</td>
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<tr>
<td>Research Methods</td>
<td>.3</td>
</tr>
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<td>.3</td>
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<tr>
<td>Retail and Consumer Sciences Electives</td>
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</tr>
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<td>Professional Paper/Project</td>
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<td><strong>Total</strong></td>
<td><strong>36</strong></td>
</tr>
</tbody>
</table>

1. Retail and Consumer Sciences 538, 541; Hotel, Restaurant, and Tourism 510, 532.
2. Retail and Consumer Sciences 562.
3. Retail and Consumer Sciences 501.

**DOCTOR OF PHILOSOPHY HEALTH AND HUMAN SCIENCES MAJOR**

**Requirements**

The requirements for the doctoral degree are listed below by concentration.

**Hospitality and Tourism Management Concentration**

<table>
<thead>
<tr>
<th>Hours Credit</th>
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<tbody>
<tr>
<td>Required Courses</td>
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<tr>
<td>Research Methods</td>
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<td>Statistics</td>
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<tr>
<td>Cognate Area</td>
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<tr>
<td>Electives</td>
<td>.3</td>
</tr>
<tr>
<td>Professional Paper/Project</td>
<td>.21</td>
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<tr>
<td>Dissertation</td>
<td>.24</td>
</tr>
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<td><strong>Total</strong></td>
<td><strong>86</strong></td>
</tr>
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</table>

1. Hotel, Restaurant, and Tourism 614, 615, 547, 523, 524.
2. Hotel, Restaurant, and Tourism 537, Retail and Consumer Sciences 616.
4. Cognate hours must include at least 3 hours at the 600 level.
5. Graduate-level courses that will help develop students' instructional capabilities.

**Retail and Consumer Sciences Concentration**

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Required Courses</td>
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<tr>
<td>Research Methods</td>
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</tr>
<tr>
<td>Statistics</td>
<td>.12</td>
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<tr>
<td>Statistical Methods</td>
<td>.9</td>
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<tr>
<td>Electives</td>
<td>.3</td>
</tr>
<tr>
<td>Professional Paper/Project</td>
<td>.21</td>
</tr>
<tr>
<td>Dissertation</td>
<td>.24</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>86</strong></td>
</tr>
</tbody>
</table>

1. Retail and Consumer Sciences 614, 615, 625, 641.
2. Retail and Consumer Sciences 590, 616.
4. Cognate hours must include at least 3 hours at the 600 level.
5. Graduate-level courses that will help develop students' instructional capabilities.

**GRADUATE CERTIFICATE IN SERVICES MANAGEMENT**

The Department of Retail, Hospitality, and Tourism Management offers a graduate certificate in services management for students seeking continuing education and career advancement opportunities in the services industry.

The 12-hour certificate is available by completing Retail and Consumer Sciences 541, 538, and Hotel, Restaurant, and Tourism 510, 532.
GRADUATE CERTIFICATE IN TOURISM DEVELOPMENT

The Department of Retail, Hospitality, and Tourism Management offers a graduate certificate in tourism development for students seeking continuing education and career advancement opportunities related to tourism in public and private sectors. The 12-hour certificate is available by completing Hotel, Restaurant, and Tourism 523, 524, 435, 423.

DEPARTMENT OF THEORY AND PRACTICE IN TEACHER EDUCATION

http://web.utk.edu/~tpte/
Susan M. Benner, Head

Professors
Allington, R., PhD .................................................. Michigan State
Benner, S., EdD ........................................................... Columbia
Brewer, E., EdD .......................................................... Tennessee
Davis-Wiley, P., EdD ....................................................... Houston
Hargis, C., EdD ........................................................... Colorado
Hatch, J., PhD .............................................................. Florida
Long, V. (Associate Dean), EdD ........................................ Missouri (Columbia)
McGill-Franzen, A., PhD ................................................ State University of New York (Albany)
Rider, R. (Dean), PhD ...................................................... North Carolina
Rowell, C., EdD ............................................................. George Peabody
Turner, T., EdD .............................................................. Penn State
Ubben, C., PhD ............................................................. Minnesota

Associate Professors
Anfara, V., PhD .......................................................... New Orleans
Barclay-McLaughlin, M., PhD ......................................... Michigan
Bell, S., PhD .............................................................. Tennessee
Cagle, L. (Associate Dean), EdD ........................................ Georgia
Davis, J., PhD .............................................................. New Mexico
Giliane, C., PhD ........................................................... Illinois
Melear, C., PhD ........................................................... Ohio State

Assistant Professors
Angelle, P., PhD .......................................................... Louisiana State
Aydeniz, M., PhD ......................................................... Florida
Botzakis, S., PhD .......................................................... Georgia
Broemmel, A., PhD ......................................................... Southern Illinois
Brown, C., EdD ............................................................. George Washington
Cady, J., PhD ............................................................... Illinois
Cihak, D., PhD ............................................................. Georgia State
Groenke, S., PhD ........................................................... Virginia Tech
Hagevick, R., PhD .......................................................... North Carolina State
Hendricks, D., PhD ........................................................ Alabama
Hodge, L., PhD .............................................................. Vanderbilt
Patterson, F., EdD ............................................................ Tennessee
Stairs, A., PhD ............................................................. Boston College
Taylor, M., PhD .............................................................. Missouri
Wobbers, K., PhD .......................................................... Michigan State
Woolsey, L., PhD ........................................................... Ohio State
Wooten, D., PhD ........................................................... New York

MAJORS

DEGREES

Education
PhD
Leadership studies in education concentration
Literacy studies concentration (specializations in ESL and reading)
Special education concentration
Teacher education concentration (specializations in early childhood education, elementary education, English education, mathematics education, science education, and social science education)

Educational Administration
MS, EdS

Teacher Education
MS

Track 1 (does not result in a teaching license)
Art education concentration
Early childhood special education concentration
Education of the deaf and hard of hearing concentration
Elementary education concentration
English education concentration

Track 2 (for individuals seeking an initial teaching license)

Elementary education concentration
Foreign language/ESL education concentration
Mathematics education concentration
Science education concentration
Social science education concentration

Superintendent Education

EDUCATION PRINCIPALSHIP IN TEACHER EDUCATION

The educational administration and supervision programs, the department prepares entry-level and executive-level administrators for schools and colleges, and prepares policy scholars to serve in these organizations and in state, regional, and national policy agencies. The graduate degree programs are designed to enrich the knowledge, skills and values requisite to effective leadership in educational practice settings. The graduate programs focus on the preparation and development of administrative and instructional leaders who will serve in the diverse settings of schools and colleges, and educational units of government. Specialized coursework leading to the urban education certificate is available in the area of urban administration.

MASTER OF SCIENCE

EDUCATIONAL ADMINISTRATION MAJOR

The Master of Science with a major in educational administration is intended for students who are seeking licensure in school administration and is directed toward providing beginning practitioners with the “best practice” knowledge and skills derived from the field and from research. Students are encouraged to transfer these practices into the world of school administration. Specifically, the MS is designed to prepare school principals and supervisors for licensure in Tennessee and for success in their initial administrative assignments. This two-year program combines evening (5:45-8:35 PM) and summer classes with on-the-job field activities organized around real school problems.
Initial Licensure Program

The Master of Science with a major in educational administration requires 36 hours of graduate-level coursework, a professional portfolio, and a comprehensive examination. Included in the 36 hours of coursework is a site-based internship. In order to obtain initial administrative licensure from the State of Tennessee, graduates from this program must have three years of experience in schools (i.e., teaching, counseling, etc.). Additionally, students must pass the School Leaders Licensure Assessment (SLLA) examination that is required by the State of Tennessee to obtain initial licensure as a school administrator. It is expected that students admitted to this program possess leadership potential that has been demonstrated in prior experience.

The four major themes of the Master of Science program with a major in educational administration include:

- Expansion of the knowledge base that forms the framework of leadership and a broader conceptualization of educational organizations.
- Emphasis on the performance dimensions of the principalship and administration with particular attention given to the knowledge, skills, and dispositions underlying performance.
- Integration of theory and practice.
- Collaboration between universities and schools.

The University of Tennessee’s Master of Science degree with a major in educational administration is a National Council for Accreditation of Teacher Education (NCATE) approved program that follows the Interstate School Leaders Licensure Consortium (ISLLC) performance standards and the National Policy Board for Educational Administration (NPBEA) recommendations for the knowledge, skills, and dispositions required today for school leaders. The program is also actively involved in the University Council for Educational Administration (UCEA), a consortium of leading research universities offering programs in educational administration.

Admission

A completed application must be received by both the Office of Graduate and International Admissions and the Department of Theory and Practice in Teacher Education, educational administration program. A grade point average (GPA) of 2.70 or higher for undergraduate work or GPA 3.20 or higher for prior graduate work is required. Applicants to the Master of Science program must possess teacher or school-related licensure; have, or will have, by program completion three years teaching experience or experience working in schools; and must interview with an admission committee. Candidates for the educational administration major must possess leadership potential preferably demonstrated by previous leadership experience. Three rating forms must be provided with recommendations from three present or former employers that identify a candidate’s strengths, weaknesses, and leadership potential. Interviews with applicants will be held each year in April. Courses will officially start in June.

Requirements

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Core Requirements (513, 515, 548, 553)</td>
</tr>
<tr>
<td>15</td>
<td>Specialization (523, 554, 583, 544 and an approved curriculum course)</td>
</tr>
<tr>
<td>3</td>
<td>Research (516)</td>
</tr>
<tr>
<td>6</td>
<td>Internship (580)</td>
</tr>
<tr>
<td>45</td>
<td>Total</td>
</tr>
</tbody>
</table>

1 A thesis option is available with approval of advisor.
2 Elective from outside the Educational Administration area chosen in consultation with advisor.

SPECIALIST IN EDUCATION

EDUCATIONAL ADMINISTRATION MAJOR

The department offers a Specialist in Education degree with a major in educational administration. This degree is designed for individuals who already possess a master’s degree in education. Exceptions may be made only by the faculty of the program to which the student is applying. This degree may be used to fulfill the course requirements for obtaining licensure as a school administrator.

Admission

Application forms must be completed and submitted by March 15. These include the Office of Graduate and International Admissions’ application and for those interested in licensure, the Educational Specialist in Educational Administration application. A graduate GPA of 3.20 or higher, documentation of teaching or related experience (a minimum of three years of school-related experience is needed for licensure as a school administrator), and three rating forms that assess a candidate’s strengths, weaknesses, leadership, and scholarly potential are required.

Requirements

The EdS with a major in educational administration requires a minimum of 45 hours of study. A final comprehensive examination is required as is a culminating research paper or thesis depending on the program.

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Core Requirements (513, 515, 548, 553)</td>
</tr>
<tr>
<td>15</td>
<td>Specialization (523, 554, 583, 544 and an approved curriculum course)</td>
</tr>
<tr>
<td>9</td>
<td>Research (516, 592, 2Elective)</td>
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<tr>
<td>6</td>
<td>Internship (580)</td>
</tr>
<tr>
<td>45</td>
<td>Total</td>
</tr>
</tbody>
</table>

GRADUATE CERTIFICATE IN EDUCATIONAL ADMINISTRATION (PREK-12)

The Certificate in Educational Administration (PreK-12) consists of a minimum of 18 graduate hours of selected coursework. Students that currently hold a Master of Science or Specialist in Education degree in Education, or a related field, may apply for admission to the certificate program. Admission criteria are the same as outlined for the Master of Science degree with the Educational Administration Major. Participants will obtain the competencies required for the Beginning Administrator License (with a 481 Tennessee endorsement). The curriculum for the Certificate in Educational Administration (PreK-12) is – Educational Administration 583 (3 hours), 515 (3 hours), 553 (3 hours), 554 (3 hours), 548 (3 hours), Theory and Practice in Teacher Education 595 (3 hours).

GRADUATE CERTIFICATE IN URBAN EDUCATION

The Department of Theory and Practice in Teacher Education offers a graduate certificate in urban education for experienced urban teachers. A cohort group is competitively selected each year. Participants complete a 12-credit hour, four-course program of study over a two-year period. First-year courses are Theory and Practice in Teacher Education 595 and 540. Second-year courses are Theory and Practice in Teacher Education 595 and 550.
TEACHER EDUCATION

The department offers programs for students seeking Tennessee licensure in the following areas – elementary teaching (K-6); middle grades teaching (4-8); secondary content field teaching (7-12) in English education, foreign language education, mathematics education, science education, social sciences education; art education (K-12); English as a Second Language (K-12); modified special education (K-12) and early childhood special education (PreK-3); special education for the deaf and hard of hearing; reading endorsement, and comprehensive special education endorsement. The program features a professional year internship with accompanying coursework, which may lead to a master’s degree with a major in teacher education. Specialized coursework leading to a certificate in urban education is also available in the area of urban teaching.

For admission, most programs (except the Track 2 Initial Licensure/ Master of Science) require current scores from the GRE general section, and all require a departmental application form and letters of recommendation. For additional information about the various programs of study and admission, write to the Student Services Center in the College of Education, Health, and Human Sciences, Claxton Complex A332. http://www.utk.edu/departments/advising or visit the departmental Web site at http://web.utk.edu/%7Etptel.

MASTER OF SCIENCE

TEACHER EDUCATION MAJOR

The Master of Science with a major in teacher education has two tracks. Track 1 is for students who hold a valid Tennessee teaching license, or for those preparing to teach on the post-secondary level, or for those preparing for careers that do not require teacher licensure. Track 2 is designed for students seeking initial teacher licensure.

Both Track 1 and Track 2 offer thesis and non-thesis options and require students to submit a written comprehensive examination. In addition, students completing theses must sit for an oral examination of their theses.

TRACK 1

Track 1 non-licensure concentrations are art education; early childhood special education; education of the deaf and hard of hearing; elementary education; English education; foreign language/ESL education; mathematics education; reading education; science education; science education (informal education); social science education; and special education.

Admission

Students must meet all current graduate school admission requirements in addition to submitting a departmental application and three rating forms.

Requirements

- Completion of a prescribed set of courses: Core Area (9 hours minimum) Theory and Practice in Teacher Education 517, approved research course, Instructional Technology 521, 573, or approved Instructional Technology course.
- Concentration Area (12 hours).
- Related Studies (3-12 hours).
- Completion of thesis or non-thesis option.

Thesis: Minimum 30 hours, satisfactory completion of written thesis and oral defense of thesis; 2/3 of total hours for MS degree must be 500-level or above.

Non-Thesis: Minimum 33 hours, satisfactory completion of written comprehensive examination; 2/3 of total hours for MS must be 500-level or above.

ART EDUCATION CONCENTRATION

• TRACK 1

Advising Note for Thesis and Non-Thesis Options

- The Track I MS serves those students who have a BS, BA, or BFA and desire a master’s degree, but do not wish to pursue certification to teach art, or who already have certification to teach art and wish to pursue a master’s.
- An exhibition, instead of a thesis, must be of work directed by art and art education faculty. The artwork must be completed while pursuing the master’s degree. A written paper must accompany the exhibition. The paper includes a philosophical statement; process and media explanation (demonstration of knowledge); compositional analysis of each work; and how the work relates to one personal artist statement.
- For both tracks, a comprehensive written examination is required during the final semester of work. An oral exam is given over the thesis. Students are expected to read and meet requirements in the Graduate School section, at the front of the catalog, and carefully read the requirements regarding the courses in their graduate program.

<table>
<thead>
<tr>
<th>Art Education Concentration (Thesis Option) • Track 1</th>
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<tbody>
<tr>
<td>Hours Credit</td>
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<tr>
<td>1Core ................................................................ 6</td>
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<tr>
<td>2Concentration ........................................... 18</td>
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<td>Theory and Practice in Teacher Education 500 (Thesis) 6</td>
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<table>
<thead>
<tr>
<th>Art Education Concentration (Non-Thesis Option) • Track 1</th>
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</thead>
<tbody>
<tr>
<td>Hours Credit</td>
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<tr>
<td>1Core ................................................................ 6</td>
</tr>
<tr>
<td>2Concentration ........................................... 21</td>
</tr>
<tr>
<td>500-Level Electives ........................................ 6</td>
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</tr>
</tbody>
</table>

CONTENT FIELDS TEACHING • TRACK 1

Concentrations are English Education, Foreign Language/ESL Education, Mathematics Education, Science Education, Social Science Education.

Non-Thesis Option

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Core Area .................................................. 9</td>
</tr>
<tr>
<td>Concentration Area ...................................... 12</td>
</tr>
<tr>
<td>Related Studies .......................................... 12</td>
</tr>
<tr>
<td>All classes must be approved by major advisor.</td>
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</table>

* Theory and Practice in Teacher Education 517; Educational Psychology 550, 582, Educational Administration 516, or other approved research course; Instructional Technology 521, 573 or other approved Instructional Technology course.

Non-Thesis: Minimum 33 hours of approved coursework and satisfactory completion of written and/or oral comprehensive examination. Two-thirds of the total hours for the MS must be 500 level or above.
**Thesis Option**  
Minimum 30 hours of approved coursework, 6 hours of Theory and Practice in Teacher Education 500, and satisfactory completion of written thesis and oral defense of thesis. Two-thirds of the total hours for the MS must be 500 level or above.

**EARLY CHILDHOOD SPECIAL EDUCATION CONCENTRATION • TRACK 1**

**Thesis Option**

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Description</th>
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<tbody>
<tr>
<td>3</td>
<td>Audiology and Speech Pathology 563</td>
</tr>
<tr>
<td>3</td>
<td>Special Education 554</td>
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<td>3</td>
<td>Elementary Education 566</td>
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<td>Elementary Education 567</td>
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<tr>
<td>3</td>
<td>Special Education 568</td>
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<tr>
<td>3</td>
<td>Special Education 504</td>
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<tr>
<td>3</td>
<td>Child and Family Studies 530</td>
</tr>
<tr>
<td>3</td>
<td>Educational Psychology 577</td>
</tr>
<tr>
<td>3</td>
<td>(other approved research design class may be substituted)</td>
</tr>
<tr>
<td>6</td>
<td>Theory and Practice in Teacher Education 500</td>
</tr>
</tbody>
</table>

Total 33

**Non-Thesis Option**

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>3</td>
<td>Audiology and Speech Pathology 563</td>
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<tr>
<td>3</td>
<td>Special Education 554</td>
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<tr>
<td>3</td>
<td>Special Education 504</td>
</tr>
<tr>
<td>3</td>
<td>Child and Family Studies 530</td>
</tr>
<tr>
<td>3</td>
<td>Educational Psychology 550, 582, or Educational Administration 516</td>
</tr>
<tr>
<td>3</td>
<td>(other approved research design class may be substituted)</td>
</tr>
<tr>
<td>3</td>
<td>Electives (Advisor approval required)</td>
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</tbody>
</table>

Total 36

**EDUCATION OF THE DEAF AND HARD OF HEARING CONCENTRATION • TRACK 1**

Contact the department head for information on this concentration.

**ELEMENTARY EDUCATION CONCENTRATION • TRACK 1**

**Thesis Option**

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>1 Core</td>
</tr>
<tr>
<td>12</td>
<td>2 Concentration</td>
</tr>
<tr>
<td>3</td>
<td>3 Related Studies</td>
</tr>
<tr>
<td>6</td>
<td>Theory and Practice in Teacher Education 500 (Thesis)</td>
</tr>
</tbody>
</table>

Total 30

1 Educational Psychology 577 or other approved research design course; Theory and Practice in Teacher Education 517; 3 hours determined by student and advisor.
2 Choose from at least three areas – reading education, language arts, education, mathematics education, science education, social studies education, elementary curriculum, middle school curriculum.
3 Determined by student and advisor.

**Non-Thesis Option**

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>1 Core</td>
</tr>
<tr>
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<td>2 Concentration</td>
</tr>
<tr>
<td>3</td>
<td>3 Related Studies</td>
</tr>
<tr>
<td>6</td>
<td>Theory and Practice in Teacher Education 500 (Thesis)</td>
</tr>
</tbody>
</table>

Total 30

1 Educational Psychology 550, 582, Educational Administration 516, or other approved research design course; Theory and Practice in Teacher Education 517; 3 hours determined by student and advisor.
2 Science Education 506, 509, 510; 3 hours determined by student and advisor.
3 Determined by student and advisor.

**READING EDUCATION CONCENTRATION**

**TRACK 1**

**Thesis Option**

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Concentration (reading education courses)</td>
</tr>
<tr>
<td>3</td>
<td>Related Studies</td>
</tr>
<tr>
<td>6</td>
<td>Theory and Practice in Teacher Education 500 (Thesis)</td>
</tr>
</tbody>
</table>

Total 30

1 Educational Psychology 577 or other approved research design course; Theory and Practice in Teacher Education 517; 3 hours determined by student and advisor.
2 Choose 3 hours from language arts education, English education, elementary curriculum, elementary education, middle school curriculum, special education, or educational psychology.

**Non-Thesis Option**

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Concentration (reading education courses)</td>
</tr>
<tr>
<td>9</td>
<td>Related Studies</td>
</tr>
</tbody>
</table>

Total 30

1 Educational Psychology 550, 582, Educational Administration 516, or other approved research design course; Theory and Practice in Teacher Education 517; 3 hours determined by student and advisor.
2 Science Education 506, 509, 510; 6 hours determined by student and advisor.
3 Determined by student and advisor.

**SCIENCE EDUCATION (INFORMAL EDUCATION) CONCENTRATION • TRACK 1**

**Thesis Option**

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>1 Core</td>
</tr>
<tr>
<td>12</td>
<td>2 Concentration</td>
</tr>
<tr>
<td>3</td>
<td>3 Related Studies</td>
</tr>
<tr>
<td>6</td>
<td>Theory and Practice in Teacher Education 500 (Thesis)</td>
</tr>
</tbody>
</table>

Total 30

1 Educational Psychology 577 or other approved research design course; Theory and Practice in Teacher Education 517; 3 hours determined by student and advisor.
2 Science Education 506, 509, 510; 3 hours determined by student and advisor.
3 Determined by student and advisor.

**Non-Thesis Option**

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>1 Core</td>
</tr>
<tr>
<td>6</td>
<td>2 Concentration</td>
</tr>
<tr>
<td>6</td>
<td>3 Related Studies</td>
</tr>
</tbody>
</table>

Total 33

1 Educational Psychology 550, 582, Educational Administration 516, or other approved research design course; Theory and Practice in Teacher Education 517; 6 hours determined by student and advisor.
2 Science Education 506, 509, 510; 6 hours determined by student and advisor.
3 Determined by student and advisor.

**SPECIAL EDUCATION CONCENTRATION**

**TRACK 1**

**Thesis Option**

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>1 Core</td>
</tr>
<tr>
<td>15</td>
<td>2 Concentration</td>
</tr>
<tr>
<td>6</td>
<td>Theory and Practice in Teacher Education 500 (Thesis)</td>
</tr>
</tbody>
</table>

Total 30
1 Special Education 587 or Theory and Practice in Teacher Education 517; Special Education 586, 590.
2 Select (with major advisor) from affective motivational disorder (6-9); general special education (6-9); reading education (6-9); cognitive education (6-9); gifted education (6-9); modified programs (6-12); comprehensive programs (6-12). Others by committee approval.
3 Coursework (24 hours); thesis (6 hours).

**Non-Thesis Option**

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Core</td>
<td>9</td>
</tr>
<tr>
<td>2Concentration</td>
<td>27</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>36</strong></td>
</tr>
</tbody>
</table>

1 Special Education 587 or Theory and Practice in Teacher Education 517; Special Education 586, 590.
2 Select (with major advisor) from affective motivational disorder (6-9); general special education (6-9); reading education (6-9); cognitive education (6-9); gifted education (6-9); modified programs (6-12); comprehensive programs (6-12). Others by committee approval.
3 Problem courses in lieu of thesis (30 hours); additional problem courses (6 hours); oral exams over problems courses.

**TRACK 2: INITIAL LICENSURE PROGRAMS**

The Track 2 master's is intended for individuals desiring to earn teacher licensure. Applicants to this program must first be admitted to teacher education. Elementary or secondary education applicants must complete the equivalent of an undergraduate minor in either elementary or secondary education. Applications to the middle grades teaching program complete an academic minor in one of the following licensure areas — mathematics, science, social studies, language arts, or foreign language arts. Post-baccalaureate students interested in seeking licensure in art education, special education, or in other fields that require students to earn an undergraduate major would be expected to complete an equivalent undergraduate program of study. Please refer to the catalog for complete details. Individuals are encouraged to contact the college's Student Services Center, A332 Claxton Complex, for a diagnostic interview and to develop a tentative course of study and time line.

**Requirements**

**Track 2 Common Course Requirements**

Master's Track 2 programs are 36-hour (non-thesis); 42-hour (thesis). Students, regardless of teaching area (e.g., elementary, secondary, etc.), complete a common teacher licensure core of 24-hours during the professional year (see below).

**Professional Year Courses (24 hours)**

Education 574 (2), 575 (12), 591 (4), and specialty studies (6).

**Additional Course Requirements (12 hours)**

In addition to the above common core of courses, students must complete an additional 12 hours of coursework that is unique to their particular teacher preparation field.

**Art Education**

Art Education 510, 520, 530, 540.

**Early Childhood Special Education**

Special Education 554; Elementary Education 566, 567; Special Education 568.

**Education of the Deaf and Hard of Hearing**

Research elective (3); non-specified electives (9).

**Elementary Teaching**

Theory and Practice in Teacher Education 517; 9 hours of educational electives (chosen from at least three areas): historical, philosophical, or social foundations; instructional technology; reading education; language arts education; science education; social science education; elementary education; middle school curriculum.

**Middle Grades Teaching**

Theory and Practice in Teacher Education 542; Reading Education 543; an education course in the primary area of licensure (see faculty advisor).

**Modified and Comprehensive Special Education**

Special Education 553, 590; 6 hours of electives (see advisor).

**Secondary Teaching**

Theory and Practice in Teacher Education 517; 549 or 558, or 588, or an elective in the history of sociology or philosophy of education; 6 hours of specialty area electives (see faculty advisor).

**SPECIALIST IN EDUCATION**

**TEACHER EDUCATION MAJOR**

The department offers a Specialist in Education degree with a major in teacher education. This degree is designed for those students who already possess a master’s degree in education. Exceptions may be made only by the faculty of the program to which the student is applying. The Specialist in Education with a major in teacher education encompasses concentrations in elementary education; English education; foreign language/ESL education; mathematics education; reading education; science education; social science education; and special education.

These concentrations require completion of a minimum of 30 hours of coursework beyond the master’s, including 6 hours in core courses, 18 hours in specialized courses, and 6 hours to be determined by the student’s committee. Both thesis and non-thesis options are available.

**Admission**

Candidates must complete both university and departmental applications, including the Office of Graduate and International Admissions’ application and the EdS teacher education application from the department. A graduate GPA of 3.20 or higher, documentation of teaching or related experience, and three rating forms with recommendations that assess a candidate’s strengths, weaknesses, leadership, and scholarly potential are required. Some concentrations have specific application deadlines while others have a rolling admissions policy. Some concentrations require a minimum of three years of teaching or related experience. In addition, some concentrations have additional requirements such as writing samples, work samples, or interviews. The departmental EdS application, rating forms, specific program deadlines, and other requirements are available from the department.

**Requirements**

The total EdS program involves a minimum of four semesters of study with no fewer than 60 hours of graduate credit beyond the baccalaureate, including research/thesis hours.

Education courses at the 400-level required for licensure are not eligible. At least 2/3 of the semester hours accumulated in the master’s and all of the last 30 hours of coursework must be in 500- or 600-level courses. The EdS thesis must be approved by the student’s committee prior to submission to the Graduate School for final approval and acceptance. The student must register for thesis hours during this time.

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Core Area</td>
<td>6</td>
</tr>
<tr>
<td>2Concentration</td>
<td>12</td>
</tr>
<tr>
<td>3Research</td>
<td>6</td>
</tr>
<tr>
<td>4Related Studies</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total (Thesis and Non-Thesis)</strong></td>
<td><strong>30</strong></td>
</tr>
</tbody>
</table>

1 Must include one course from two of the following areas outside the concentration – curriculum or leadership; anthropological, historical, philosophical or social foundations; human growth and development; preK-4 teaching methodology; instructional technology.
2 Theory and Practice in Teacher Education 593, 594, 595.
3 Theory and Practice in Teacher Education 518 or 500 (thesis).
4 Must be related to focus of degree and must be outside specialty area education program, e.g., English, reading, speech, drama, communication, instructional technology, math, science, social sciences.

EDUCATION MAJOR

Faculty from the department participate in the delivery of the PhD with a major in education. Concentrations and specializations are available in leadership studies in education; literacy studies (specialization in ESL or reading); special education; and teacher education (specialization in early childhood education, elementary education, English education, mathematics education, science education, or social science education).

Information on admission appears at the beginning of the College of Education, Health, and Human Sciences section of this catalog.

DOCTOR OF PHILOSOPHY

EDUCATION MAJOR

LEADERSHIP STUDIES IN EDUCATION

CONCENTRATION

LITERACY STUDIES CONCENTRATION

SPECIAL EDUCATION CONCENTRATION

TEACHER EDUCATION CONCENTRATION

Students in these concentrations share a common set of course requirements with credits required as shown below. Doctoral committees may require students to take additional hours to fulfill degree requirements.

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Area</td>
</tr>
<tr>
<td>Core Requirements</td>
</tr>
<tr>
<td>Concentration/Specialization</td>
</tr>
<tr>
<td>Cognate</td>
</tr>
<tr>
<td>Dissertation</td>
</tr>
</tbody>
</table>

1 Must include Theory and Practice in Teacher Education 640 (3) or Educational Administration 615 (3).
2 Seminar in primary concentration (3); Theory and Practice in Teacher Education 604, 605, 617.

Admission

Students must submit the University of Tennessee, Knoxville, Graduate Application to the Office of Graduate and International Admissions. Students must also submit the Theory and Practice in Teacher Education Departmental Application for Graduate Study. Applicants must submit current (taken within the past five years) GRE scores that equal or exceed the minimums expected for applicants to the PhD with a major in education. Three letters of reference from those who know of the candidate's record and promise are required. An overall GPA of 3.30 in previous graduate study is required for admission to doctoral study and an interview with the faculty may be required. Admissions decisions are made on a holistic basis to discern the candidate’s promise for doctoral study and to ascertain the match of the candidate’s educational goals with the resources and goals of the department.
The college had its beginnings in the university when surveying was introduced into the curriculum in 1838. The first two professional degrees, Civil Engineer and Mining Engineer, were established in 1879 at the same time that the Board of Trustees authorized the establishment of a graduate school. Known as Mechanic Arts originally, Engineering became a college in 1904.

The purpose of the College of Engineering is to educate men and women to the high levels of research, technical competence, and social understanding that will enable them to fulfill their responsibilities as professional engineers.

Graduate programs of the College of Engineering provide opportunities for advanced study leading to the Master of Science and the Doctor of Philosophy degrees. For a listing, consult majors and degrees available on the chart at the front of this catalog.

Facilities for research and service include the Center for Homeland Security and Counterproliferation, Center for Materials Processing, Center for Transportation Research, Maintenance and Reliability Center (MRC), and the Scintillation Materials Research Center (SMRC).

**MASTER OF SCIENCE**

**RELIABILITY AND MAINTAINABILITY ENGINEERING MAJOR**

A Master of Science degree with a major in reliability and maintainability engineering is offered through an interdepartmental program. Available concentrations are aerospace engineering, biomedical engineering, computer engineering, electrical engineering, industrial engineering, mechanical engineering, and nuclear engineering. Both thesis and non-thesis options are available. The program can be completed on campus or through distance delivery.

**Admission**

Individuals seeking admission to the Master of Science program with a major in reliability and maintainability engineering must first be admissible to the University of Tennessee, Knoxville, and then admitted to a department offering a concentration within the MS with a major in reliability and maintainability engineering.

Applicants for admission to the MS program with a major in reliability and maintainability engineering are expected to have earned a bachelor's degree from an accredited undergraduate program in engineering or physics. Students from other appropriate disciplines (e.g., chemistry, mathematics, etc.) can be admitted but additional engineering courses may be required. Entering students must have, as a minimum, competency in mathematics through ordinary differential equations. The Reliability and Maintainability Engineering Program Coordinator is the contact for all students interested in the reliability and maintainability engineering major.

**Requirements**

Students, with the concurrence of their graduate committee, may choose between a thesis option and a non-thesis project option. The chosen coursework must be approved by the graduate student's major professor and committee. After the completion of the formal program coursework and research, the student must pass an oral examination conducted by his/her graduate committee. The committee will include the student's major professor, the Reliability and Maintainability Engineering Program Coordinator (or appointee), and another faculty member at the rank of assistant professor or above.

At least two-thirds of the minimum required hours must be taken in courses numbered at or above the 500 level.

**Thesis Option (30 hours)**

- Twelve hours of core courses chosen from the list below.
- Three hours of elective courses chosen from the list below.
- Six hours in statistics chosen from the list below.
- Three hours in engineering, statistics, business management, or a related field.
- Master's thesis. Six hours through the department of the major professor.
- A final oral examination covering the thesis and related coursework. The final oral examination must be at the University of Tennessee Knoxville campus.

**Non-Thesis Option (30 hours)**

- Twelve hours of core courses chosen from the list below.
- Six hours of elective courses chosen from the list below.
- Six hours in statistics chosen from the list below.
Three hours in engineering, statistics, business management, or a related field.

- Project in lieu of thesis (3 hours). The course will be supervised by the student's committee. A written project proposal describing what the student will do in the course must be approved and submitted in advance to the student's graduate committee. A written final report is required. The project course may be taken through the major professor's department – Chemical Engineering 580, Electrical and Computer Engineering 501, Engineering Science 590, Industrial Engineering 501, Mechanical Engineering 590, or Nuclear Engineering 598.

- A final oral examination covering the project and related coursework. The final oral examination must be at the University of Tennessee Knoxville campus.

**Reliability and Maintainability Engineering Core Courses**

Statistics 560; Industrial Engineering, Mechanical Engineering or Nuclear Engineering 483*; Industrial Engineering, Materials Science and Engineering, Mechanical Engineering, or Nuclear Engineering 484*; Chemical Engineering or Nuclear Engineering 585*.

**Reliability and Maintainability Engineering Electives**

Biomedical Engineering, Chemical Engineering, Electrical and Computer Engineering, Materials Science and Engineering, or Mechanical Engineering 507; Chemical Engineering or Industrial Engineering 561; Electrical and Computer Engineering 503 or 504; Industrial Engineering 516 or 517; Biomedical Engineering, Engineering Science, Mechanical Engineering 534*; or Nuclear Engineering 579*.

**Statistics Electives**


- Currently offered through distance.

**DUAL MS-MBA**

The College of Business Administration and the College of Engineering offer an integrated program leading to the conferral of the Master of Business Administration degree with a major in business administration (concentration in operations management) and the Master of Science degree in one of the following engineering majors – aerospace, biomedical, chemical, computer, electrical, engineering science, industrial, materials science, mechanical, and nuclear engineering (refer to each major for specific information and requirements).

The establishment of the dual degree program addresses the critical need for personnel trained in both engineering and management who can integrate an increasingly complex body of knowledge for rapid introduction of new products to the marketplace. The objective of the dual degree program is to prepare graduates to take a leading management role in companies that must react quickly to a dynamic market where forces of competition require rapid changes via short cycles in design, manufacturing, and product development. Since the development of a commercial product is a central part of the program, the MS-MBA is also for students who wish to become entrepreneurs.

**Admission**

Applications are accepted for fall semester only. Applicants for the MS-MBA program must make separate application to, and be competitively and independently accepted by, the Office of Graduate and International Admissions for the Master of Business Administration degree program and the office of Associate Dean for Student Affairs at the College of Engineering. Students will initially apply for the MBA program, indicating on their application the intent to pursue the dual MS-MBA program and the appropriate engineering major (refer to the MBA program for separate instructions). Students accepted for both the MBA and the MS with a major in one of the participating engineering majors will be assigned to Dual Degree Program Committee advisors, who will be responsible for course approval and supervision of the students' progress through the dual program.

Applications by U.S. citizens and permanent residents received after the MBA application deadline (March 1) will be considered as space allows. Additional information is required and different application dates are established by the Office of Graduate and International Admissions for international students.

**Requirements**

All engineering students enrolled in the program must complete common coursework designed to provide them with an integrated, multidisciplinary teamwork experience. The MBA curriculum in product development and manufacturing consists of 30 hours of common coursework in the College of Business Administration and 12 hours of common coursework in the College of Engineering. Engineering common coursework includes a culminating 3-hour integrated project course requiring a comprehensive report, and a final examination as required by the Dual Degree Program Committee, to be taken during the first session of summer following the second year.

During the second year, dual degree candidates will take courses in their engineering major. The coursework for each option is designed to provide students with a concentration in their major and advanced skills to accomplish their teamwork assignments.

The dual degree candidate must satisfy the curriculum and graduation requirements of both the engineering major being pursued and the College of Business Administration. Students withdrawing from the dual degree program before completing both degrees will not receive credit toward graduation in either degree program for courses taken in the other degree program, except as such courses qualify for credit without regard to the dual degree program. The MS and the MBA degrees will be awarded upon successful completion of the requirements of the dual degree program.

**Approved Dual Credit**

A maximum of 15 hours of the engineering courses may be counted toward the MBA degree program.

**GRADUATE CERTIFICATE IN RELIABILITY AND MAINTAINABILITY ENGINEERING**

The College of Engineering offers a graduate certificate in reliability and maintainability engineering. The program is designed primarily for part-time students in that all of the courses are available through distance education (see http://www.anywhere.tennessee.edu/default.htm). The 12-hour certificate is earned by completing 483 and 484, which are cross-listed among all participating departments in the College of Engineering, plus two elective courses selected from a list of courses provided by the participating departments – Chemical Engineering, Industrial and Information Engineering, Mechanical, Aerospace, and Biomedical Engineering, and Nuclear Engineering. Currently, the available elective courses are Chemical Engineering 561, Industrial and Information Engineering 516 and 591, Mechanical Engineering 534 and 599, and Nuclear Engineering 579 and 585. The selection of elective courses is determined through an advising conference with each individual student, and is based on the student’s personal interests, academic background, and work experience. Applicants must meet the minimum criteria established by the Graduate Council.

**DOCTOR OF PHILOSOPHY REQUIREMENTS**

Detailed minimum university requirements for the doctoral degree are listed at the front of the catalog under the Graduate School. Most departments have additional specific requirements listed in their portion of the catalog. The College of Engineering requires a minimum of 36 hours of graduate coursework. Departments, programs, and/or dissertation committees may impose a
high minimum. A minimum of 24 hours of Doctoral Research and Dissertation and a minimum of 72 hours of graduate credit (coursework plus research and dissertation) are required.

PROGRAMS AT THE UT SPACE INSTITUTE

At the University of Tennessee Space Institute near Tullahoma, graduate-level courses are offered in engineering fields such as aerospace, chemical engineering, electrical engineering, engineering science, industrial engineering including engineering management, materials science and engineering, mechanical engineering, and mathematics and physics. All programs lead to the Master of Science degree. Also, PhD programs are available in many of these fields. Information may be obtained from the Registrar, The University of Tennessee Space Institute, Tullahoma, Tennessee 37388.

DEPARTMENT OF CHEMICAL ENGINEERING

http://www.che.utk.edu/
Bamin Khomami, Head
Paul D. Frymier, Graduate Liaison

Professors
Blenkowski, P.R., PhD .......................... Purdue
Counce, R.M., PhD .............................. Tennessee
Khomami, B., PhD ............................... Illinois
Sheh, Atul C. (UTSI), PhD ........................ Northwestern

Associate Professors
Bruns, D.D., PhD ............................... Houston
Edwards, B.J., PhD .............................. Delaware
Frymier, P.D., PhD ............................... Virginia
Keffer, D.J., PhD ................................. Minnesota
Petrovan, S. (Research), PhD ........................ Iasi Tech (Romania)
Wang, T.W., PhD ................................. Massachusetts Institute of Technology
Weber, F.E., PhD ................................. Minnesota

Adjunct Faculty
Collier, J.R., PhD ................................. Case Institute of Technology
Steele, W.V., PhD ................................. Queens (Belfast)

Emeriti Faculty
Holmes, J.M., PhD ............................... Tennessee
Moore, C.F., PhD, PE ............................ Louisiana State
Prados, J.W., PhD, PE ............................ Tennessee

MAJOR DEGREES

Chemical Engineering
Advanced control systems concentration
Chemical bioengineering concentration
Chemical engineering concentration
Polymers science and engineering concentration

Chemical Engineering
Reliability and Maintainability Engineering
Chemical engineering concentration

Core Graduate Classes in Chemical Engineering
A graduate degree in chemical engineering requires the mastery of the core fundamentals of the discipline. These fundamentals are represented by five core courses – 505, 531, 547, 548, and 551. Both the master’s (thesis and non-thesis) and doctoral degrees in chemical engineering require the successful completion of these core courses.

Additional Coursework
In addition to the core classes, supplementary coursework appropriate for each graduate degree will be needed. The coursework beyond the core courses is determined in consultation with the student’s advisor and dissertation or thesis committee and must be approved by the committee and the department head.

MASTER OF SCIENCE

CHEMICAL ENGINEERING MAJOR

Requirements

Thesis Option
The standard master’s program includes a thesis and leads to the Master of Science. Minimum departmental requirements are as follows.

- A total of at least 21 semester hours in graduate-level courses (excluding 500 and 501) in chemical engineering and related areas beyond the baccalaureate. These courses must include the five core courses.
- Research and a thesis to give at least 9 hours of credit in 500.
- Active participation in graduate seminars in the department. Resident students must register for 501 every semester it is offered.
- A final oral examination covering the thesis and related fields and graduate coursework.

Non-Thesis Option
Any candidate may apply for a non-thesis option. Upon acceptance, a supervisory committee of three will be appointed. At least two members of the committee will be from the faculty in the department. The requirements for completion of the non-thesis option are:

- Completion of a total of 30 hours of graduate coursework. At least 18 of those hours must be in the department.
- Satisfactory completion of a culminating experience.

Chemical Engineering 580 (Critical Review) as this course shall include a comprehensive exam administered by the faculty committee.

DUAL MS-MBA

Chemical Engineering Major

August – First Year
Business Administration 511 MBA Core I ................................. 3
Fall – First Year
Business Administration 512 MBA Core II ............................... 15
Mechanical Engineering 504 .............................. 1

Spring
Business Administration 513 MBA Core III ................................. 9
Mechanical Engineering 506 .............................. 2
Mechanical Engineering 508 .............................. 3

Summer
– Internship ........................................ –
Chemical Engineering 509 .................................... 1
Fall – Second Year
Chemical Engineering 509 ................................. 1
– Departmental/Engineering Courses* ................................. 9

Spring
– MBA Hub Course Elective ................................. 3
Chemical Engineering 509 ................................. 1
– Departmental/Engineering Courses* ................................. 9

Summer (first session)
Chemical Engineering 594 ................................. 3

Total 60

* The departmental courses include the five required departmental core courses.
DOCTOR OF PHILOSOPHY
CHEMICAL ENGINEERING MAJOR

Requirements

Students may apply directly to the PhD program either with or without having completed a master’s thesis. Students proceeding directly to the PhD program from a baccalaureate degree should submit evidence of outstanding performance in a rigorous undergraduate program and the ability to perform independent research at the doctoral level.

A total of 72 hours beyond the bachelor’s degree are required for the PhD. These consist of coursework hours and research and dissertation hours (Chemical Engineering 600). Specifically, the departmental requirements consist of the satisfactory completion of:

- A minimum of 36 semester hours in graduate-level courses (excluding 600) in chemical engineering and related fields beyond the baccalaureate. These courses must include the five core courses and at least 6 hours of courses at the 600 level from the University of Tennessee, Knoxville.
- A comprehensive examination consisting of a written part and an oral part. The written part covers the core fundamentals of the program. The defense of the dissertation proposal constitutes the oral portion of the exam.
- A minimum of 24 hours of research and dissertation credit in Chemical Engineering 600. Registration must be continuous from the time research begins. (See the Continuous Registration requirement in the Graduate School section of this catalog.)
- Successful oral defense of the dissertation before the student’s dissertation committee.
- Active participation in graduate seminars conducted by the department. Resident students must register for 501 every semester offered.

Intercollegiate Graduate Minor in Computational Science (IGMCS)

The Department of Chemical Engineering participates in the intercollegiate graduate minor in computational science (IGMCS) program. Any student pursuing a Master’s or PhD with a major in chemical engineering can receive a minor in computational science by completing the appropriate IGMCS requirements. For further information see the description of the IGMCS listed under the Department of Computer Science. The Department of Chemical Engineering also contributes courses to the IGMCS program curriculum.

MAJORS DEGREES

Civil Engineering MS, PhD
Construction engineering concentration
Environmental engineering concentration
Geotechnical/Materials engineering concentration
Public works engineering concentration
Structural engineering concentration
Transportation engineering concentration

Environmental Engineering MS
Air quality concentration
Environmental risk assessment concentration
Mixed waste management concentration
Waste management concentration
Water quality concentration
Water resources concentration

MASTER OF SCIENCE

The Master of Science programs in civil engineering and environmental engineering are offered to graduates of recognized undergraduate curricula. It is required that all applicants to the degree programs submit scores from the General Graduate Record Examination (GRE). Both degree programs have thesis and non-thesis options. It is the policy of the department that students supported by university-related financial aid complete an integrated project, which is defined as a Thesis (Civil Engineering/Environmental Engineering 500) or Special Problems (Civil Engineering/Environmental Engineering 590). The appointment letter may specify which of the two options must be selected.

CIVIL ENGINEERING MAJOR

Departmental requirements are that for a major in civil engineering, the bachelor’s degree must be in civil engineering, or certain undergraduate prerequisite courses must be taken before Admission to Candidacy. The Department of Civil and Environmental Engineering offers both thesis and non-thesis options for the Master of Science with a major in civil engineering. Either option must be approved by the student’s major professor.

Thesis Option
A minimum of 30 semester hours of approved graduate courses, including 6 hours of thesis, is required.

Non-Thesis Option
A minimum of 33 semester hours of approved graduate courses, which may include a 3-hour special problems course to be completed under the direction of the student’s major professor, is required.

ENVIRONMENTAL ENGINEERING MAJOR

For the Master of Science with a major in environmental engineering, normally a bachelor’s degree in a field of engineering is required. For a student who does not have an engineering background, the following minimum prerequisite courses will be required – Engineering Fundamentals 151, 152; Statistics 251; Civil Engineering 380, 390, and 395 or 416; Mathematics 141, 142, 231, 241; Chemistry 120, 130. In general, these must be completed with a B average before courses for graduate credit can be taken. The Department of Civil and Environmental Engineering offers both thesis and non-thesis options for the Master of Science with a major in environmental engineering. Either option must be approved by the student’s major professor.
DOCTOR OF PHILOSOPHY

CIVIL ENGINEERING MAJOR

A graduate program leading to the Doctor of Philosophy is offered with a major in civil engineering. It is required that all applicants to the degree programs submit scores from the General Graduate Record Examination (GRE). Specific departmental requirements for the PhD include the following.

- A minimum of 72 semester hours beyond the bachelor’s degree, exclusive of credit for the MS thesis. Of this number, a minimum of 24 hours in 600 Doctoral Research and Dissertation will be required. It is expected that the research work will be in journal publication form prior to approval of the dissertation.
- A minimum of 18 semester hours of graduate courses in civil engineering or environmental engineering, exclusive of thesis or dissertation credit, at least 6 hours of which must be 600-level courses.
- Additional coursework in civil engineering, environmental engineering, or related scientific and engineering fields, amounting to a minimum of 18 semester hours, subject to approval by the student’s faculty committee. These related fields will normally include such disciplines as mechanics, chemistry, mathematics, microbiology, physics, and other engineering fields. A minimum of 6 semester hours of mathematics will be required beyond the civil engineering undergraduate requirements.
- At the discretion of the student’s dissertation committee and depending on the student’s background, more than 36 hours of courses may be required.
- A maximum of 24 course hours from the master’s degree may be used to satisfy the course requirements for the PhD.
- One foreign language if the student’s faculty committee feels that a reading knowledge of a foreign language is crucial to the student’s research efforts.
- Upon completion of at least one-half of all coursework, each student must pass a comprehensive examination.

After completion of the dissertation, prior to graduation, each student must pass a dissertation defense examination administered by a faculty committee.

Environmental Policy Minor

The department participates in a program designed to give graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. See Department of Political Science for program description.
The departmental graduate committee is responsible for administering, promoting, and advancing the general well being of the graduate program. Departmental actions regarding a graduate student may be appealed in writing, first to the departmental graduate committee and then to the department faculty.

The requirements outlined below apply to graduate degrees in both electrical engineering and computer engineering. The research project emphasis and/or the specific courses taken will determine the actual degree awarded.

**MASTER OF SCIENCE**  
**COMPUTER ENGINEERING MAJOR**  
**ELECTRICAL ENGINEERING MAJOR**

Graduate work leading to the Master of Science with a major in electrical engineering or computer engineering may be completed during three semesters of full-time study or two to three years of part-time study.

**Admission**

Applicants for admission to the MS program are expected to have completed a bachelor’s degree in electrical engineering or computer engineering with an average of at least 3.00 out of 4.00, both overall and in the senior year. In addition, all applicants are required to submit scores from the general Graduate Record Examination (GRE). Applicants whose native language is not English, including those who have earned degrees at U.S. institutions, must score at least 213 on the computer-based TOEFL exam, 550 on the written exam, or 80 on the Internet-based Test to be considered for admission to the program.

Applicants who hold the bachelor’s degree in other fields of engineering, computer science, mathematics, or the physical sciences are also expected to have a minimum cumulative grade-point average of 3.00 and a minimum senior year average of 3.00 in that field. The department will require that selected undergraduate courses be taken as determined by the applicant's prior education and experience. The student will be admitted under non-degree status until the required undergraduate courses are successfully completed with a 3.00 average.

**Requirements**

Students may choose between a thesis option, a non-thesis course-only option, and a non-thesis project option MS program. All students must file a Master’s Program Plan with the departmental graduate committee specifying which option they have selected, a semester-by-semester schedule of the courses they intend to take, and the members of the student’s master’s committee. Students may change between options one time by filing an amended Master’s Program Plan and with approval of the departmental graduate committee. A student who receives financial support under a research assistantship is enrolled in the thesis option by default. Students who have held a research assistantship will require approval from the departmental graduate committee to change to one of the non-thesis options. Candidates for the MS with a major in computer engineering are required to take at least two courses from the electrical and computer engineering 500-level series as part of their curriculum.

**Thesis Option (30 hours)**

- 6 semester hours of mathematics at the 400-level or above, selected from a list approved by the graduate committee; or 6 semester hours of ECE courses at the 500 level or above; or 6 semester hours of non-ECE courses approved by the student’s master committee and the graduate committee.
- An additional 18 semester hours of 400-level or above work in electrical and computer engineering, with at least 6 hours of 500-level or 600-level work in each of two areas of electrical and computer engineering.
- Master’s thesis, totaling 6 hours.
- A final oral examination covering the thesis and related coursework.

**Non-Thesis Courses Only Option (30 hours)**

- An additional 24 semester hours of 400-level or above work in electrical engineering or computer engineering with 18 of the hours at the 500-level or 600-level. Of the 18 hours required at the graduate level, at least 6 must be in each of two areas of electrical engineering or computer engineering and an additional 6 hours outside of the two areas.
- A final comprehensive written examination. This examination will be given in January and August.

**Non-Thesis Project Option (30 hours)**

- An additional 21 semester hours of 400-level or above work in electrical engineering or computer engineering, with 15 of the hours at the 500-level or 600-level. Of the 15 hours required at the graduate level, at least 6 must be in each of two areas of electrical engineering or computer engineering and an additional 3 hours of work outside of the two areas.
- ECE 501 (Project in Lieu of Thesis) with a minimum grade of B. This course will be administered by the student’s master’s committee. A written project proposal describing what the student will do in the course must be submitted in advance for the graduate committee’s approval. A written final report and oral presentation is required and one copy of the final draft must be submitted to the graduate committee.
- A final written and oral examination covering the project and related coursework.

*NOTE: At least two thirds of the minimum required hours must be taken in courses numbered at or above the 500 level.

**DUAL MS-MBA**  
**Computer Engineering Major • Electrical Engineering Major**

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<tr>
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<td>Mechanical Engineering 504</td>
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142 COLLEGE OF ENGINEERING
DOCTOR OF PHILOSOPHY
COMPUTER ENGINEERING MAJOR
ELECTRICAL ENGINEERING MAJOR

The PhD is offered with a major in computer engineering or electrical engineering. Exceptional students holding the bachelor’s degree may be admitted to the doctoral program without first obtaining a master’s degree. Candidates holding the MS must satisfy requirements 2 through 7 below while candidates holding only the BS must satisfy requirements 1 through 7.

Applications are required to submit scores from the general Graduate Record Examination (GRE). A TOEFL score of 550 on the written exam, 213 on the computer exam, or 80 on the Internet-based Test is required for non-native speakers of English, including those who have earned degrees at U.S. institutions. Specific departmental requirements for the PhD include the following.

1. For students holding only a BS, a minimum of 48 course hours is required. Exceptional PhD students may request that course hour requirements of 48 hours beyond the BS degree be reduced to a lesser number, but not less than 39 hours beyond the BS. Request for this reduction is to be initiated by the student’s PhD dissertation committee. The student’s major professor, with the concurrence of the dissertation committee, will prepare a curriculum plan showing exactly what courses will be taken and provide a justification as to why a reduced course hour requirement is appropriate. The request will be submitted to the Graduate Committee for approval. The Graduate Committee may approve/deny or modify the requested reduction. Any reduction in course hours granted will be contingent upon successful completion of all other PhD requirements under the supervision of the major professor and dissertation committee in place at the time of the request for reduction in course hour requirements. An approved reduction in course hour requirement will be automatically rescinded, unless reinstated by the Graduate Committee, if the student makes a subsequent change in the dissertation committee. The minimum dissertation hours required of students receiving approval for reduced course hours (normally 24) will be increased by exactly the amount of the reduction in required course hours. The first 24 hours should satisfy
   a. 6 semester hours of mathematics at the 400-level* or above, selected from a list approved by the graduate committee; or 6 semester hours of ECE courses at the 500 level or above; or 6 semester hours of non-ECE courses approved by the student’s major committee and the graduate committee.
   b. An additional 18 semester hours of 400-level* or above work in electrical and computer engineering, with at least 6 hours of 500-level or 600-level work in each of two areas of electrical and computer engineering.

In addition, the student must satisfy requirements 2 through 7 below.

2. For students holding an MS, a minimum of 24 semester hours of coursework, excluding research and dissertation credit or seminar courses, must be taken at the University of Tennessee, Knoxville. These hours must include the following.
   a. A minimum of 12 semester hours in electrical and computer engineering at the 500 and 600 levels.
   b. A minimum of 9 semester hours of 600-level coursework. At least 3 hours of this work must be in an area other than the student’s major area.
   c. A minimum of 6 hours of mathematics at the 500-level or above and approved by the departmental graduate committee.

3. Satisfactory performance on a qualifying examination. Separate qualifying examinations are offered for electrical engineering and for computer engineering. The qualifying examination is prepared by the electrical and computer engineering faculty and consists of two 4-hour written examinations covering courses required in the undergraduate electrical and computer engineering curriculum through the junior level. The qualifying examination is offered twice each year (January and August), and a student is to take it the first time it is offered after the student enrolls in the program. A student who fails the qualifying examination must take and pass the examination the next time it is offered to remain in the program. A minimum of 12 hours of coursework must be completed after the student has taken the qualifying examination the first time.

4. Satisfactory performance on a comprehensive examination administered by the student’s committee. The exam results are reported to the graduate committee for approval and the exam is filed in the department. The comprehensive exam is given when the student is ready to apply for admission to candidacy. The comprehensive examination consists of both written and oral parts. The written part consists of a complete review of the literature in the student’s dissertation topic and a review of the major tools to be used in the dissertation work. The student’s committee may require additional written sections. The student must demonstrate a mastery of the dissertation area, ability to think analytically and creatively, skill in using academic resources, and ability to complete the dissertation satisfactorily. The oral part of the comprehensive examination consists primarily of a professional presentation of a proposal for dissertation work and its defense. The committee may cover additional topics in the oral part.

5. Participation in departmental seminars.


7. Successful public defense of the dissertation by the student.

*NOTE: At least two thirds of the minimum required hours must be taken in courses numbered at or above the 500 level.

DEPARTMENT OF INDUSTRIAL AND INFORMATION ENGINEERING
http://www.engr.utk.edu/ie/
Alberto Garcia, Interim Head
Rupy Sawhney, Graduate Liaison

Professors
Ding, F., PhD .................................................. North Carolina State
Garcia, A. (Associate Dean),
PhD .................................................. University of Illinois at Urbana-Champaign
Garrison, G.W. (UTSI), PhD ................................ North Carolina State

Associate Professors
Aikens III, C.H., PhD ........................................... Tennessee
Jackson, D.F., PhD, PE ..................................... Tennessee
Sawhney, R.S., PhD ........................................... Tennessee

Assistant Professors
Ford, R.E., PhD ........................................... Tennessee
Jeong, M.K., PhD ........................................ Georgia Tech
Kim, D., PhD ............................................ Florida

Research Faculty and Staff
Halstead, P.D., BS ........................................ State University of New York
Admission

Applicants must first submit a formal Graduate Application for Admission. In addition to the minimum requirements of the Graduate Council, the Department of Industrial and Information Engineering requires:

- Three rating forms or letters of reference.
- GRE scores.
- Essay (two double-spaced pages – contact department for current topic).

The Departmental Graduate Committee sets any prerequisite courses or other measures that apply to the particular situation of the applicant. The department and the Office of Graduate and International Admissions must be notified of any change in the entering date after admission has been granted.

MASTER OF SCIENCE INDUSTRIAL ENGINEERING MAJOR

Students who enroll in the Master of Science program may select a concentration in engineering management, human factors engineering, manufacturing systems engineering, product development and manufacturing or traditional industrial engineering. Each of these concentrations, with the exception of the product development and manufacturing, allows a student to select either a thesis or non-thesis option. Students who select the manufacturing systems engineering concentration of the dual degree program must select the non-thesis option. The thesis option requires 27 hours of coursework and 6 hours thesis. The non-thesis option requires 30 hours of coursework and a 3-hour design project. The engineering management concentration requires an additional 3 hours.

INDUSTRIAL ENGINEERING CONCENTRATION

Depending upon a student’s background and career objectives, graduate work in industrial engineering enables the student to select an area of specialization from operations research, human factors engineering, information systems engineering, maintenance and reliability engineering, or general industrial engineering.

INFORMATION ENGINEERING CONCENTRATION

Information engineering is concerned with the specification, design, implementation and management of data- and knowledge-intensive information systems. The engineering of large-scale information systems requires knowledge and practical experience in areas such as database management systems, data modeling, information optimization, knowledge acquisition, data/knowledge representation, software systems engineering, and network design and management.

ENGINEERING MANAGEMENT CONCENTRATION

The engineering management concentration has an additional admission requirement of two years relevant experience as a practicing engineer or scientist. This concentration is fully supported off-campus, utilizing electronic media for videotaping and interactive distance teaching methods.

HUMAN FACTORS ENGINEERING CONCENTRATION

Human factors engineering is concerned with ways of designing jobs, machines, operations, and work environments so they are compatible with human capacities and limitations. The human factors practitioner, operating within an industrial or service environment, is called upon both to apply existing human performance knowledge to the design or modification of work and workplaces and also to generate new experimental data required for system design and evaluation.

MANUFACTURING SYSTEMS ENGINEERING CONCENTRATION

Under the manufacturing systems engineering concentration, students learn strategies for improving product quality, implementing various production strategies, analysis of production planning and scheduling systems, and supplier and distribution integration. Dual degree students can select manufacturing systems engineering as an option.

PRODUCT DEVELOPMENT AND MANUFACTURING CONCENTRATION

The product development and manufacturing concentration is a non-thesis option, available only to students taking the dual MS-MBA program.

DUAL MS-MBA

*Industrial Engineering Major • Manufacturing Systems Engineering • Product Development and Manufacturing Concentrations*

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<th>Hours Credit</th>
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<td>Business Administration 511 MBA Core I</td>
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DOCTOR OF PHILOSOPHY
INDUSTRIAL ENGINEERING MAJOR

Admission

Admission to the PhD program requires an undergraduate degree and academic background that meets the admission criteria for the master’s program in industrial engineering or a master’s degree in industrial engineering (or a closely related field), and previous academic performance that clearly demonstrates the capacity to do original research and technical investigative work and the potential for a successful scholarly career. If admitted, prerequisites (if required) will be established by the graduate committee based on the student’s academic background. All students are required to take the Graduate Record Examinations (GRE) and submit three letters of reference and a personal statement about their professional goals. International students are also required to take the Test of English as a Foreign Language (TOEFL).

Requirements

The total program of study requires a minimum of 72 graduate hours beyond the bachelor’s degree, exclusive of credit for the master’s thesis. This includes a minimum of 36 graduate hours of coursework beyond the bachelor’s degree and 24-36 hours of doctoral research and dissertation work. For a master’s program completed at another institution or in another field, the requirement may exceed the 36 hours of coursework (other than research and dissertation) dependent on the previous program of study.

GRADUATE CERTIFICATE IN
ENGINEERING MANAGEMENT

The Industrial and Information Engineering Department offers a graduate certificate in engineering management. The program is designed for professionals who work in an engineering organization and are interested in improving their technical management skills and knowledge. The program consists of four graduate courses that are available through distance education.

The 12-hour graduate certificate is earned by completing Engineering Management 533, 534, 536, and 539 with a grade of B or better. The hours may be utilized toward a graduate degree later if the student meets all other degree requirements.

Applicants must meet the minimum admission requirements and be admitted to the University of Tennessee, Knoxville, Graduate School. The only academic prerequisite for the certificate program is a bachelor’s degree from a recognized university or college.

DEPARTMENT OF MATERIALS
SCIENCE AND ENGINEERING

http://www.engr.utk.edu/mse/

George M. Pharr, Head

Professors

Benson, R.S., PhD ........................................... Florida State
Bhattacharyya, S., PhD ................................. Georgia Tech
Brooks, C.R., PhD ........................................ Tennessee
Breslin, R.R., PhD ........................................ Florida State
Dahotre, N.B., PhD ...................................... Michigan State
Dhami, G., PhD ............................................ Penn State
Dahotre, N.B., PhD ...................................... Michigan State
Egami, T., PhD ............................................... Pennsylvania
George, E.P., PhD ........................................ Pennsylvania
Joy, D.C., DPhil .............................................. Oxford (UK)
Liaw, P.K., PhD ................................................. Northwestern
Liu, C.T., PhD ................................................. Brown
Lundin, C.D., PhD ......................................... Rensselaer Polytechnic Institute
McHargue, C.J., PhD .................................. Kentucky
Miller, D.C., PhD ........................................... Stanford
Pharr, G.M., PhD, PE .................................. Stanford
Simpson, M.L., PhD .................................... Tennessee
Spruiell, J.E., PhD ....................................... Tennessee
Wadsworth, J., DEng .................................... Sheffield (UK)
Wadsworth, L.C., PhD ................................... North Carolina State

Associate Professors

Kit, K., PhD ................................................ Delaware
Meek, T.T., PhD ........................................... Ohio State
Morris, J.R., PhD .......................................... Cornell
Rack, P.D., PhD ........................................... Florida

Assistant Professors

Choo, H., PhD .............................................. Illinois Institute of Technology
Gao, Y., PhD ................................................ Princeton
Hu, B., PhD ................................................ Chinese Academy of Sciences
Keppens, V., PhD ..................................... Katholieke Universiteit Leuven (Belgium)
Rawn, C.J., PhD ........................................... Arizona

Emeriti Faculty

Brooks, C.R., PhD ........................................ Tennessee
Fellers, J.F., PhD .......................................... Akron
Hansen, M.G., PhD ....................................... Wisconsin

MAJORS DEGREES

Materials Science and Engineering

MS, PhD

Polymers concentration
Textiles concentration

Polymer Engineering

MS, PhD

Polymer processing concentration
Polymer science concentration
Textile science concentration

Graduate programs are offered leading to the degrees of Master of Science and Doctor of Philosophy with a major in materials science and engineering or polymer engineering. Both the materials science and engineering and polymer engineering programs are flexible and interdisciplinary in nature. Students may be admitted from a wide range of disciplines. These include physics, chemistry, chemical engineering, mechanical engineering, electrical engineering, materials engineering, and engineering science programs.

The materials science and engineering concentrations offer specializations to include, but not limited to, ceramics, composites, electronic materials, physical metallurgy, materials processing, welding metallurgy and materials joining, corrosion science and engineering, biomedical materials, nanowovens science and technology, mechanical and physical behaviors of materials, and nanoscience and technology.

The polymer engineering concentrations offer specialty areas in rheology; polymer morphology; mechanical, physical, and chemical behaviors of polymers; composite materials; and nanowovens science and technology.

Admission

Applicants for admission to the MS and PhD programs in materials science and engineering and polymer engineering are expected to have completed a bachelor’s degree in an area of engineering or science with a grade-point-average of at least 3.00 out of 4.00 both overall and in the senior year. In addition, all applicants must submit scores from the general Graduate Record Examination (GRE). Applicants whose native language is not English must score at least 213 on the computer-based TOEFL examination, 550 on the written examination, or 80 on the Internet-based Test to be considered for admission to the programs.
MASTER OF SCIENCE
MATERIALS SCIENCE AND ENGINEERING MAJOR

POLYMER ENGINEERING MAJOR

Thesis Option
A total of 30 hours is required for the MS with a major in either materials science and engineering or polymer engineering. Additional requirements include the following.

- A major consisting of 12 hours of graduate courses in materials science and engineering or polymer engineering. The materials science and engineering major must include 511, 512, 515, and 516 for the metallurgy concentration; 511, 512, 540, and 541 for the polymers concentration; 511, 512, 540, 552, and 553 for the textiles concentration; 511, 512, and two graduate specialization courses approved by the student's faculty committee for the materials concentration; and 511, 512 and two courses from the approved nanomaterials specialization list for the nanomaterials concentration.

- Additional courses up to 12 hours total in related areas.

- Master's thesis 500, totaling 6 to 12 hours.

- Satisfactory performance on a comprehensive oral examination administered by the faculty committee.

All resident students are required to participate in the graduate seminar in materials science and engineering or polymer engineering, as appropriate, during each semester in which it is offered. Three hours of Materials Science and Engineering 503 or 504 may be counted toward degree requirements. The polymer engineering major must include 540, 541, 543, 546, 549, and 550 for the polymer processing and polymer science concentrations; and 540, 541 or 543, 549, 550, 552, and 553 for the textile science concentration; exceptions are given if similar material has been covered in prior coursework.

- Completion of a total of 30 hours of graduate coursework. At least 18 of those hours must be in the department and up to 12 hours may be in related areas. Three hours of Materials Science and Engineering 503 or 504 may be counted toward degree requirements. The materials science and engineering major and the polymer engineering major must include the same courses required for the thesis option. The faculty committee must approve the candidate's degree program.

- Satisfactory completion of Materials Science and Engineering 580 (Critical Review) as a culminating experience. This course shall include a comprehensive examination administered by the faculty committee.

Non-Thesis Option
Any candidate may apply for a non-thesis option. Upon acceptance, a supervisory committee of three will be appointed. At least two members of the committee will be from the faculty in the major area, either materials science and engineering or polymer engineering. The requirements for completion of the non-thesis option are as follows.

- Completion of a total of 30 hours of graduate coursework. At least 18 of those hours must be in the department and up to 12 hours may be in related areas. Three hours of Materials Science and Engineering 503 or 504 may be counted toward degree requirements. The materials science and engineering major and the polymer engineering major must include the same courses required for the thesis option. The faculty committee must approve the candidate's degree program.

- Satisfactory completion of Materials Science and Engineering 580 (Critical Review) as a culminating experience. This course shall include a comprehensive examination administered by the faculty committee.

DOCTOR OF PHILOSOPHY
MATERIALS SCIENCE AND ENGINEERING MAJOR

POLYMER ENGINEERING MAJOR

After one year in residence and with the approval of the faculty, a student may proceed directly to the doctoral program without completion of a master's degree.

Requirements
Departmental requirements for completion of the doctoral degree are as follows.

- Satisfactory performance on the applicable comprehensive examination.

- Active participation in graduate seminars conducted by the department.

- For students proceeding directly to the PhD from the baccalaureate degree, a minimum of 72 graduate hours is required. These hours must include 42 graduate course hours with at least 6 hours of 600-level courses and 30 hours of dissertation. Six hours of Materials Science and Engineering 503 or 504 may be counted toward degree requirements. At least 24 hours must be courses taught in the department. The materials science and engineering major and the polymer engineering major must include the courses required for the master's program. For students in the nanomaterials concentration at least 12 hours of coursework must be from the approved nanomaterials specialization list. In addition, for students in the textile science concentration of the polymer engineering major, the courses must include 541 and 543.

- For students having a thesis-based master's degree from UT in materials science and engineering or polymer engineering or a master's degree from another university in materials science and engineering, polymer engineering, or metallurgical engineering, a minimum of 48 graduate hours is required. These hours must include 18 hours of graduate coursework with at least 6 hours of 600-level courses and 30 hours of dissertation. Three hours of Materials Science and Engineering 503 or 504 may be counted toward degree requirements. For students in the nanomaterials concentration at least 12 hours of coursework must be from the approved nanomaterials specialization list. At least 12 hours must be courses in the department.

DUAL MS-MBA
Materials Science and Engineering Major

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<th>Hours</th>
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</table>

1 Approved related-area courses for the MSE non-thesis Master of Science requirements.
2 Departmental/Engineering Courses must fulfill MSE non-thesis Masters of Science requirements.
3 MSE 594 is an approved substitute for MSE 580 for the dual degree program.
DEPARTMENT OF MECHANICAL, AEROSPACE, AND BIOMEDICAL ENGINEERING

http://www.engr.utk.edu/mabe/

William R. Hamel, Head
Gary V. Smith, Graduate Liaison

Professors
Antar, B.N. (UTSI), PhD ............................................. Texas
Ariribili, R.V., PhD ..................................................... Virginia Tech
Baker, A.J., PhD, PE ..................................................... New York
Dareing, D.W., PhD, PE ............................................. Illinois
Flandro, G.A. (UTSI), PhD .......................................... Cal Tech
Frankel, J.I., PhD ....................................................... Virginia Tech
Hamel, W.R., PhD ........................................................ Tennessee
Jendrucko, R.J., PhD, PE ............................................. Virginia
Keyhani, M., PhD ......................................................... Ohio State
Kihn, K.D., PhD ........................................................... Stanford
Komistek, R.D., PhD ..................................................... Memphis
Landes, J.D., PhD, PE .................................................... Lehigh
Majdalani, J.C. (UTSI), PhD ......................................... Utah
Parang, M. (Associate Dean), PhD, PE ........................... Oklahoma
Parsons, J.R., PhD, PE ............................................. North Carolina State
Schulz, R.J. (UTSI), PhD ........................................... Tennessee
Smith, G.V., PhD, PE ..................................................... Penn State
Sollman, O., PhD, PE ....................................................... Tennessee
Steinhoff, J.S. (UTSI), PhD ........................................... Chicago
Vakili, A. (UTSI), PhD .............................................. Tennessee
Wasserman, J.F., PhD, PE ........................................... Cincinnati

Associate Professors
Boulet, J.A.M., PhD ...................................................... Stanford
Chellaboina, V.S., PhD .................................................. Georgia Tech
Lin, C.X., PhD .............................................................. Chongqing (People’s Republic of China)
Lynne, J.E., MD, PhD .................................................. North Carolina State
Madhukar, M.S., PhD .................................................. Drexel
Moulden, T.H. (UTSI), PhD ........................................... Tennessee
Nguyen, K., PhD ........................................................ Colorado
Pionke, C.D., PhD, PE ...................................................... Georgia Tech

Assistant Professors
DeSmidt, H.A., PhD ...................................................... Penn State
English, A., PhD ........................................................... Harvard-MIT
Karpov, E.G., PhD ....................................................... Southampton (UK)
Lee, D., PhD ................................................................. Minnesota
Mahfouz, M.R., PhD ..................................................... Colorado School of Mines

Emeriti Faculty
Carley, T.G., PhD, PE .................................................... Illinois
Forrester, J.H., PhD, PE ................................................ Iowa State
Hodgson, J., PhD, PE ..................................................... Georgia Tech
Johnson, W.S., PhD, PE ................................................... Clemson
Mathew, A., PhD, PE ...................................................... Illinois
Milligan, M.W., PhD, PE ........................................... Tennessee
Shannon, T.E., PhD, PE ................................................ Tennessee
Snyder, W.T., PhD ....................................................... Northwestern

MAJORS

Aerospace Engineering ................................................ MS, PhD

Aerodynamics concentration
Aerodynamics and performance concentration
Energy conversion and utilization concentration
Flight and aerospace mechanics concentration
Gas dynamics concentration
Heat transfer and fluid mechanics concentration

Propulsion concentration
Space engineering concentration
Structures and stress analysis concentration
Thermodynamics concentration

Aerospace Engineering ................................................ MS-MBA

Biological Engineering ................................................. MS, PhD

Biofluid mechanics concentration
Bioimaging concentration
Biomedical engineering concentration
Biological engineering concentration
Biofluid mechanics concentration

Biomedical Engineering ................................................ MS-MBA

Medical Engineering .................................................... MS

Dynamics, control, and robotics concentration
Energy conversion and utilization concentration
Gas dynamics concentration
Heat transfer and fluid mechanics concentration
Machine design concentration
Power generation concentration
Product development and manufacturing concentration
Propulsion concentration
Space engineering concentration
Stress analysis concentration
Thermodynamics concentration

Mechanical Engineering ................................................. MS-MBA

Medical Engineering .................................................... PhD

Dynamics, control, and robotics concentration
Energy conversion and utilization concentration
Gas dynamics concentration
Heat transfer and fluid mechanics concentration
Machine design concentration
Power generation concentration
Propulsion concentration
Space engineering concentration
Stress analysis concentration
Thermodynamics concentration

Reliability and Maintainability Engineering ....................... MS

Aerospace engineering concentration
Biomedical engineering concentration
Mechanical engineering concentration

Graduate Certificate Program

Computational fluid mechanics

Graduate programs leading to the Master of Science and Doctor of Philosophy are available with majors in mechanical engineering, aerospace engineering, biomedical engineering, and engineering science. Changing from one of these programs to another requires departmental approval. Each applicant is advised as to any prerequisite courses before entering a program. A dual MS-MBA program with a concentration in product development and manufacturing is also available with a major in mechanical engineering or in engineering science.

Within the engineering science concentrations interdisciplinary programs are arranged to meet individual needs or interests. The flexibility and interdisciplinary aspect of the program
concentrations are intended to be of particular interest to prospective students currently employed in research, development, or design activities and whose interests in continuing education (either full-time or part-time) lie at one of the interfaces between science and engineering or can best be met by interdisciplinary study in engineering. The program’s course offerings and research activities are also intended to meet the needs of students who seek preparation for employment in engineering areas requiring specialization in mechanics or in related interdisciplinary studies such as bio-mechanics.

In mechanical engineering or aerospace engineering, entrance into the Master of Science program is available to qualified students in the department. Such students should have completed a significant number of courses in mechanical or aerospace engineering and to qualified graduates of other curricula who satisfy the necessary prerequisites. A program application is required in addition to the Graduate Application for Admission. Admission into the doctoral program will be granted to those applicants who have demonstrated superior achievement in their engineering backgrounds. The general GRE is required of all applicants for admission.

In biomedical engineering, entrance into the graduate program is available to graduates of recognized curricula in engineering, mathematics, or one of the physical sciences who satisfy the necessary prerequisites. A program application is required in addition to the Graduate Application for Admission. The names and addresses of three references must be included with the program application. The general GRE is required of all applicants for admission.

In engineering science, entrance into the graduate program is available to graduates of recognized curricula in engineering, mathematics, or one of the physical or biological sciences. A program application is required in addition to the Graduate Application for Admission. The names and addresses of four references must be included with the program application. The general GRE is required of all applicants for admission.

Each student must satisfactorily complete a program of study that has been approved by his/her advisory committee and complies with the requirements of the Graduate Council. In engineering science, the student’s major professor may be selected from a department other than the Department of Mechanical, Aerospace, and Biomedical Engineering; however, at least one member of the student’s graduate advisory committee must be on the faculty of the Department of Mechanical, Aerospace, and Biomedical Engineering.

Graduate Credit for Undergraduate Courses

Students majoring in mechanical engineering or aerospace engineering may not normally use more than one 400-level engineering course to meet their advanced degree requirements. Undergraduate courses that are required for the bachelor’s degree in mechanical engineering may not be taken for graduate credit by graduate students in mechanical engineering. Undergraduate courses that are required for the bachelor’s degree in aerospace engineering may not be taken for graduate credit by graduate students in aerospace engineering. For students majoring in engineering science, 400-level graduate courses in engineering may be used to meet requirements at the discretion of the advising committee. However, at least two-thirds of the minimum required hours in a master’s degree program must be at or above the 500-level. With the approval of the student’s major department, a student whose major is outside the Department of Mechanical, Aerospace, and Biomedical Engineering may take 400-level graduate courses in the department. Such students should consult with instructors regarding prerequisites for undergraduate courses.

MASTER OF SCIENCE

AEROSPACE ENGINEERING MAJOR

BIOMEDICAL ENGINEERING MAJOR

ENGINEERING SCIENCE MAJOR

MECHANICAL ENGINEERING MAJOR

Requirements

In aerospace engineering, mechanical engineering, biomedical engineering, and engineering science, two MS options are offered. Option I requires a thesis and is the normal program for graduate students. Option II does not require a thesis and provides graduate students, including co-op and other off-campus students, the opportunity to focus their programs in special areas through extended coursework.

**Aerospace Engineering Major • Mechanical Engineering Major • Option I (Thesis)**

<table>
<thead>
<tr>
<th>Hours Credit</th>
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</thead>
<tbody>
<tr>
<td>1 Coursework total ...................................... 24</td>
</tr>
<tr>
<td>Thesis ....................................................... 6</td>
</tr>
<tr>
<td>Total 30</td>
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</tbody>
</table>

**Aerospace Engineering Major • Option II (Non-Thesis)**

<table>
<thead>
<tr>
<th>Hours Credit</th>
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</thead>
<tbody>
<tr>
<td>1 Coursework total ...................................... 24</td>
</tr>
<tr>
<td>590 Selected Engineering Problems ..................... 6</td>
</tr>
<tr>
<td>Total 30</td>
</tr>
</tbody>
</table>

**Biomedical Engineering Major • Option I (Thesis)**

<table>
<thead>
<tr>
<th>Hours Credit</th>
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</thead>
<tbody>
<tr>
<td>1 Coursework total ...................................... 24</td>
</tr>
<tr>
<td>Thesis ....................................................... 6</td>
</tr>
<tr>
<td>Total 30</td>
</tr>
</tbody>
</table>

**Biomedical Engineering Major • Option II (Non-Thesis)**

<table>
<thead>
<tr>
<th>Hours Credit</th>
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</thead>
<tbody>
<tr>
<td>1 Coursework total ...................................... 24</td>
</tr>
<tr>
<td>590 Selected Engineering Problems ..................... 6</td>
</tr>
<tr>
<td>Total 30</td>
</tr>
</tbody>
</table>

**Engineering Science Major • Option I (Thesis)**

<table>
<thead>
<tr>
<th>Hours Credit</th>
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</thead>
<tbody>
<tr>
<td>1 Coursework total ...................................... 24</td>
</tr>
<tr>
<td>Thesis ....................................................... 6</td>
</tr>
<tr>
<td>Total 30</td>
</tr>
</tbody>
</table>

**Engineering Science Major • Option II (Non-Thesis)**

<table>
<thead>
<tr>
<th>Hours Credit</th>
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</thead>
<tbody>
<tr>
<td>1 Coursework total ...................................... 24</td>
</tr>
<tr>
<td>Selected Engineering Problems ........................ 6</td>
</tr>
<tr>
<td>Total 30</td>
</tr>
</tbody>
</table>
For all program options, other 500-level engineering courses that are approved by the student’s master’s committee and the graduate programs committee may be substituted for the mathematics courses. All program options require participation in the departmental graduate seminars program and passing a final examination on all work submitted for the degree. The final examinations in Option II (non-thesis) will cover all coursework. The thesis option, Option I, requires submission and defense of a written thesis that demonstrates the ability to conduct and report an independent investigation.

**DUAL MS-MBA**

**Aerospace Engineering Major**

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>August – First Year</th>
<th>Fall – First Year</th>
<th>Spring</th>
<th>Summer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Business Administration 511 MBA Core I</td>
<td>Business Administration 512 MBA Core II</td>
<td>Business Administration 513 MBA Core III</td>
<td>Internship</td>
</tr>
<tr>
<td>3</td>
<td>15</td>
<td>9</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

**Fall – Second Year**

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Aerospace Engineering 509</th>
<th>Mechanical Engineering 506</th>
<th>Mechanical Engineering 508</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Summer (first session)**

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Mechanical Engineering 594</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td></td>
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</tbody>
</table>

**Total 60**

**Mechanical Engineering Major**

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>August – First Year</th>
<th>Fall – First Year</th>
<th>Spring</th>
<th>Summer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Business Administration 511 MBA Core I</td>
<td>Business Administration 512 MBA Core II</td>
<td>Business Administration 513 MBA Core III</td>
<td>Internship</td>
</tr>
<tr>
<td>3</td>
<td>15</td>
<td>9</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

**Fall – Second Year**

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Mechanical Engineering 509</th>
<th>Departmental/Engineering Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9</td>
<td></td>
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</tbody>
</table>

**Summer (first session)**

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Mechanical Engineering 594</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td></td>
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</table>

**Total 60**

**Biomedical Engineering Major**

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>August – First Year</th>
<th>Fall – First Year</th>
<th>Spring</th>
<th>Summer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Business Administration 511 MBA Core I</td>
<td>Business Administration 512 MBA Core II</td>
<td>Business Administration 513 MBA Core III</td>
<td>Internship</td>
</tr>
<tr>
<td>3</td>
<td>15</td>
<td>9</td>
<td>1</td>
<td>1</td>
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</tbody>
</table>

**Fall – Second Year**

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Biomedical Engineering 509</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
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</tbody>
</table>

**Spring**

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>MBA Hub Course Elective</th>
<th>Mechanical Engineering 509</th>
<th>Departmental/Engineering Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>1</td>
<td>9</td>
<td></td>
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</tbody>
</table>

**Summer (first session)**

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Mechanical Engineering 594</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td></td>
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</tbody>
</table>

**Total 60**

Dual degree candidates enrolled in engineering science are required to take 18 hours of graduate-level engineering courses during the second year of the program. This program requires a coursework plan, approved by the Dual Program Committee, including a concentration such that the student can accomplish his/her teamwork assignments.
DOCTOR OF PHILOSOPHY
AEROSPACE ENGINEERING MAJOR
BIOMEDICAL ENGINEERING MAJOR
ENGINEERING SCIENCE MAJOR
MECHANICAL ENGINEERING MAJOR
Requirements

All students must complete a minimum of 72 semester hours beyond the bachelor’s degree, exclusive of credit for the master’s thesis. These shall include a minimum of 24 hours in Doctoral Research and Dissertation and a minimum of 48 semester hours in other courses.

In mechanical engineering, aerospace engineering, or biomedical engineering, the courses must include the following.

- A minimum of 12 semester hours of graduate credit in mathematics courses numbered 400 or above with a minimum of 6 hours numbered 500 or above.
- A minimum of 24 semester hours in the department in courses numbered 500 and above, with at least 12 of these hours in the major. A minimum of 9 semester hours of courses is required at the 600 level. These are exclusive of thesis, problems, or dissertation credit. The student’s advisory committee can approve a student's petition to replace one 600-level course with one or more 500-level course(s) that are more appropriate.

In engineering science, the courses must include the following.

- A minimum of 24 semester hours in engineering graduate courses, exclusive of thesis and dissertation credit. These courses will normally be numbered 500 and above, with at least 9 semester hours of 600-level courses, which constitute one or two areas of concentration selected by the student. The number of courses in this group to be taken will depend on the program selected by the student and the approval of his/her advisory committee.
- A minimum of 12 semester hours in mathematics or computer science in courses numbered 400 and above, exclusive of a first course in ordinary differential equations.

Additional requirements for all students include the following.

- Registration and participation in the graduate seminar in the major program.
- Meet all departmental examination requirements, which include passing a written and oral comprehensive examination.
- Presentation of a dissertation proposal to the student’s advisory committee and approval of that proposal by that committee.
- Successful defense of the dissertation.

GRADUATE CERTIFICATE IN COMPUTATIONAL FLUID DYNAMICS

The College of Engineering offers a graduate certificate in computational fluid dynamics (CFD). The program is designed primarily for the part-time student interested in gaining dexterity in this subject by taking a course sequence through distance education. All coursework is permanently archived at the College of Engineering Computational Fluid Dynamics Laboratory Web site, hence available on demand on a totally flexible schedule. The certificate is earned by completing the three courses, Engineering Science 551, 552, and 581 (CFD Laboratory), which are extensively cross-listed among departments in the College of Engineering. The certificate is completed with one elective 3-hour course from an approved list. Those currently approved are Chemical Engineering 507 and Electrical and Computer Engineering 599 (Computer Fire Modeling). A wider selection of courses will be added when they become available.
Graduate Credit for Undergraduate Courses

400-level courses in nuclear engineering may be used for graduate credit. However, at least two-thirds of the minimum required hours in the MS must be taken in courses numbered 500 or above.

MASTER OF SCIENCE
NUCLEAR ENGINEERING MAJOR

A graduate program leading to the Master of Science degree is available to graduates of recognized undergraduate curricula as described above. Each applicant will be advised as to the necessary prerequisite courses before he/she enters the program.

Requirements

The minimum requirements for the MS in nuclear engineering are:

- A major consisting of 12 hours of graduate courses in nuclear engineering which must include at least one of the following sequences – 511, 512; 521, 522; 551, 552; 571, 572; 581, 582.
- A minor consisting of 6 hours of elective courses in mathematics, statistics, or another field related to nuclear engineering.
- 6 hours in either nuclear engineering or a related field.
- One of the following four options for a culminating experience.
  - Option 1 – a thesis project (6 hours of 500).
  - Option 2 – two to four engineering practice projects (6 hours of 598).
  - Option 3 – one engineering practice project (3 hours of 598) plus 6 hours of additional nuclear engineering coursework.
  - Option 4 – nine hours of additional nuclear engineering coursework and a comprehensive written exam on all coursework prepared by the student’s graduate committee (i.e., no thesis or engineering practice project).

Options 1 and 2 result in a minimum total of 30 hours and Options 3 and 4 result in a minimum total of 33 hours. The determination of which option a student may undertake is made by the student’s graduate committee and is based on the student’s personal interests, academic background, and work experience, as well as the nature of projects currently available in the department.

A thesis project requires the student to conduct independent, in-depth research. An engineering practice project is similar to a thesis project but smaller in scope and can be research, design, product development, special operations, or a critical review of published literature in a specific technical area. The student must submit a brief written proposal for each project undertaken, either thesis or engineering practice, which must be approved by the student’s graduate committee. The final report for an engineering practice project is normally prepared in thesis format (i.e., according to the Graduate School, Guide to the Preparation of Theses and Dissertations); however, another formal report format may be used if approved by the student’s graduate committee. The student must also register for the appropriate number of hours of either 500 or 598, as specified by the student’s major professor, during each semester that work is performed on a thesis or engineering practice project. Finally, the student must pass an oral examination on all work presented for the degree (all coursework and all projects).

The MS with a major in nuclear engineering is also available to distance students via selected courses that are delivered synchronously over the Web to the student’s computer. More detailed information about this distance program is located at http://www.anywhere.tennessee.edu/ne/default.htm.

DUAL MS-MBA

The College of Business Administration and the College of Engineering offer an integrated program in product development and manufacturing leading to the conferral of the Master of Business Administration degree and the Master of Science degree with a major in nuclear engineering. The establishment of the dual program addresses the critical need for personnel trained in both engineering and management who can integrate an increasingly complex body of knowledge for rapid introduction of new products to the marketplace. The objective of the dual degree program is to prepare graduates to take a leading management role in companies that must react quickly to a dynamic market where forces of competition require rapid changes in design and manufacturing and a short product development cycle.

Admission

Applications are accepted for fall semester only. Applicants for the MS-MBA program must make separate application to, and be competitively and independently accepted by the Office of Graduate and International Admissions for the Master of Business Administration program and the Master of Science program with a major in nuclear engineering, and by the Dual Program Committee.

Students will initially apply for the MBA program, indicating on their application the intent to pursue the dual MS-MBA program and the appropriate engineering major (refer to the MBA program for separate instructions). Students accepted for both the MBA and the MS with a major in nuclear engineering will be assigned to a Dual Program Committee advisor (a faculty member in nuclear engineering) who will be responsible for course approval and overall supervision of the students’ progress through the dual program.

Applications by United States citizens and permanent residents received after the MBA application deadline (March 1) will be considered as space allows. Additional information is required and different application dates are established by the Office of Graduate and International Admissions for international students.

Requirements

All engineering students enrolled in the product development and manufacturing program must complete common coursework designed to provide them with an integrated, multidisciplinary teamwork experience. The MBA curriculum in product development and manufacturing consists of 33 hours of common coursework in the College of Business Administration and 15 hours of common coursework in the College of Engineering. Engineering common coursework includes a culminating 3-hour integrated project course requiring a comprehensive report, and a final examination as required by the Dual Program Committee, to be taken during the first session of summer following the second year.

During the second year, dual degree candidates will also take courses in their engineering major. The coursework is designed to provide students with a concentration in their major and advanced skills to accomplish their teamwork assignments. Dual degree candidates enrolled in nuclear engineering are required to take 18 hours of graduate-level nuclear engineering courses during the second year of the program, which must be approved by the student’s Dual Program Committee Advisor. In addition, a dual degree candidate who majors in nuclear engineering must successfully defend, in an oral examination administered by at least three nuclear engineering faculty members, the student’s Dual Program Committee Advisor, all work presented for the MS degree (all coursework and the culminating integrated project).
The dual degree candidate must satisfy the curriculum and graduation requirements of the engineering major being pursued and the College of Business Administration. Students withdrawing from the dual degree program before completing both degrees will not receive credit toward graduation in either degree program for courses taken in the other degree program, except as such courses qualify for credit without regard to the dual degree program. The MS and the MBA will be awarded upon successful completion of the requirements of the dual program.

**DOCTOR OF PHILOSOPHY**

**NUCLEAR ENGINEERING MAJOR**

Students in the field of nuclear engineering desiring to study for the Doctor of Philosophy degree must have a Bachelor of Science or Master of Science from a recognized university with a major in engineering, physics, chemistry, or mathematics. All candidates will be required to demonstrate general competence in a comprehensive examination in the areas of engineering science, mathematics, chemistry, physics, and nuclear engineering.

**Requirements**

Specific requirements for the PhD with a major in nuclear engineering include the following:

- A minimum of 48 hours beyond the bachelor's degree, exclusive of credit for the MS thesis or nuclear engineering practice.
- A minimum of 24 hours in doctoral research, Nuclear Engineering 600.
- A minimum of 30 hours in nuclear engineering courses numbered 500 and above (or the equivalent), with at least 9 hours of 600-level courses. These are exclusive of thesis or dissertation credit. Three of the 9 hours of 600-level courses can be from a department other than nuclear engineering, provided the selection supports the student's research area.
- A minimum of 12 hours in mathematics, statistics or other courses related to nuclear engineering beyond nuclear engineering undergraduate requirements numbered 400 or above.
- A minimum of 6 hours in courses numbered 500 or above from a department other than nuclear engineering. The choice depends on the student's overall program and should expand his/her knowledge in a given field.

The first part of the comprehensive examination is prepared by the nuclear engineering faculty and consists of 6 hours of written examination that is administered over a two-day period. All past written examinations are filed in the library and students are encouraged to review them. Students are invited to take the written examination after completing approximately 30 hours of graduate coursework. A student who fails the written examination must take and pass the examination the next time it is offered to remain in the PhD program. Registration for 600 is not permitted until the written examination is passed. The second part of the comprehensive examination is completed with the successful oral defense of a written dissertation proposal.

A candidate must successfully defend, in an oral examination, all work presented for the degree (all coursework and the dissertation).

**GRADUATE CERTIFICATE IN NUCLEAR CRITICALITY SAFETY**

The Department of Nuclear Engineering offers a graduate certificate in nuclear criticality safety. The program is designed primarily for part-time students. All of the courses are available through distance education (see http://www.anywhere.tennessee.edu/ne/default.htm).

The 12-hour certificate is earned by completing 421, 543, and 582 plus one of the following three courses: 470, 571, or 581. The selection of one of the latter three courses is determined through an advising conference with each individual student and is based on the student's personal interests, academic background, and work experience. Applicants must meet the minimum criteria established by the Graduate Council. Students without a nuclear engineering background must take Nuclear Engineering 301 prior to beginning the graduate coursework described above.
The University of Tennessee College of Law commenced operation in 1890 and has continuously sought to provide high-quality legal education in a university community.

The principal objective of the college is to prepare students for the practice of law. The college teaches the analytical skills needed to interpret cases and statutes, the ability to communicate effectively, an awareness of the historical growth of the law, a knowledgeable appreciation of the interrelationship of law and society, and the ability to use law as an implement of social change and development. Students are thus equipped to serve their communities not only as advocates and counselors, but as policy makers and active, responsible citizens.

The program of the college has three dimensions – teaching and learning, research into and appraisal of our legal systems and institutions, and service to the community. Each plays a significant role in the college as a modern law center.

The teaching and learning element of legal education at the college involves a co-operative classroom interaction between faculty and students in the analytical study of a host of questions and problems found in today's legal profession. These involve decisional law, statutory interpretation, administrative regulation, techniques of trial and appellate advocacy, and the roles and responsibilities of the lawyer in advising and representing clients.

The college is also directly involved in providing service to the community. A major element of public service is centered in the Legal Clinic where students, under the guidance of skilled and experienced licensed practitioners, provide legal services to clients. Additionally, through research, consultation, and other services to legal institutions and groups within the state, the college seeks to participate in the development and improvement of the society in which its students may eventually practice law.

In combination, the direction and objectives of the college lead to the development not of a narrow technician, but of a student of the law with the perspective, breadth, and understanding necessary to accomplish the many tasks assigned by society to the legal profession.
Graduate Programs

The College of Law offers the Doctor of Jurisprudence degree program; a dual degree program with the College of Business Administration leading to the JD and the Master of Business Administration degree; and a dual degree program with the Department of Political Science, College of Arts and Sciences, leading to the JD and Master of Public Administration. In addition, graduate students may be eligible to take a limited number of law courses to count toward a graduate degree.

Current information regarding admission, financial aid, course requirements, academic policies, extracurricular activities, and student services is available from the Admissions Office, The University of Tennessee College of Law, 1505 West Cumberland Avenue, Knoxville, Tennessee 37996-1810 and at the college's Web page www.law.utk.edu. Completed application should be received before February 1 of the year of requested admission.

DOCTOR OF JURISPRUDENCE

The Doctor of Jurisprudence degree will be conferred upon candidates who complete, with the required average, six semesters of resident law study and who have 89 hours of credit, including all required courses. Of the required 89 hours of credit, no more than 18 hours of credit may be earned in any combination of the following courses – 947, 993, 994, 995, 996, or 997. The required average is 2.00 and that average must be maintained on the work of all six semesters and also for the combined work of the grading periods in which the last 28 hours taken in residence were earned. Averages are computed on weighted grades. Grades are awarded on a numerical scale (in increments of 0.10) from 0.00 to 4.30. No credit toward the JD degree is awarded for grades of 0.00 to 0.70.

Eligible law students may receive up to 6 hours of credit toward the JD for acceptable performance (a grade of B or higher) in upper-level courses that materially contribute to the study of law and which are taken in other departments at the University of Tennessee, Knoxville. Course selection and registration are subject to guidelines approved by the law faculty which include the requirement that any such course be acceptable for credit toward a graduate degree in the department offering the course.

Refer to the Law Catalog and Student Handbook for current degree requirements.

CONCENTRATION IN ADVOCACY AND DISPUTE RESOLUTION

Students interested in a concentration in advocacy and dispute resolution must complete the following courses

Second Year Fall Semester – 813, 920.

Third Year (one of the following) – 905, 908 and 914 or 947. During the second and third year, any combination totaling 12 hours from the following courses – 821, 855, 877, 915, 916, 918, 921, 922, 923, 927, 990*, 991*("Only if approved by the Dean or Dean’s designee as satisfying the requirements of the concentration.

Students electing a concentration in advocacy and dispute resolution may not take any of the above courses on a S/NC basis.

CONCENTRATION IN BUSINESS TRANSACTIONS

Students interested in a concentration in business transactions must complete all of the following law courses.

818 Fundamental Concepts of Income Taxation
826 Introduction to Business Transactions*
827 Business Associations
972 Income Taxation of Business Organizations
940 Land Finance Law
840 Commercial Law
842 Contract Drafting Seminar

Students electing a concentration in business transactions may not take any of the above courses on an S/NC basis except 826.

*Dover this course is not required for students who have an undergraduate major in accounting, finance, or business administration, who hold the MBA, or who are enrolled in the dual JD-MBA program. Waivers may also be granted to students who have acquired the requisite business knowledge through other coursework or through practical experience.

DUAL JD-MBA PROGRAM

The College of Business Administration and the College of Law offer a coordinated dual program leading to the conferral of both the Doctor of Jurisprudence and the Master of Business Administration.

The establishment of the dual program recognizes the increasingly complex body of knowledge necessary to the creative conduct of business and business-related law practice, the complementary nature of many aspects of the graduate programs of the College of Law and the College of Business Administration, and the intellectual benefits inherent in the concurrent study of both business and business-related law. The program is designed to accommodate the interests of students who (a) contemplate a career in public service and want to acquire the skills and perspective of the lawyer and the business-oriented manager; (b) contemplate a career in business management and want to acquire the skills and perspective of a lawyer; or (c) contemplate a career as a lawyer specializing in business-related law and want to acquire the skills and perspective of the business-oriented manager.

Admission

Applicants for the JD-MBA program must make separate application to, and be competitively and independently accepted by, the College of Law for the JD, the Office of Graduate and International Admissions and College of Business Administration for the MBA degree, and by the Dual Program Committee.

Students who have been accepted by both colleges may apply for approval to pursue the dual program anytime prior to, or after, matriculation in either or both colleges. Such approval will be granted, provided that dual program studies are started prior to entry into the last 28 hours of JD coursework and prior to the third semester of the MBA program. Students interested in entering the dual degree program should submit a letter of application to the Dual Program Committee. Upon receipt of the application, the Dual Program Committee will determine eligibility and assign students to advisors who will be responsible for course approval and supervision of the student's progress through the dual program.

Requirements

A dual program candidate must satisfy the graduation requirements of each college. Students withdrawing from the dual program before completion of both degrees will not receive credit toward graduation from either college for courses in the other college, except as such courses qualify for credit without regard to the dual program.

The College of Law will award up to 9 hours of credit toward the JD for acceptable performance in approved graduate-level courses offered by the College of Business Administration. The College of Business Administration will award up to 6 hours of credit toward the MBA for acceptable performance in approved courses offered in the College of Law. The approval of courses is the responsibility of the Dual Program Committee and the student's assigned advisor.

Students may begin their studies in either the JD or the MBA program, but may not enroll in MBA coursework while completing...
the first year of the law curriculum and may not enroll in JD coursework while completing the first year of the business curriculum. During the first year in the JD program, students register through the College of Law. During the first year in the MBA program, students register as graduate students. After the first two years, any term in which students take law courses or a mixture of law and graduate courses, they are classified and registered as law students. If taking only graduate courses, they are classified and registered as graduate students.

**Approved Dual Credit**

MBA courses in which the student has earned a B grade or higher and are to be counted toward the JD program must include 9 hours approved by the College of Law. The 6 hours of law courses in which the student has earned a 2.30 or C+ grade or higher and are to be counted toward the MBA must be selected from those approved by the Assistant Dean of the MBA Program.

**DUAL JD-MPA PROGRAM**

The College of Law and the Department of Political Science in the College of Arts and Sciences offer a coordinated dual degree program leading to the conferral of both the Doctor of Jurisprudence and Master of Public Administration degrees. In this program, a student may earn the MPA and JD in about four years rather than the five years that otherwise would be required. Students pursuing the dual degree program should plan to be enrolled in coursework or an internship for one summer term in addition to taking normal course loads for four academic years.

**Admission**

Applicants for the JD-MPA program must make separate application to, and be independently accepted by, the College of Law for the JD and the Department of Political Science and the Office of Graduate and International Admissions for the MPA. Applicants must also be accepted by the Dual Degree Committee. All applicants must submit a Law School Admission Test (LSAT) score. An applicant’s LSAT score may be substituted for the Graduate Record Examination (GRE) score, which is normally required for admission to the MPA program. Application may be made prior to or after matriculation in either the JD or the MPA program, but application to the dual program must be made prior to entry into the last 29 hours required for the JD and prior to entry into the last 15 hours required for the MPA.

**Requirements**

A dual degree candidate must satisfy the requirements for both the JD and the MPA, as well as the requirements for the dual program. The College of Law will award a maximum of 9 hours of credit toward the JD for successful completion of approved graduate level courses (500 or 600 level) offered in the Department of Political Science. The MPA program will award a maximum of 9 hours of credit toward the MPA for successful completion of approved courses offered in the College of Law. All courses for which such cross-credit is awarded must be approved by the JD-MPA coordinators in the College of Law and the Department of Political Science. All candidates for the dual degree must successfully complete Administrative Law (Law 821). An internship is strongly recommended for students in the dual degree program, as it is for all MPA candidates, but an internship is not required.

During the first two years in the dual program, students will spend one academic year completing the required first year of the College of Law curriculum and one academic year taking courses solely in the MPA program. During those first two years, students may not take courses in the opposite area without the approval of the JD-MPA coordinators in both academic units. In the third and fourth years, students are strongly encouraged to take both law and political science courses each semester.

Dual degree students who withdraw from the program before completion of the requirements for both degrees will not receive credit toward either the JD or the MPA for courses taken in the other program except as such courses qualify for credit without regard to the dual program.

**Awards of Grades**

For grade recording purposes in the College of Law and the Department of Political Science, grades awarded in courses in the other unit will be converted to either Satisfactory/No Credit and will not be computed in determining a student’s GPA or class standing. The College of Law will award a grade of Satisfactory for an approved MPA course in which the student earns a grade of B or higher and a grade of No Credit for any lower grade. The Political Science Department will award a grade of Satisfactory for an approved law course in which the student earns a grade of C+ or higher and a grade of No Credit for any lower grade. The official academic record of the student maintained by the Office of the University Registrar shall show the actual grade assigned by the instructor without conversion.

**Policy for Graduate Students Taking Law Courses**

Students pursuing a graduate degree in another college may, upon approval of the College of Law and the major chairperson, take up to 6 hours of law courses and receive credit toward the graduate degree. The graduate student must register for the law course during regular registration at the College of Law requesting an S/NC grade only. If a C or above is earned in a law course, an S will be recorded on the transcript. If a student earns below a C, an NC will be recorded, and the course cannot be used toward meeting degree requirements. Grades for law courses will not be reflected in the cumulative average. Law courses may be taken for credit only by students enrolled in a graduate degree program.

Different rules apply to the student enrolled in the Dual JD-MBA or JD-MPA Programs. Grades must be earned according to the grading system of the respective college, e.g. numerical grades for law courses, letter grades for graduate courses. Refer to section on Grades for the grading scale acceptable toward meeting degree requirements. Cumulative GPA for law courses only will be carried until graduation, at which time both the graduate and the law cumulatives will be shown on the permanent record.
Nursing MSN

College of Nursing

Joan Creasia, Dean
Jan L. Lee, Associate Dean for Academic Affairs
Kenneth Phillips, Associate Dean for Research
Sandra McGuire, Chair of Master’s Program
Sandra P. Thomas, Chair of Doctoral Program

http://nightingale.con.utk.edu

Professors
Creasia, J., PhD ...................................................... Maryland
Farr, G., PharmD ...................................................... Tennessee
Hall, J., PhD .......................................................... San Francisco
Lee, J., PhD .......................................................... Southern California
Mozingo, J., PhD ...................................................... Tennessee
Phillips, K., PhD ...................................................... Tennessee
Thomas, S., PhD ...................................................... Tennessee

Associate Professors
Bell, D., DNSc ...................................................... Tennessee
Chen, S., PhD ........................................................ Utah
Davis, M., PhD ...................................................... Tennessee
McGuire, S., EdD ...................................................... Tennessee
Preston, J., DNSc ...................................................... Tennessee
Robinson, C.R., PhD ............................................... Tennessee
Shoffner, D., PhD ...................................................... Tennessee
Speraw, S., PhD ...................................................... California

Assistant Professors
Beebe, L., PhD ...................................................... Kentucky
Brown, A., MSN ...................................................... Alabama (Birmingham)
Brown, M., PhD ...................................................... Tennessee
Callien, B., PhD ...................................................... Wisconsin
Dyess, R., MSN ...................................................... Tennessee
Evans, G., MSN ...................................................... Tennessee
Fields, B., PhD ...................................................... Tennessee
Gaylord, N., PhD ...................................................... Tennessee
Gunther, M., PhD ...................................................... Tennessee
Helton, S., MSN ...................................................... Texas Women’s
Kollar, M., PhD ...................................................... Tennessee
Mefford, L., PhD ...................................................... Tennessee
Nalle, M., PhD ...................................................... Tennessee
Pierce, M., MSN ...................................................... Tennessee
Roman, M., PhD ...................................................... Kentucky
Wade, J., PhD ...................................................... Tennessee
Witucki, J., PhD ...................................................... Tennessee
Wyatt, T., PhD ...................................................... Virginia

MAJOR
Nursing
Adult health nursing concentration
Family nurse practitioner concentration
Homeland security nursing concentration
Mental health nursing concentration
Nurse anesthesia concentration
Nursing administration concentration
Nursing of women and children concentration

DEGREES
MSN

PhD

Graduate Certificate Programs
Adult Health Nursing
Family Nurse Practitioner
Homeland Security Nursing
Homeland Security Studies
Mental Health Nursing
Nurse Anesthesia
Nursing Administration
Nursing Education
Nursing of Women and Children

The College of Nursing was established in July 1971. The master’s program was initiated in 1976 and approval for the doctoral program was granted in 1988. For more information, contact the Director of MSN or PhD Program, The University of Tennessee, College of Nursing, 1200 Volunteer Boulevard, Knoxville, Tennessee 37996-4180; (865) 974-4151.

Facilities for research and service include the Center for Nursing Practice and the Center for Nursing Research.

MASTER OF SCIENCE IN NURSING

NURSING MAJOR

The College of Nursing program is accredited by the Collegiate Commission on Nursing Education that may be contacted at One Dupont Circle NW, Ste 530, Washington, DC 20036-1120, 1-202-887-6791, and is unconditionally approved by the Tennessee Board of Nursing.

The purpose of the master’s program in nursing is to prepare leaders, managers, and practitioners who facilitate achievement of optimal health in the dynamic health care system. The program prepares advanced practice nurses for a career in adult health nursing, nursing of women and children, mental health nursing, and nurse anesthesia as well as role preparation as nurse practitioners, clinical nurse specialists or nursing administrators. Advanced practice nursing involves the delivery of care, management of resources, interdisciplinary collaboration, and application of technology, information systems, knowledge, and critical thinking.
Graduates of the program are expected to
• Provide advanced nursing care in a variety of health care settings.
• Utilize theoretical knowledge to guide advanced practice nursing.
• Collaborate in research activities and utilize knowledge gained from research in advanced practice nursing.
• Evaluate health policies and economics related to delivery of health care.
• Assume roles as leaders and collaborators with other professionals and communities in planning, providing, and evaluating health care.

Admission
• Meet requirements for admission to graduate study.
• Achieve a competitive score on the combined verbal and quantitative portions of the Graduate Record Exam.
• Achieve a TOEFL score of at least 550 on the paper test, 213 on the computer-based test, or 80 on the Internet-based Test if native language is not English.
• Applicants for nurse anesthesia require an interview.
• Hold a bachelor’s degree in nursing (Bachelor of Science in Nursing) from an accredited program.
  a. Hold or be eligible for licensure to practice nursing in Tennessee.
  b. Have an undergraduate GPA of 3.00 or higher on a 4-point scale, or a GPA of 3.30 for courses in the undergraduate major.
  c. Have completed a health assessment course.
  d. Have completed 3 hours of graduate-level statistics.
• OR
• Hold a bachelor’s degree in a discipline other than nursing (master’s entry student or RN) from an accredited college or university.
  a. Have a cumulative undergraduate GPA of at least 3.00 on a 4-point scale.
  b. Have satisfactorily completed the following prerequisite courses: chemistry (8 hours); microbiology (including lab); anatomy and physiology (6 to 8 hours); nutrition (covering lifespan in health and illness); social sciences (9 hours) and a general psychology course (3 hours); undergraduate research course or equivalent; 3 hours of graduate-level statistics prior to enrollment in graduate research course.
  c. Nurse anesthesia option not available to master’s entry students.
• New students normally are admitted to the program only at the beginning of fall semester. However, under special circumstances and on a space available basis, a BSN graduate may be admitted at the beginning of spring or summer terms in a temporary non-degree status. Applications from full-time BSN and master’s entry students for fall admission must be received by February 1. Part-time and post-master’s applications must be received by October 1. Nurse anesthesia applications must be received by March 1 for spring admission in the following academic year.

Non-Degree Status
Only 505 and 511 are open to students in Non-Degree Status. Students not yet accepted into the master’s program must be advised by the Chair of the Master of Science in Nursing program prior to enrollment.

Special Requirements
• Before enrollment in the master’s program, each student must successfully complete a criminal background check.
• Each student must hold personal professional liability insurance and health insurance.
• Registered nurses must be eligible to practice nursing in Tennessee, i.e., licensed in Tennessee or one of the interstate compact states.
• Each student must present proof of hepatitis B vaccination and rubella and rubeola immunization or sufficient titer for immunity; TB status.
• Each student must present evidence of current two-person CPR certification.
• Non-registered nurse students must have completed courses in chemistry, nutrition, microbiology, anatomy, and physiology plus 12 hours of behavioral science courses.
• For more detailed information about the application process, contact Master of Science in Nursing Program, The University of Tennessee College of Nursing, 1200 Volunteer Boulevard, Knoxville, Tennessee 37996-4180; (865) 974-0591.

Thesis and Non-Thesis Options
The thesis option is available for interested students and is especially encouraged for those who are considering pursuit of doctoral degrees sometime in the future. Students who choose the non-thesis option must register for Nursing 582.

Program Requirements

<table>
<thead>
<tr>
<th>Core (7 hours)</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>507 Concepts for Advanced Practice Nursing: Health Promotion and Health Policy</td>
<td>4</td>
</tr>
<tr>
<td>510 Theoretical Foundations of Nursing</td>
<td>3</td>
</tr>
</tbody>
</table>

Advanced Practice Core (9 hours) *

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>504 Advanced Health/Physical Assessment</td>
</tr>
<tr>
<td>505 Advanced Clinical Pharmacology</td>
</tr>
<tr>
<td>515 Advanced Pathophysiology for Nursing Practice</td>
</tr>
</tbody>
</table>

Advanced Pathophysiology for Nursing Practice (not required for nurse anesthesia students or neonatal students) | 3 |

Research (6-9 hours)

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>501 Nursing Research: Methods, Design and Analysis</td>
</tr>
<tr>
<td>500 Thesis</td>
</tr>
<tr>
<td>582 Scholarly Inquiry for Advanced Practice Nursing</td>
</tr>
</tbody>
</table>

Concentration (choose one)

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>529, 530, 531 Adult Health</td>
</tr>
<tr>
<td>529, 538-539 Adult Health: Gerontology</td>
</tr>
<tr>
<td>544-545-546-547-548-549 Clinical Nurse Anesthesia Practicum</td>
</tr>
<tr>
<td>532, 533, 534, 535, 536, 537 Homeland Security: Advanced Practice</td>
</tr>
<tr>
<td>532, 533, 534, 537 Homeland Security: Management</td>
</tr>
<tr>
<td>550-551-553-554-555-556 Nursing of Women and Children: Women’s Health</td>
</tr>
<tr>
<td>550-551-527-528-562-563 Nursing of Women and Children: Child Health</td>
</tr>
</tbody>
</table>
550-551-552-564-568-569 Nursing of Women and Children: Neonatal Health ........................................ 20
560-561-519 Mental Health Nursing I, II ...................... 16
570-571-572-573 Family Nurse Practitioner I, II, III ........ 19
590-591 Nursing Administration: Macro/Micro Analysis ........ 12

Additional Course Requirements
Electives for nursing administration concentration ............. 9
Electives for homeland security nursing: management track .... 3
Epidemiology for homeland security nursing: management and advanced practice tracks .... 3

Students who enter the program as non-RNs must complete the following undergraduate nursing courses in addition to meeting the requirements listed above.

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>311</td>
<td>Foundations of Professional Nursing Practice</td>
<td>5</td>
</tr>
<tr>
<td>319</td>
<td>Pathophysiology of Health Deviations</td>
<td>4</td>
</tr>
<tr>
<td>333</td>
<td>Health Assessment</td>
<td>3</td>
</tr>
<tr>
<td>341</td>
<td>Transcultural Nursing</td>
<td>2</td>
</tr>
<tr>
<td>351</td>
<td>Pharmacology I</td>
<td>2</td>
</tr>
<tr>
<td>361</td>
<td>Health Maintenance and Restoration: Adult</td>
<td>5</td>
</tr>
<tr>
<td>406</td>
<td>Pharmacology II</td>
<td>2</td>
</tr>
<tr>
<td>415</td>
<td>Nursing the Childbearing Family</td>
<td>4</td>
</tr>
<tr>
<td>421</td>
<td>Health Maintenance and Restoration in Mental Health</td>
<td>5</td>
</tr>
<tr>
<td>432</td>
<td>Health Promotion, Maintenance, Restoration in the Community</td>
<td>3</td>
</tr>
<tr>
<td>444</td>
<td>Care of Children, Adolescents, and Their Families</td>
<td>3</td>
</tr>
<tr>
<td>454</td>
<td>Professional Leadership Issues</td>
<td>2</td>
</tr>
<tr>
<td>461</td>
<td>Health Restoration: Adult</td>
<td>4</td>
</tr>
</tbody>
</table>

Registered nurses whose bachelor’s degrees are not in nursing must have completed courses in chemistry, nutrition, microbiology, anatomy, and physiology plus 12 hours of behavioral science courses. They must also complete 305, 382, and 454 and complete or successfully challenge the following.

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>311</td>
<td>Foundations of Professional Nursing Practice</td>
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<tr>
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</tr>
<tr>
<td>333</td>
<td>Health Assessment</td>
<td>3</td>
</tr>
<tr>
<td>351</td>
<td>Pharmacology I</td>
<td>2</td>
</tr>
<tr>
<td>361</td>
<td>Health Maintenance and Restoration: Adult</td>
<td>5</td>
</tr>
<tr>
<td>403</td>
<td>Health Promotion, Maintenance, and Restoration in Childbearing Families</td>
<td>5</td>
</tr>
<tr>
<td>404</td>
<td>Health Promotion, Maintenance, and Restoration in Children, Adolescents, and Their Families</td>
<td>5</td>
</tr>
<tr>
<td>406</td>
<td>Pharmacology II</td>
<td>2</td>
</tr>
<tr>
<td>421</td>
<td>Health Maintenance and Restoration in Mental Health</td>
<td>5</td>
</tr>
<tr>
<td>461</td>
<td>Health Restoration: Adult</td>
<td>4</td>
</tr>
<tr>
<td>494</td>
<td>Alternative Preceptorship</td>
<td>4</td>
</tr>
</tbody>
</table>

A total of 24 hours can be obtained by successful completion of the NLN ACE Examination. See undergraduate catalog for other challenge options. RNs who are in the process of completing a BSN at the University of Knoxville, with the intent of enrolling in the MSN program, follow the same plan with the addition of 471.

Final Examination Requirements
All students must successfully complete a final examination as required by the Graduate Council. For thesis students, the examination will consist of an oral defense of the thesis as well as other written or oral questions designed to measure student mastery of the entire program of study. For non-thesis students, the written examination will cover the entire program of study and may, at the discretion of the student’s committee, be followed by an oral examination.

Special Policies
- If the clinical performance of any student for any course is found to be unsatisfactory, the student will receive a grade of F for the course.
- If a student achieves a final grade of D or F for any required undergraduate or graduate nursing course, he or she will not be permitted to repeat the course and will be required to withdraw from the program.
- If the clinical performance of any student is characterized by unethical, unprofessional or unsafe behavior, or behavior that places the client in jeopardy, the student will be required to withdraw from the program.

Students are expected to maintain a 3.00 cumulative GPA; however, students must maintain a grade of B or better in clinical concentration courses and/or directed clinical practice. Graduate students are not permitted to repeat a course, repeat an exam or do additional work for the purpose of raising a grade already received. A student who receives a final grade below a B in a clinical concentration course will be dismissed from the program. A student whose cumulative GPA drops below a 3.00 as a result of earning grades of C in other courses will be placed on academic probation. A student will be allowed to continue in graduate study while on academic probation as long as each semester’s grade point average is 3.00 or better and the grade for clinical concentration work is at least 3.00.

RN-MSN Track
The RN-MSN track provides an opportunity for qualified associate degree and diploma-prepared nurses to obtain the MSN.

Admission
- Associate degree or diploma in nursing.
- Minimum grade point average 3.00 (on 4 point scale) for all pre-professional course requirements.
- Eligible to practice as a registered nurse in Tennessee (licensed as an RN in Tennessee or one of the interstate compact states).
- Have satisfactorily completed the following prerequisite courses – chemistry (8 hours); microbiology (including lab); anatomy and physiology (6 to 8 hours) nutrition (covering lifespan in health and illness); social sciences (9 hours) and a general psychology course (3 hours).
- Three professional letters of reference.
- Personal statement of goals and objectives.

Prior to Admission to Graduate Program
- Complete the BSN with at least a 3.00 GPA.
- Achieve a competitive score on the combined verbal and the quantitative portions of the Graduate Record Examination.

Bachelor of Science in Nursing Courses
- RN’s are exempt from sophomore level Nursing 201 (Introduction to Nursing) and will be given proficiency credit based on RN status.
- RN students will take the NLN Acceleration Challenge Exams prior to starting upper division coursework. If a decision score of 100 is achieved (per section), the student will receive proficiency credit for Nursing 361, 403, 404, 421, and 461.
- Proficiency credit can be obtained in courses marked with an asterisk (*).

Bachelor of Science in Nursing Degree
- A baccalaureate degree in nursing will be awarded upon completion of all required level 300 and 400 courses.
- A total of 123 undergraduate hours are required for the baccalaureate degree with the last 30 hours completed in residence at the University of Tennessee, Knoxville.
- RN-MSN students will complete (or challenge*) the following courses, prior to beginning MSN courses.
DOCTOR OF PHILOSOPHY

NURSING MAJOR

The College of Nursing offers a doctoral program leading to the Doctor of Philosophy degree with a major in nursing. This is a unified program offered jointly with the University of Memphis, College of Nursing. Students may complete all or part of the program at either site. The dissertation must be completed in its entirety at one site.

The doctoral program prepares nursing scholars capable of integrating research, theory, and practice into their roles as researchers, educators, and/or administrators. Specifically, the graduate of this program should be able to

- Analyze, test, refine, and expand the theoretical basis of nursing.
- Conduct research that generates knowledge and advances nursing as a discipline.
- Provide leadership as nurse scientists who can function in a variety of roles and settings.
- Collaborate with members of other disciplines in health-related research.
- Develop, implement, evaluate, and recommend health care policy.
- Demonstrate professionalism, advocacy, ethical principles and scientific integrity.

Admission

- Meet requirements for admission to graduate study.
- Hold a master's degree in nursing from a program accredited by the National League for Nursing Accrediting Commission or the Commission on Collegiate Nursing Education. Some outstanding applicants who are prepared at the bachelor's level in nursing may be considered. In such cases, graduate level courses in nursing theory, concentration specialty, and/or research will be integrated into the formal program of doctoral degree requirements.
- Have a minimum cumulative grade point average of 3.30 on a 4.00 scale for previous college work.
- Achieve a competitive score on the combined verbal and quantitative portions of the Graduate Record Exam.
- Have successfully completed a basic statistics course and graduate nursing theory and research courses prior to enrollment in nursing doctoral level courses.
- Have TOEFL score of at least 550 on the paper test, 213 on the computer-based test, or 80 on the Internet-based Test if native language is not English.
- Complete Graduate Program Data Form, College of Nursing.
- Submit Graduate Rating Forms from three college level instructors and/or nurses and administrators who have supervised applicant's professional work.
- Submit a sample of scholarly writing (e.g., thesis, published paper).
- Submit an essay describing personal and professional aspirations.
- Submit Graduate Application for Admission, academic transcript(s), Graduate Record Examination scores, and, if required, TOEFL scores to the Office of Graduate and International Admissions. Submit three Graduate Rating Forms, sample of scholarly writing, and Graduate Program Data Form with essay to the Director of the PhD program prior to November 1 of the year prior to fall admission.
- Schedule a personal interview with the College of Nursing PhD Student Admissions Committee prior to March 15 of the year preceding fall admission. International applicants may be interviewed by telephone or teleconferencing at the discretion of the admissions committee.

Requirements

The following courses are required for all students.

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>601 Philosophy and Theory for Nursing Science .................. 3</td>
</tr>
<tr>
<td>603 Nursing Research and Inquiry .................................. 3</td>
</tr>
<tr>
<td>605 Middle-Range Theoretical Formulations for Nursing Science Development .................. 3</td>
</tr>
<tr>
<td>606 Nursing Research Seminar ........................................ 3</td>
</tr>
<tr>
<td>607 Qualitative Nursing Research .................................... 3</td>
</tr>
<tr>
<td>608 Quantitative Nursing Research ................................... 3</td>
</tr>
<tr>
<td>609 Research Practicum* .............................................. 2</td>
</tr>
<tr>
<td>610 Nursing Science Seminar ......................................... 2</td>
</tr>
<tr>
<td>612 Health and Nursing Policy/Planning ............................ 3</td>
</tr>
<tr>
<td>613 Nursing Leadership in Complex Systems ......................... 3</td>
</tr>
<tr>
<td>- Inferential Statistics ............................................. 3</td>
</tr>
<tr>
<td>- Cognates** ...................................................... 6</td>
</tr>
<tr>
<td>- Elective ....................................................... 3</td>
</tr>
<tr>
<td>600 Dissertation .................................................... 24</td>
</tr>
<tr>
<td>**Note: One hour per semester, must be taken for two semesters. **Possible cognate areas include, but are not limited to, anthropology, child and family studies, psychology, education, management, public health, social work, philosophy, and statistics.</td>
</tr>
</tbody>
</table>

Doctoral Committee

Early in the student's program, a nursing faculty advisor will be selected by the student in consultation with the program director. The student's comprehensive examination committee consists of the faculty teaching core courses and one representative from the cognate area. The student then selects the dissertation committee. Four faculty, holding the rank of assistant professor or above, comprise the committee, three of whom (including the chair) must be approved by the Graduate Council to direct doctoral dissertations. At least one member of the committee must be from an academic unit other than nursing.

Special Policies

- A maximum of 6 graduate hours taken before acceptance into the doctoral program may be applied toward the degree.
- Prior to enrollment in the PhD program, each student must successfully complete a criminal background check.
- A minimum grade of B in all nursing doctoral courses and a 3.00 cumulative GPA are required for continuation i the program.

Intercollegiate/Interdisciplinary Gerontology Minor

Graduate students in the College of Nursing may pursue an intercollegiate/interdisciplinary minor in gerontology. The gerontology minor gives the student an opportunity for combining knowledge about aging in American society with his/her major concentration.

Core courses and a practicum are offered by the College of Social Work and selected departments within the Colleges of Education, Health, and Human Sciences and Arts and Sciences. A cross-listed seminar between contributing programs is designed to integrate experiences from different sources and to demonstrate the multi-faceted nature of working within an aging socie-
Please refer to the College of Education, Health, and Human Sciences for specific requirements.

**Nursing Education Minor**

Graduate students in the College of Nursing may pursue a nursing education minor. The minor consists of 12 hours – 6 hours in nursing and 6 in education. Required courses in the College of Nursing are 566 and 565. In consultation with the Nursing Education Minor Coordinator, students select 6 hours of coursework from the College of Education, Health, and Human Sciences.

**GRADUATE CERTIFICATES**

The College of Nursing offers certificates for nurses who need additional training. A master’s degree in nursing is required for admission.

The total hours will vary depending on the student’s academic record, clinical experience, and objectives. Students must complete a minimum of 12 hours. Most students complete 16-20 hours of course credit with the exception of those pursuing the homeland security nursing certificate or the nurse anesthesia certificate. The nurse anesthesia certificate program requires students who have completed the master’s degree in nursing within the preceding five years to complete 60-70 hours of course credit. Contact the MSN chair for more information.

- **ADULT HEALTH NURSING**
  - Course requirements are 530 and 531 plus additional hours as determined by the college.
- **FAMILY NURSE PRACTITIONER**
  - Course requirements are 570, 571, 572, and 573 plus additional hours as determined by the college.
- **HOMELAND SECURITY NURSING**
  - Course requirements are 532, 533, 534, 535, 536, plus additional hours as determined by the college.
- **HOMELAND SECURITY STUDIES**
  - The graduate certificate in homeland security studies is available to graduate students who seek to gain specialized knowledge and skills related to the prevention and management of catastrophic incidents which result in mass casualties, whether the cause is naturally-occurring, accidental, or terrorism. Admission to the certificate program is selective and requires admission to a degree-seeking program and relevant professional work experience. A degree in nursing is not required. The certificate program is composed of 13 credits: Nursing 532: Homeland Security Threats (3 cr.), Nursing 533: Homeland Security I (5 cr.), and Nursing 534: Homeland Security II (5 cr.).
- **MENTAL HEALTH NURSING**
  - Course requirements are 560 and 561, plus additional hours as determined by the college.
- **NURSE ANESTHESIA**
  - In addition to the general requirements for admission to graduate study and the College of Nursing, the following are required of all nurse anesthesia certificate applicants:
    - One year of critical care experience with adult clients.
    - Certification in Advanced Cardiac Life Support (ACLS) and Pediatric Advanced Life Support (PALS).
    - A personal interview.
  - Course requirements are 506, 516, 517, 518, 522, 523, 524, 525, 526 of nurse anesthesia didactic content, plus additional hours as determined by the college and 54 hours of nurse anesthesia clinical practice courses, 544, 545, 546, 547, 548, 549, 583.
- **NURSING ADMINISTRATION**
  - Course requirements are 590 and 591, plus additional hours as determined by the college.
- **NURSING EDUCATION**
  - The post-master’s certificate in Nursing Education consists of 12 hours – 6 hours in nursing and 6 in education. Required courses in the College of Nursing are 566 and 565. In consultation with the Nursing Education Minor Coordinator, students select 6 hours of coursework from the College of Education, Health, and Human Sciences.
- **NURSING OF WOMEN AND CHILDREN**
  - Course requirements are 550 and 551, plus additional hours as determined by the college.
College of Social Work

Karen Sowers, Dean
Sherry Cummings, Acting Associate Dean, Nashville
Geraldine Faria, Associate Dean, Knoxville
Theora Evans, Acting Associate Dean, Memphis
Paul M. Campbell, Director, Office of Social Work Research and Public Service
Charles Glisson, Director, Children’s Mental Health Services Research Center

http://www.csw.utk.edu/

MAJOR DEGREES

Social Work
Evidenced-based Practice Across Systems
PhD

The College of Social Work began as the Nashville School of Social Work, founded in 1942 under the auspices of Vanderbilt University, Scarritt College, and George Peabody College. It joined the University of Tennessee in 1951. By 1974 the three branches, located in Nashville, Memphis and Knoxville, offered the two-year master’s program. The doctoral program was inaugurated in 1983. In 1985 the Bachelor of Science in Social Work program was added, and the School achieved college status.

The University of Tennessee College of Social Work is the only graduate professional social work education program in Tennessee and offers the full continuum of social work education degrees at the baccalaureate, master’s and doctoral levels.

Social work is a helping profession that focuses on providing skilled intervention in the prevention and amelioration of individual and societal problems. It is the purpose of the college to provide an education that fosters growth in both individual and career development.

Graduate Programs

The two-year program (thesis or non-thesis option) leading to the Master of Science in Social Work is fully accredited by the Council on Social Work Education and is offered on all three campuses. The foundation curriculum of the PhD program is available only in Knoxville. The interdisciplinary graduate certificate in gerontology at the University of Tennessee, offered on all three campuses, prepares graduate students to work with and on behalf of the rapidly growing older population. The graduate certificate in gerontology consists of 21 credit hours – 3 required courses may be used to count towards both the MSSW and the gerontology certificate if they fulfill requirements of both programs. With proper planning, one can complete both programs of study in a two-year period. For more information/application materials go to the Web at http://web.utk.edu/~sals/gerontology/. The Tennessee State School Social Work Licensure Program at the University of Tennessee College of Social Work is available to currently enrolled
bachelor’s level and master’s level students as well as persons who already hold a bachelor’s and/or master’s degree in Social Work from an accredited social work program. Information and application materials are available from the College of Social Work, Henson Hall, Knoxville, Tennessee 37996-3333.

Financial Aid

Students may apply directly to the university’s Office of Financial Aid and Scholarships for assistance such as the National Direct Student Loan or the Work-Study Program.

Information regarding scholarships administered by the college is made available after admission. Financial aid is available to qualified students in the form of fellowships, scholarships, and teaching and research assistantships. Graduate assistantships and other forms of assistance are awarded on the basis of merit and interest to applicants who are accepted into the PhD program.

MASTER OF SCIENCE IN SOCIAL WORK

SOCIAL WORK MAJOR

The college offers a new MSSW curriculum that is informed by state-of-the-art, cutting-edge knowledge and grounded upon core social work values and ethics. The concepts of critical thinking and evidenced-based practice, complexity, culturally affirming practice, social and economic justice, and at-risk populations permeate the new MSSW curriculum. The MSSW program seeks to prepare MSSW graduates to make demonstrable improvements in the quality of life of at-risk and vulnerable populations across individuals, families, groups, organizations, communities, the state of Tennessee, the nation and society.

Admission

Admission to the master’s program is based on the following.

• A bachelor’s degree from an accredited college or university with appropriate preparation in the social sciences. At least three-fourths of the applicant’s undergraduate work should be in the social sciences, humanities, physical sciences, and other arts and sciences subjects. Applicants must have a course in human biology and demonstrate a liberal arts perspective through coursework in at least four of the following five areas – economics or mathematics; government, political science or history; sociology or anthropology; psychology; philosophy, literature, or the arts. Applicants with other academic backgrounds may request consultation to discuss ways that they can meet the requirements.

• A grade point of 2.70 or higher on a 4.00 scale. Applicants falling below this average may be considered for probationary admission on the basis of supplemental evidence of the ability to perform at a satisfactory level. The university requires a minimum GPA of 2.70 for admission to graduate study.

• Personal qualifications acceptable for entrance into the professional practice of social work.

• All applicants must submit up-to-date scores from the Graduate Record Examination (general).

Preference is given to applicants with a GPA of 3.00 or above in their undergraduate work with substantial preparation in the social sciences. Applicants who have a prior conviction, other than a minor traffic violation, may not necessarily be denied admission to the MSSW program. However, such convictions may prevent placement in certain field practice agencies and/or licensure in certain states.

Advanced Standing

The University of Tennessee College of Social Work has an advanced standing program. Admission to advanced standing requires a BSW from an accredited program; an overall undergraduate GPA of 3.00 or higher; and personal qualifications acceptable for entrance into the professional practice of social work. These students will follow the curriculum plan and meet all requirements of the concentration during three semesters of study in the program.

Application for admission to the advanced standing program is through the regular admission process.

Extended Study

Planned part-time programs are available in all three locations of the college. Admission requirements are the same as for full-time study. Coursework can be completed over a three- or four-year period.

Transfer Credits

Coursework equivalent to the first year of the master’s program, completed in another accredited graduate social work program, is usually accepted toward degree requirements. Applicants must meet the admission requirements of the Graduate Council and the College of Social Work. Transfer courses must be approved as equivalent to required and/or elective courses taken for graduate credit and passed with a grade of B or better. An S (Satisfactory/No Credit system) for the field practicum is also accepted. In addition, transfer courses must be part of an otherwise satisfactory graduate program (B average) and be approved by the dean. This coursework must be completed within the six-year period prior to the receipt of the degree.

A maximum of 6 hours from work earned in disciplines other than social work may be transferred as elective credits. The student’s academic committee must approve the request and the transfer credit must meet Graduate Council requirements.

Proficiency Examination

Students in the master’s program may earn a maximum of 9 hours by proficiency examination. Students interested in proficiency examinations are referred to the College of Social Work Student Handbook statement describing the procedure for applying for examination and the applicable courses.

Requirements

• The program requires successful completion of a minimum total of 60 semester hours.

• Students may select a thesis or non-thesis option. Students pursuing the thesis option receive 6 hours for successful completion.

• Students must successfully complete a comprehensive exam or thesis defense.

• Students must have an overall GPA of 3.00 or better on all graded courses and satisfactory performance in field.

Professional Foundation Curriculum

MSSW foundation content (first year – fall and first half of spring semester) includes fundamental, evidence-based knowledge and skills that will prepare students to practice across client systems within a culturally affirming generalist social work context. MSSW foundation curriculum includes content in the following areas – social work practice, research, human behavior in the social environment, social policy, populations at risk and social and economic justice, values and ethics, diversity, critical thinking/evidenced-based practice, and field.
Field Practice
The application of knowledge and skills is a critical aspect of a competency-based, practice-oriented MSSW curriculum. The opportunity for students to practice and learn in experiential settings is provided through collaboration between the college and a wide range of social service organizations. This effort between the partners produces effective experiences that enhance the students’ professional development in their individual areas of focus. Opportunities designed to meet the field practice requirement are available within Tennessee, in certain other parts of the country, and in selected international locations. Field practica are offered either concurrently with class instruction or in block format.

Foundation placements are selected through a joint process involving the student, the field coordinator, and personnel from potential internship sites. These first placements are designed to provide students with supervised generalist practice experience, which is consistent with the generalist knowledge and skill development education they receive in the classroom. Accordingly, students’ experiences are planned and designed to meet specific foundation educational objectives. Concentration internships build on the generalist foundation. The concentration practicum provides supervision in a practice setting selected with attention to a student’s area of focus, individual career interests, and educational needs. As with the foundation placement, students actively participate with the field coordinator and potential agency Field Instructors to select their concentration placement site. The concentration field placement experience focuses on the integration of social work knowledge and values while emphasizing the acquisition and development of advanced practice skills built on, but distinct from generalist, foundation skills.

Students receiving a grade of NC in field practice may not repeat the field practice.

Advanced Content
All MSSW students begin to take advanced required courses in the second session of spring semester during their first year of study. These advanced required courses include content in leadership, supervision, management, psychopathology, and advanced empirical knowledge for practice and evidence-based interventions. These courses are embedded in an understanding of the complex ways that risk and resilience interact across the lifespan and systems to enhance well being.

Areas of Focus
MSSW students complete the concentration portion of their MSSW program of study (second year – fall and spring semesters) by taking four required core courses and then choosing from a series of required electives/selectives within a specific area of focus. These courses enable students to become competent in knowledge and skills necessary for advanced social work practice with complex situations and problems.

Integrative Seminar
The integrative seminar is the MSSW capstone experience. The seminar allows students to integrate and synthesize knowledge learned across the curriculum and to critically apply it within each student’s specified area of focus.

DOCTOR OF PHILOSOPHY
SOCIAL WORK MAJOR
The College of Social Work offers the Doctor of Philosophy with a major in social work.

The focus of social work education at the doctoral level is to foster the development of an attitude of scientific inquiry, knowledge of the scientific method, ability to extend the knowledge base of social work practice, and effective participation in leadership roles in social work education, research, and practice.

The emphasis of the doctoral program is upon
• The analysis of direct intervention and social administration and of the interrelationships among each of them and their social policy, organizational, and community contexts.
• Research-based knowledge to inform and guide social work practice, social policy, and social welfare program development.

The program consists of foundation courses, elective courses, and dissertation research. The courses are available only in Knoxville. Students and their committees can develop a plan for completing their research in Nashville and Memphis based on the availability of dissertation resources.

Students have the opportunity to work in the Children’s Mental Health Services Research Center as part of their training. The center focuses on services to children who have experienced mental health problems associated with abuse, neglect, violence and a variety of psychosocial problems.

Admission
The PhD program is designed for students who have completed a master’s degree in an accredited school of social work and have post-master’s social work/social welfare experience. Applicants who do not meet these requirements, but believe they have equivalent credentials should contact the chair of PhD program for further information regarding admissions criteria.

Applications may be downloaded at www.csw.utk.edu/phd.

Requirements
A minimum of 66 hours beyond the master’s degree including the following.
• Completion of 27 hours of required coursework.
• Completion of 15 hours of advanced electives, at least 12 of which are taken outside the department, and 9 of those 12 related to the dissertation.
• Completion of at least 24 hours of dissertation research.
• Successful completion of qualifying and comprehensive examinations.
• Completion and defense of the dissertation.

The curriculum of the PhD program consists of foundation coursework, electives, and dissertation research. The foundation curriculum consists of 27 hours of coursework in the history and philosophy of social work, issues in direct service and administration and planning, areas of practice, and research methodology and statistics. Upon this foundation, students and their academic committees develop a plan of study consisting of coursework in social work and other departments of the university.

Typically, the 24 hours of foundation curriculum are completed and elective coursework begun during the first year of study Social Work 670 and the elective requirement are completed and dissertation research begun in the second year of study. Dissertation research is continued in the third year of study. While it is generally expected that the coursework will be completed on a full-time basis, dissertation research can be completed on a planned part-time basis.

Specific courses required are 601, 602, 612, 613, 640, 650, 670, and Statistics 531 and 532 or any two graduate level statistics courses approved by the doctoral program chair.

Examinations
All doctoral students are required to pass a qualifying examination and a comprehensive examination. The qualifying examination covers the foundation curriculum. The comprehensive examination is administered by members of the comprehensive exam committee and is designed for the student to demonstrate comprehensive knowledge of the major and cognate areas and the dissertation topic. In case of failure of either examination, the
student may request a retake. The result of the second exami-
nation is final.

Intercollegiate/Interdisciplinary Gerontology Minor

Graduate students in the College of Social Work, at the
Knoxville location, may pursue an intercollegiate/interdisciplinary
minor in gerontology. The gerontology minor gives the student an
opportunity for combining the knowledge about aging in Ameri-
can society with his/her major concentration.

Core courses and a practicum are offered by the College of
Social Work and selected departments within the Colleges of Ed-
ucation, Health, and Human Sciences and Arts and Sciences. A
cross-listed seminar between contributing programs is designed
to integrate experiences from different sources and to demon-
strate the multi-faceted nature of working within an aging socie-
ty. Please refer to the College of Education, Health, and Human
Sciences for specific requirements.
MAJOR
Veterinary Medicine

DEGREE
DVM

The College of Veterinary Medicine, established in 1974, offers a professional curriculum leading to the Doctor of Veterinary Medicine (DVM) degree. Residency training programs in the various clinical specialties are also offered.

The primary objective of the college is to enable students to attain essential information, skills, attitudes and behaviors to meet the varied needs of society and the veterinary profession. The professional curriculum provides an excellent basic science education in addition to training in diagnosis, disease prevention, medical treatment, and surgery. Graduates are qualified to pursue careers in the many facets of veterinary medicine and related health professions.

About two-thirds of the veterinarians in the United States are engaged exclusively in pet or companion animal practice. A growing number are concerned with the health problems of zoo animals, laboratory animals, wildlife, and aquatic species. A number of veterinarians are involved in the health care of food and fiber animals ensuring the supply of safe and healthy food.

Veterinarians also find rewarding careers in the U.S. Public Health Service, the Armed Forces, and in state, county, or local health agencies. A large number of veterinarians are employed by the U.S. Department of Agriculture and by state departments of agriculture for important work in livestock disease control, meat and poultry inspection, serum and vaccine production, and the protection of our country against the importation of foreign animal diseases. With the events of September 11, 2001, veterinarians are making significant contributions to biosecurity and homeland defense.

Excellent research opportunities exist for veterinarians – research directly benefiting animals and research conducted with animals that benefits humans. Such opportunities are available at colleges and universities and with governmental agencies, private research institutions and biological and pharmaceutical companies.

The college jointly administers a graduate program leading to the Master of Science and the Doctor of Philosophy degrees with a major in comparative and experimental medicine. This program provides a wide spectrum of interdisciplinary training that prepares graduates for teaching and/or research careers in the health sciences. The majority of the graduate students and graduate faculty of the College of Veterinary Medicine are involved in the comparative and experimental medicine program. (See Comparative and Experimental Medicine in the Intercollegiate section of this catalog.)

Because of the interdisciplinary departmental administration of the college, the faculty also have opportunities in the graduate programs of other instructional units, including Animal Science (nutrition, physiology, genetics and animal management), Microbiology (bacteriology, virology and immunology), Ecology and Evolutionary Biology (environmental toxicology), and Public Health. (Refer to other sections of this catalog for a full description of these programs.)

DOCTOR OF VETERINARY MEDICINE

Admission

To qualify for admission to the professional program of the College of Veterinary Medicine, a candidate must have completed at least the minimum pre-veterinary course requirements listed below. These may be completed at any accredited college or university that offers courses equivalent to those at the University of Tennessee, Knoxville. Pre-veterinary course requirements must be completed by the end of spring term of the year in which the applicant intends to enroll. Biochemistry requirements must have been satisfactorily completed within five years of the time the applicant wishes to enter the program.

<table>
<thead>
<tr>
<th>Subject Area</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>6</td>
</tr>
<tr>
<td>¹Humanities and Social Sciences</td>
<td>18</td>
</tr>
<tr>
<td>Physics</td>
<td>8</td>
</tr>
<tr>
<td>General Chemistry</td>
<td>8</td>
</tr>
<tr>
<td>Organic Chemistry</td>
<td>8</td>
</tr>
<tr>
<td>²Biochemistry</td>
<td>4</td>
</tr>
<tr>
<td>General Biology</td>
<td>8</td>
</tr>
<tr>
<td>Genetics</td>
<td>3</td>
</tr>
<tr>
<td>³Cellular Biology</td>
<td>3</td>
</tr>
</tbody>
</table>

Total 66
May include, for example, courses in English literature, speech, music, 
art, philosophy, religion, language, history, economics, anthropology, 
political science, psychology, sociology, and geography.

Exclusive of laboratory.

It is expected that this requirement will be fulfilled by a course in cellular 
or molecular biology.

**Admission Procedures**

Admission of new students is for the fall semester, with first 
priority given to residents of Tennessee.

The College of Veterinary Medicine utilizes the Veterinary 
Medical College Application Service (VMCAS) for all applicants. 
Instructions for making application for admission may be ob-
tained from the Office of the Associate Dean, The University of 
Tennessee, College of Veterinary Medicine, 2407 River Drive, 
Room A102, Knoxville, Tennessee 37996-4550, or on-line at 
VMCAS(<www.aavmc.org>).

The deadline for receipt of the completed application materi-
als is October 1. Non-Tennessee applicants must have a mini-
um cumulative grade point average of 3.20 on a 4.00 scale for 
applications to be considered.

Applications are accepted only from U.S. citizens or perma-
nent residents of the U.S.

**Requirements**

The curriculum of the College of Veterinary Medicine is a 
nine-semester, four-year program. Each class begins in August 
and graduates four years later in May. The first three years gen-
erally follow the traditional fall and spring semesters with the 
summer break following years one and two. The final year of the 
professional curriculum begins immediately following semester 
six and is a continuous clinical rotation experience extending 
over 54 weeks.

Development of a strong basic science foundation is empha-
sized in the first year. Courses consist mostly of pre-clinical sub-
jects of anatomy (gross and microscopic), physiology, immunol-
ogy, bacteriology, virology and parasitology. Also included in the 
first year are clinical subjects of physical diagnosis and epidemi-
ology. Considerable integration of subject matter is incorporated 
during this year.

The second and third years include the study of diseases, 
their causes, diagnosis, treatment and prevention, and courses 
are team-taught on an organ system basis.

The final year (three semesters) is devoted to intensive edu-
cation in solving animal disease problems involving extensive 
clinical experience in the Veterinary Teaching Hospital. Each stu-
dent will participate exclusively in clinical rotations in the Veteri-
nary Teaching Hospital and in required externships (preferably 
off-campus).

Innovative features of this curriculum include six weeks of 
student centered, small group, applied learning exercises in se-
mersets one through five; three weeks of dedicated clinical expe-
riences in the Veterinary Teaching Hospital in semesters three 
through five; and elective course opportunities in semesters four 
through nine which allow students to focus on individual educa-
tional/career goals. Students enrolled in the DVM program may 
register for up to 10 hours of graduate courses and these hours 
will be credited toward the DVM. Elective study offers a unique 
educational alternative for students in the College of Veterinary 
Medicine and is intended to enhance professional growth, concen-
tration in an area of interest, and career opportunities.

In addition to education in the science and art of veterinary 
medicine, students receive instruction in paramedical subjects 
such as animal behavior, medical communication, professional 
ethics, jurisprudence, economics, and practice management.

The curriculum requires successful completion of 164 credit 
hours.

**VETERINARY PUBLIC HEALTH**

**CONCENTRATION**

A veterinary public health concentration is available for stu-
dents enrolled in the DVM curriculum and graduate veterinari-
ans. This concentration is part of the Master of Public Health de-
gree in the College of Education, Health, and Human Sciences. 
For more information, see Public Health in this catalog. The Col-
lege of Veterinary Medicine shares governance of the concentra-
tion through the Public Health Academic Program Committee 
and student advisors within this concentration are faculty in the 
College of Veterinary Medicine. This concentration requires a 
separate application to the MPH Program.
AVIATION SYSTEMS
(UT Space Institute)
http://www.utsi.edu/Academic/AvSys/index.html

Stephen Corda, Chair and Liaison

Associate Professors
Corda, S. (Liaison), PhD  . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .Maryland
Solies, U.P., PhD  . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .Tennessee

Research Assistant Professor
Allison, R., MS  . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .Tennessee
Ranaudo, R.J., MS  . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .Ohio

Emeriti Faculty
Collins, F.G., PhD  . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .California
Paludan, C.T., PhD  . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .Denver

Adjunct Faculty
Cavagnaro, Catherine  . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .Illinois
Palumbo, Nathan  . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .Purdue

MAJOR DEGREE
Aviation Systems  MS

The University of Tennessee Space Institute offers a program leading to the Master of Science degree with a major in aviation systems. Aviation systems is a unique blend of aerospace engineering, aviation technology, flight science, and flight test engineering and research. The aviation systems program is designed for those who possess a bachelor's degree in engineering or science and wish to study under a system philosophy toward careers in research and development or administration in areas pertinent to aviation and aerospace. Current emphases include flight testing, aircraft performance and flying qualities, aircraft design, atmospheric and earth/ocean science, airborne sensing, and human factors.

Admission

To qualify for admission to this program, the applicant must possess a bachelor’s degree in engineering or science from an accredited institution, show evidence of ability to pursue and benefit from the program, and fulfill the University of Tennessee, Knoxville, graduate admission procedures and grade point standards. It is expected that the student will have completed coursework in calculus and physics, and preferably aerodynamics, aircraft performance, or other aerospace-related subjects.

MASTER OF SCIENCE
AVIATION SYSTEMS MAJOR

Both thesis and non-thesis programs are available. The thesis program involves a minimum of 30 hours credit while the non-thesis program involves a minimum of 33 hours. Both options are fully supported off-campus utilizing electronic media for videotaping and interactive distance teaching methods.

Requirements

Thesis Option

The thesis program involves satisfactory completion of the following requirements.

Research and Development Specialization

• 12 hours of 500-level courses in the major field of aviation systems.
• 6 hours in industrial engineering (engineering management).
• 6 hours of electives from the major field, mathematics or engineering.
• 6 hours of Aviation Systems 500 demonstrating the ability to conduct and report on an independent investigation.
• Defense of thesis and completion of final exam.

Administration Specialization

• 12 hours of 500-level courses in the major field of aviation systems.
• 3 hours in industrial engineering (engineering management).
• 3 hours in economics or finance.
• 6 hours of electives selected from the major field, mathematics or engineering.
• 6 hours of Aviation Systems 500 demonstrating the ability to conduct and report on an independent investigation.
• Defense of thesis and completion of final exam.
Non-Thesis Option

The non-thesis program will be permitted in special circumstances and involves satisfactory completion of the following requirements.

Research and Development Specialization

- 12 hours of 500-level courses in the major field of aviation systems.
- 6 hours in industrial engineering (engineering management).
- 12 hours of electives in the major field, mathematics, or engineering.
- 3 hours of an assigned project under Aviation Systems 550.
- A comprehensive final written examination on all coursework submitted for the degree and defense of the project course paper.

Administration Specialization

- 12 hours of 500-level courses in the major field of aviation systems.
- 3 hours in industrial engineering (engineering management).
- 3 hours in economics or finance.
- 12 hours of electives in the major field, mathematics, or engineering.
- 3 hours of an assigned project under Aviation Systems 550.
- A comprehensive final written examination on all coursework submitted for the degree and defense of the project course paper.

MASTER OF SCIENCE
COMPARATIVE AND EXPERIMENTAL MEDICINE MAJOR

Admission

Admission requirements of the Graduate Council of the University of Tennessee, Knoxville, apply. In addition, all applicants must furnish three letters of recommendation from individuals who are familiar with their scholastic or professional records.

Applicants must have a baccalaureate degree with coursework in chemistry through organic, mathematics through calculus, physics, and basic biology. More advanced study in biology such as biochemistry, mammalian anatomy, histology, cell biology, or other appropriate biomedical courses from an accredited university is recommended.

Applicants for admission to the Master of Science degree program whose backgrounds include no formal training in the biomedical field beyond the baccalaureate degree will be required to score at least 1,000 on the quantitative and verbal portions of the Graduate Record Examination.

Requirements

Students must complete a minimum of 24 hours of coursework and 6 hours of Thesis 500. Comparative and Experimental Medicine 504 and 541 are required, as are 4 hours of 600-level graduate journal clubs. In addition, students must take at least 3 hours of 500- or 600-level statistics and a minimum of 8 hours of coursework in a specified discipline. Areas of emphasis may include hematology, oncology, pathology, pharmacology, toxicology, immunology, genetics, infectious disease, epidemiology, metabolism, or other areas of medicine. Exceptions to accommodate students with specific interests must be approved by the Joint Graduate Coordinating Committee after application, in writing, to the director.

The graduate committee (at least three members) is chosen before the end of the second term and must include at least one member from the College of Veterinary Medicine and at least one member from the Graduate School of Medicine. If a minor is declared, one member must be from the minor discipline. A final oral examination must be passed at the completion of the program.

DOCTOR OF PHILOSOPHY
COMPARATIVE AND EXPERIMENTAL MEDICINE MAJOR

Admission

Admission requirements of the Graduate Council of the University of Tennessee, Knoxville, apply. In addition, all applicants must furnish three letters of recommendation from individuals who are familiar with their scholastic or professional records.

Applicants generally will be expected to have a professional degree in one of the medical sciences (e.g., MD, DDS, DVM) or a master’s degree in one of the biomedical sciences and a Graduate Record Examination score of at least 1000 for the quantitative and verbal sections.

An individual having a baccalaureate degree with a strong background in the physical and biological sciences may be admitted upon presenting evidence of exemplary performance on the Graduate Record Examination.

Exceptional veterinary students at the University of Tennessee, Knoxville, may be admitted to the comparative and experimental medicine graduate program but will be enrolled officially as veterinary students. During summers such students may take advantage of registering for graduate courses to be counted as elective courses in the veterinary program.
Requirements

Students with professional degrees (e.g., MD, DDS, DVM) or master’s degrees in a program-related biomedical science must complete at least 24 hours of coursework and 24 hours of Dissertation 600. Others must complete a minimum of 48 hours of coursework and 24 hours of Dissertation 600.

Comparative and Experimental Medicine 504 and 541 are required, as are 6 hours of 600-level graduate journal clubs. In addition, students must take at least 3 hours of 500- or 600-level statistics and a minimum of 8 hours of coursework in a specified discipline. Areas of emphasis may include hematology, oncology, pathology, pharmacology, toxicology, immunology, genetics, infectious disease, epidemiology, metabolism, or other areas of medicine. Exceptions to accommodate students with specific interests must be approved by the Joint Graduate Coordinating Committee after application, in writing, to the director. The doctoral committee is chosen during the first year. At least one member must be from the College of Veterinary Medicine and at least one member from the Graduate School of Medicine.

A comprehensive examination must be passed before the end of the third year of the program. In addition, students must prepare and defend a prospectus outlining their proposed research projects before the end of their third year in the program. Exceptions to these requirements are provided for medical residents pursuing doctoral degrees who must successfully complete the comprehensive examination and research prospectus before the end of their fourth year in the program.
Center for Business and Economic Research
(College of Business Administration)
William Fox, Director

The Center for Business and Economic Research (CBER) is well known within Tennessee for its extensive record of high quality public policy research related to a broad range of issues of importance to the life of Tennesseans, their economy, and their government. The research spans such diverse issues as welfare, taxation, Internet, health care, economic development, education and environmental policy. CBER is also the source of data that is used by both the public and private sectors for a wide range of purposes.

The quality and breadth of CBER’s work is also recognized across the U.S. and around the world. The public policy and academic communities from many states and countries call upon CBER researchers to analyze key policy issues.

CBER was established in 1937 as an auxiliary of the College of Business Administration at the University of Tennessee, Knoxville. It is located on the first floor of Temple Court. CBER currently has four research faculty, three faculty fellows in accounting, economics, and law, six graduate students, and an extensive support staff in the areas of research, data analysis, project management, modeling and forecasting, administration, and publications. CBER is designated as a State Data Center, allowing direct and timely access to Census and other data. Additionally, CBER staffs the college’s Technology Information Services, which provides technological support to the entire College of Business Administration.

Center for Executive Education
(College of Business Administration)
http://TheCenter.utk.edu
Alex Miller, Associate Dean

The College of Business Administration’s executive/management education efforts are facilitated through the Center for Executive Education, 702 Stokely Management Center. The center is a major outreach activity of the University of Tennessee, Knoxville, and a key link between the business community and the College of Business Administration.

Center for Information Studies
(College of Communication and Information)
www.sis.utk.edu/cis/

The Center for Information Studies (CIS) was established in June 1989 to be a focal point for research related to information systems and services. The center, located at 420 Communications Building, has performed research for the federal government, state and local governments, and business and industry. Projects have ranged from strategic planning efforts to information system and service evaluations, to modeling of scientific and technical communication. Staff of the center have been actively involved in proposal development and project performance with faculty and staff in other centers and departments at the university.

Areas of interest to the center include information systems design, information organization and retrieval in very large databases, directories and locator tools in a networked environment, design of regional library and information system networks, new technology applications, information system support for educational reform, modeling of information processes, development of measures and methods for evaluating information system performance and effectiveness.

The center offers four executive track Master of Business Administration degrees for working managers. Non-degree programs for the business community include programs in lean enterprise, supply chain management, process improvement and general management.

Much of the center’s work is customized to the needs of individual companies and provided at their sites in the U.S. or abroad.

A prominent feature of all programs is their applied nature. Through projects, assignments and workshops, participants use the courses to analyze their organizations and implement immediate changes.

Additional information about the Center for Executive Education can be found at http://TheCenter.utk.edu.

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Additional information about the Center for Executive Education can be found at http://TheCenter.utk.edu.
Center for Literacy Studies  
(College of Education, Health, and Human Sciences)  
The Center for Literacy Studies, founded in 1988, links theory and practice in the field of adult learning and literacy. The center collaborates with practitioners, policy makers, and other research organizations in Tennessee and across the nation in providing research, professional development initiatives, partnership development, innovative technology applications, and new approaches and knowledge in the field.

Center for Physical Activity and Health  
(College of Education, Health, and Human Sciences)  
The mission of the Center for Physical Activity and Health is to integrate scientific research, education, and practical applications of exercise and health science in a manner that enhances health, fitness, performance, and quality of life. The center is a research and service oriented organization designed to educate the University of Tennessee, Knoxville, and Knoxville communities about the benefits of regular physical activity as well as warn about the serious potential health outcomes of leading a sedentary existence.

A number of research projects are currently being conducted through the center. Many of these projects involve the role that physical activity plays in the prevention and treatment of obesity. In addition to supporting research, the center trains future leaders in exercise promotion, provides exercise opportunities for members of the university community, promotes exercise with the University of Tennessee and Knoxville communities, and provides exercise testing and assessment.

The center focuses its efforts in four main areas: training future leaders in exercise promotion, provides exercise opportunities for members of the university community, promotes exercise within the University of Tennessee and Knoxville communities, and provides exercise testing and assessment.

For additional information about services, contact Dr. Dixie L. Thompson at (865) 974-6040 or via e-mail at dixielee@utk.edu.

Center for Transportation Research  
(Office of Research)  
Stephen H. Richards, Executive Director  
The Center for Transportation Research, formerly the Transportation Center, was created in 1970 to foster and facilitate interdisciplinary research, public service, and outreach in the field of transportation at the University of Tennessee, Knoxville. It began operating full-time in 1972 and since then has contributed greatly to the overall research program of the university.

The center, 600 Henley Street, Suite 309, is a university-level organization administratively positioned within the College of Engineering at the University of Tennessee, Knoxville. The center’s multidisciplinary staff includes approximately 100 full-time researchers and technicians augmented with numerous faculty and students. The center is presently organized into five major divisions – Logistics and Systems Analysis, Infrastructure and Environment, Safety and Traffic Operations, Mobility Services and Policy, and Information Technology.

The center has three goals. The first is to conduct a program of research in transportation that is recognized for its excellence, comprehensiveness, innovation, productivity, and national leadership. The second is to develop and sustain the technical expertise for high quality transportation research by the faculty and students within the various departments and colleges of the University of Tennessee, Knoxville. The third goal is to serve the transportation research, service, and training needs of state and local government, business, and industry in Tennessee, the southeast region, and the nation.

Centers and Chairs of Excellence  
The Centers of Excellence grew out of Tennessee’s Better Schools Program, an initiative to upgrade state-aided education at all levels. State officials and legislators wanted to give a few outstanding academic programs in state-aided universities a special push toward prominence, well beyond regular annual increases for all programs. In 1984, the General Assembly appropriated and the governor approved $10 million for the first Centers of Excellence throughout the state. The public colleges and universities submitted their proposals for Centers of Excellence to the Tennessee Higher Education Commission, which made the final determinations. Now four of the university’s ten Centers of Excellence are sponsored by the UT Knoxville or located in Knoxville.

Concurrently, the university has received state funding, which it must match dollar for dollar, for Chairs of Excellence. These Chairs are $1 million endowed professorships in areas of significance to the university and to the individual, foundation, or corporation providing the matching gift money. Chairholders are noted within their respective academic units. The Chairs of Excellence are as follows.

KNOXVILLE  
Benard Blasingame Chair of Excellence in Agricultural Policy  
Chair of Excellence in Science, Technology and Medical Writing  
Clayton Homes Chair of Excellence in Finance  
College of Business Administration Chair of Excellence of Policy Studies  
Condra Chair of Excellence in Computer Integrated Engineering and Manufacturing  
Condra Chair of Excellence in Power Electronics Applications  
Goodrich Chair of Excellence in Transportation  
Hodges Chair of Excellence of English  
J. Fred Holly Chair of Excellence in Political Economy  
Nancy Gore Hunger Chair of Excellence in Environmental Studies  
The University of Tennessee Willis Lincoln Chair of Excellence in Physics  
Pilot Chair of Excellence in Leadership  
Ivan Racheff Chair of Excellence in Materials Science and Engineering  
Ivan Racheff Chair of Excellence of Plant Molecular Genetics  
Forrest and Patsy Shumway Chair of Excellence in Romance Languages  
Bernadette E. Schmitt Chair of Excellence of History

MEMPHIS  
Maury W. Bronstein Chair of Excellence in Cardiovascular Physiology  
Crippled Children’s Hospital Foundation  
William and Dorothy Dunavant Chair of Excellence in Pediatrics  
Federal Express Chair of Excellence in Pediatrics  
First Tennessee Chair of Excellence in Clinical Pharmacy  
Thomas A. Gerwin Chair of Excellence in Physiology  
Goodman Chair of Excellence in Medicine  
J. R. Hyde Chair of Excellence in Rehabilitation Engineering  
Le Bonheur Chair of Excellence in Pediatrics  
E. Erick Muirhead Chair in Pathology  
Plough Foundation Chair of Excellence in Pediatrics  
Second Le Bonheur Chair of Excellence in Pediatrics  
Semmes-Murphey Chair of Excellence in Neurology  
Mark S. Soloway Chair of Excellence in Urology  
Harriet S. Van Vleet Chair of Excellence in Biochemistry
The combination of the Centers of Excellence and Chairs of Excellence adds a dimension to the University of Tennessee that is not easily equaled by other institutions. UT’s reputation as the premiere university in the state and as a regional and national leader in instruction, research, and public service is enhanced as a result of the infusion of these special funds.

For information concerning the individual centers sponsored by the University of Tennessee, contact:

**Center for Laser Applications**
*Dr. William H. Hofmeister, Director*
Space Institute  
B. H. Goethert Pkwy.  
Tullahoma, Tennessee 37388-8897  
(931) 393-7485  
(jlewis@utsi.edu)

**Center of Excellence for Computer Applications (CECA)**
*Dr. Clinton Smullen, Director*
UT Chattanooga  
124 Grote Hall  
Chattanooga, Tennessee 37403  
(423) 755-4787  
(csmullen@cecasun.utc.edu)

**Center of Excellence for Livestock Diseases and Human Health**
*Dr. Robert N. Moore, Director*
The University of Tennessee College of Veterinary Medicine  
Veterinary Teaching Hospital  
Knoxville, Tennessee 37996  
(865) 974-5570  
(rmoore1@utk.edu)

**Center of Excellence for Materials Processing**
*Dr. Carl McHargue, Director*
The University of Tennessee, Knoxville  
514 East Stadium Hall  
Knoxville, Tennessee 37996-2351  
(865) 974-7680  
(crl@utk.edu)

**Center of Excellence for Neuroscience**
*Dr. David V. Smith, Director*
The University of Tennessee Health Science Center  
855 Monroe Avenue, Suite 515  
Memphis, Tennessee 38163  
(901) 448-5957  
(dvsmith@utmem.edu)

**Center of Excellence for Pediatric Pharmacokinetics and Therapeutics**
*Dr. Richard A. Helms, Director*
The University of Tennessee Health Science Center  
62 S. Dunlap Street, Suite 210  
Memphis, Tennessee 38163  
(901) 448-6034  
(rhelms@tennessee.edu)

**Molecular Resource Center of Excellence**
*Terry Mark-Major, Manager*
The University of Tennessee Health Science Center  
956 Court Avenue, Room A130  
Memphis, Tennessee 38163  
(901) 448-2656  
(mrc@utmem.edu)

**The Science Alliance**
*Dr. Jesse Poore, Director*
University of Tennessee  
101 South College  
Knoxville, Tennessee 37996  
(865) 974-6765  
(jpoore@utk.edu)

**Waste Management Research and Education Institute**
*Dr. Gary Sayler, Director*
The University of Tennessee, Knoxville  
The University of Tennessee Conference Center, Suite 311  
Knoxville, Tennessee 37996  
(865) 974-8080  
(sayler@utk.edu)

**Early Learning Center for Research and Practice**
*(College of Education, Health & Human Sciences)*
[http://elc.utk.edu](http://elc.utk.edu)
*Rena Hallam, Executive Director*

The Early Learning Center for Research and Practice, operated by the Department of Child and Family studies since 1927, currently offers an early education program for young children ages six weeks to five years, including children with disabilities. Through its high-quality model program for children and for university students, the Early Learning Center serves three purposes – to promote the research and scholarship activities of the department and other university faculty and students through observation and study of young children, their families and teachers; to prepare undergraduate and graduate child development and early education professionals to work effectively with young children and families; and to provide a model early education program for children, families, and early childhood professionals.

Housed in three locations, the ELC sites are all equipped with videotaping capabilities, small group research rooms, and observation booths that facilitate observation and research. A variety of research projects (such as the development of creativity in young children, early childhood assessment, teachers as collaborative researchers, and nutritional preferences of toddlers) are ongoing.

The Early Learning Center is accredited by the National Academy of Early Childhood Programs, a division of the National Association for the Education of Young Children and is a Tennessee Three-Star rated child care facility.

For more information, check the website at [http://elc.utk.edu](http://elc.utk.edu).
Institute for a Secure and Sustainable Environment  
(Office of Research)  

The University of Tennessee's Institute for a Secure and Sustainable Environment (ISSE), pronounced ICE, promotes development of policies, technologies, and educational programs that cut across multiple disciplines, engage the university's research faculty and staff, and grow in response to pressing environmental issues facing the state, the nation, and the globe. ISSE, which is located in Suite 311 in the UT Conference Center Building, 600 Henley St., became operational on July 1, 2006.  

The institute represents a restructuring and expansion of the Waste Management Research and Education Institute – a state Center of Excellence established in 1985 – to focus more broadly on environmental challenges. The institute includes programs previously found in two other long-standing organizations housed at the university and devoted to environmental research: the Joint Institute for Energy and Environment and the Energy, Environment and Resources Center. This consolidation of environmental research activities enhances collaboration, facilitates more efficient administration, and builds on existing strengths and ongoing research efforts.  

Though the institute pursues an interdisciplinary research agenda, its efforts fall into the following program areas: water resources, environmental security, energy economics and policy, environmental sustainability, and environmental education and social perspectives.  

Each program area develops research programs and projects specific to the focus topic and, when appropriate, draws on the expertise of specialists from other disciplines at the university as well as from the larger public and private research community.  

Visit the ISSE Web site at: isse.utk.edu.

Institute of Agriculture  
Buddy Mitchell, Interim Vice President for Agriculture  

The Institute of Agriculture dates to 1869 when the university was designated as Tennessee's Federal Land-Grant Institution. Since the enabling federal legislation, agriculture education programs expanded to include mission-oriented basic and applied research in agricultural sciences and natural resources, and extending this knowledge to the citizens of the state. The Institute of Agriculture is composed of four units – the Tennessee Agricultural Experiment Station, UT Extension, the College of Agricultural Sciences and Natural Resources, and the College of Veterinary Medicine.  

Agricultural Experiment Station  
Thomas H. Klintz, Interim Dean  

The university’s Board of Trustees established the Agricultural Experiment Station on June 8, 1882, five years before the passage of the Hatch Experiment Station Act by the U.S. Congress. The university was one of the first five institutions in the U.S. to establish an Agricultural Experiment Station. Since its creation, the Station’s priority has been research to improve agricultural production, products, and marketing in Tennessee. Over time, programs have expanded to include natural resources and environmental stewardship.  

The mission-oriented research initiatives of the Tennessee Agricultural Experiment Station, which are also reflected in thematic areas of the academic programs, are  

- Molecular agriculture – applying the tools of biotechnology to agricultural and natural resources problems.  
- Agro-environmental systems – systems approach to production and natural resources problems.  
- Innovative technologies – engineering and processing technologies in agriculture and food systems.  
- Agribusiness policies and practices – developing policies and practices that have economic, environmental and societal benefits.  

The seven academic departments located in Knoxville are part of the Tennessee Agricultural Experiment Station. The faculty members, with joint appointments in the Experiment Station and the College of Agricultural Sciences and Natural Resources, are the graduate faculty participating in the eleven Master of Science and five doctoral programs. Research is conducted on campus and at ten Research and Education Centers located across Tennessee and operated by the Experiment Station. The Experiment Station also supports graduate student assistanships.

University of Tennessee Extension  
Charles Goan, Interim Dean  

The University of Tennessee Extension was established in 1914. Its purpose is to extend through various educational means agricultural, natural resources, and family and consumer sciences information to the citizens in the state.  

The program is carried on through offices in each of the 95 counties of the state. Educational emphasis includes work in four major program areas: agriculture and natural resources, resource development, family and consumer sciences, and youth education through 4-H Clubs. County Extension staff members working directly with local people are supported in various disciplines by faculty who are stationed either in Knoxville, Nashville, or Jackson. The University of Tennessee Extension works cooperatively with faculty and staff at Tennessee State University in administering programs.  

Faculty members, who are State Specialists, and area agents collaborate with other faculty members of the Institute of Agriculture to conduct ongoing and timely, issue-based applied research to meet the needs of agricultural producers, foresters, and others involved with the food and fiber system. Many of the Extension faculty members are involved with the departmental graduate programs. UT Extension operates as one of the four units in the Institute of Agriculture. The state is divided into three regions with directors located in their respective regions. Regional headquarters are maintained in Knoxville, Nashville and Jackson. Extension operates in a three-way partnership among county, state and federal governments. The University of Tennessee represents the state and federal government, and a County Agricultural Extension Committee represents county government in this partnership.

University Libraries  
Barbara I. Dewey, Dean  
Jill Keally, Interim Associate Dean  
Pauline Bayne, Interim Assistant Dean  
http://www.lib.utk.edu/  

Professors  
Baker, G., MLS  .............................................. Alabama  
Bayne, P., MLS .............................................. North Carolina  
Britten, W., MLS .............................................. Clarion  
Crowther, K., Mn. ............................................ Emory  
Dewey, B., MLS .............................................. Minnesota  
Felder-Hoehne, F., MSLS  .................................... Atlanta  
Leach, S., Mn ..................................................... Emory  
Phillips, L., MLS .............................................. Rutgers  
Smith, R., MSLS .............................................. Illinois  

Associate Professors  
Akins, D., MLS .............................................. Wisconsin  
Berry, T., MLS .............................................. Tennessee  
Bridges, A., MLS .............................................. Rhode Island  
Deeken, J., MSLS ............................................ North Texas State  
Dixon, L., MSLS .............................................. Tennessee  
Garrett, M., MLS .............................................. Vanderbilt  
Keally, J., MLS .............................................. Tennessee  
Manoff, M., MLS .............................................. South Carolina  
Prescod, J., MSLS .......................................... Western Michigan  
Purcell, A., MLS .............................................. Maryland
The University of Tennessee Libraries own approximately 2.4 million volumes and subscribe to more than 32,000 periodicals and serial titles.* The UT Libraries are committed to providing access to information in all formats. A strong collection of electronic resources are available through the Libraries’ Web page at www.lib.utk.edu. UT’s Digital Library Center hosts a growing number of digital collections. The Libraries’ membership in the Association of Research Libraries reflects the University’s support of large collections of library materials to meet the needs of a comprehensive university curriculum.

Experts at the reference desk in each library offer help and assistance in using the library for research. AskUs.Now (www.lib.utk.edu/refs/askusnow/) provides chat, e-mail, IM (instant message), and telephone connections to librarians. Students will find a wide variety of materials and services in the main library (John C. Hodges Library), four branches on the Knoxville campus (Agriculture and Veterinary Medicine Library, Map Library, Music Library, and Special Collections), and the Social Work Library in Nashville.

Students can search the library catalog and hundreds of databases at any library location – and through the UT Libraries’ website. Interlibrary Services is available to help students find and retrieve materials that are not available in the UT Libraries. Workshops and classes are offered throughout the semester to help students learn how to get the most of the Libraries’ services. The services and facilities of the UT Libraries are accessible to persons with disabilities.

The John C. Hodges Main Library (1015 Volunteer Blvd.) is a 350,000 square-foot building housing collections in all subject areas. Reference assistance and research consultation are available in Reference Services (Room 135) and the Commons (Rooms 220 and 235). The Commons, which is jointly staffed by the University Libraries and the Office of Information Technology, offers a computer help desk, a wide range of software applications and computer equipment, spaces for individual and group study, and loaner laptops configured to access the wireless network. The Commons is open continuously from noon on Sunday to midnight on Friday, M.L.S Fall and Spring Semesters. The Tennessee CyberCafe, with reading tables and a coffee shop, also is open for late night study. The Studio (Room 245) offers students a state-of-the-art lab for graphics, video and web production. Still and video cameras are available for checkout from The Studio. The Center for Children’s and Young Adult Literature on the third floor provides a study collection of children’s books.

The Agriculture and Veterinary Medicine Library (Room A-113, Veterinary Teaching Hospital) has a strong collection in agriculture; veterinary, comparative and human medicine; environmental studies and biodiversity; and related biological sciences.

The Map Library (Room 15, basement of the Hoskins Library, 1401 Cumberland Ave.) houses a large collection of sheet maps, atlases, journals, and digital resources related to cartography and GIS. Materials in print, film, and digital formats are gathered from commercial sources as well as the Government Depository program.

The Music Library (301 Music Bldg.) has a comprehensive collection of music and music literature, including books, scores, audio and video recordings, current periodicals, and microfilm. Most materials in the Library of Congress “M” classification are located here. Special Collections (2nd floor, west wing, of the Hoskins Library) is dedicated to building collections of manuscripts, rare books, and other unique research materials. Collection strengths include Tennessee authors, Tennessee history and politics, Oak Ridge, and TVA. The Great Smoky Mountains Regional Collection is an ongoing effort to collect and preserve materials on the region. Students are welcome to use Special Collections. Materials from Special Collections cannot be checked out, but they can be used in the Special Collections Reading Room. The University Archives are also housed in the Hoskins Library. The Archives contain official records of the university; items published by its units, departments, and agencies; and materials that document University of Tennessee life.

The Social Work Library (Room 292, 193-E Polk Ave., Nashville) serves College of Social Work students in field practice across the state. The library has a working collection of materials in social work and related disciplines.

The Law Library on the Knoxville campus and the libraries located on the campuses in Chattanooga, Martin, Memphis, and Tullahoma are separately administered. The students and faculty of the university can use all of the libraries affiliated with The University of Tennessee.

**Maintenance and Reliability Center**

**College of Engineering**

Thomas V. Byrley, Director

The Maintenance and Reliability Center (MRC), located at East Stadium Hall, was created in 1996 to provide an international center for research, development and application of advanced maintenance and reliability engineering. Over 30 industrial firms and a network of universities and national laboratories have joined with the University of Tennessee, Knoxville, in this endeavor. The four-fold mission of the MRC consists of education, research and technology assessment, information sharing, and business support and alliances. The mission has established maintenance and reliability engineering as an interdisciplinary activity with application across a broad spectrum of industrial activities. In addition to the technology, the MRC stresses the development of management techniques that will provide industry with the means to assess the availability, costs and benefits of advanced maintenance and reliability engineering practices.

For information on the educational opportunities offered by the center, check the Web site at http://www.engr.utk.edu/mrc/.

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* Data describe the Knoxville campus, excluding the Law Library.
Nutrition Institute
(College of Education, Health, and Human Sciences)
Michael B. Zemel, Director

The Nutrition Institute is a system wide, multidisciplinary consortium of faculty who are engaged in clinical and experimental nutrition research, teaching and service. Its expertise and resources are multifaceted including tools and techniques used in cell biology, epidemiology, metabolism and clinical training.

The multidisciplinary nature of nutrition has created a situation where nutrition research and teaching is dispersed among a number of academic units, including the Department of Nutrition in the College of Education, Health, and Human Sciences as well as in several departments in the colleges of Agricultural Sciences and Natural Resources, Arts and Sciences, Medicine, and Veterinary Medicine. The institute fosters collaboration among all efforts in nutrition sciences, coordinates collaborative research programs in nutrition and provides a unified forum for exchange and interactions with the national and international nutrition community. In addition, by creating formal ties among the units within the university that are involved in undergraduate, graduate and professional education in nutrition, teaching resources are pooled to strengthen nutrition-related instruction in these units.

Office of Information Technology
http://oit.utk.edu

The Office of Information Technology (OIT) provides computing and telecommunications resources and services for students, faculty, and staff. Information about OIT is available on the OIT Web site http://oit.utk.edu.

OIT provides the core information technology equipment and services for The University of Tennessee, Knoxville. OIT provides public-access computer labs, central computing, administrative information systems, and network services, as well as information security for UT Knoxville.

Individual computer accounts are provided at no charge for all UT Knoxville students. The student’s UT email account is the official way the university communicates with students. These accounts may be used for e-mail, course work, research, and personal Web pages. Information and on-line registration for computer accounts are available at http://oit.utk.edu/accounts/. Students are also encouraged to download http://antivirus.utk.edu and use Antivirus software supplied by OIT at no cost to the student.

Students on the Knoxville campus may access the Internet through wireless, direct Ethernet, or dial-up connections. UT Knoxville’s wireless infrastructure is available in most of the academic and administrative buildings on the Knoxville campus.

To provide access to computing facilities on campus, OIT staffs several computing labs including the new Commons located on the second floor of Hodges Library. The computing labs are equipped with Windows XP and Mac OS X computers along with black and white and color laser printers, scanners, and DVD/CD writers. A variety of industry standard software applications are available for use on the machines in the computing laboratories. Refer to http://oit.utk.edu/labs for more information.

OIT Help Desk

OIT provides the telephone Help Desk as a centralized source of information and service for the computer and network resources managed by OIT. Help Desk Services are available to all University of Tennessee students. To contact the Help Desk, dial 974-9900. The Help Desk may be contacted online by filling out the Help Desk request form which can be found at http://oit.utk.edu/contact.html. For more information, visit the Help Desk Web site at http://oit.utk.edu/helpdesk.

OIT Customer Service Center

OIT maintains a Customer Service Center that centrally locates all contact points for walk-in support on related OIT services. Students can receive assistance and/or training on a wide variety of topics at the center. These services include installing academic software free of charge on personally owned computers and helping students diagnose problems with their computers. The center also cleans up virus and spyware infected machines and helps students upgrade operating systems. The Customer Service Center is located in the Commons, 2nd Floor Hodges Library and is open M-Th 9-9, F 9-4, Sun 4-9

Technology Training

Several courses are offered aimed at improving skills with the technology available at UT. Life Preserver: An Introduction to UT Computing is offered several times each semester on supported application software and operating systems. Other courses include those about MS Office products, Dreamweaver, JavaScript, using the Internet and search engines, and Web Page Essentials (four levels of HTML training). There is also a series of courses on Adobe Photoshop. Please refer to http://web.utk.edu/~training for more information.

Computer-Based Training

Computer-Based Training (CBT) is a self-paced series of interactive, Web delivered, learn-as-you-go courses offered on many computing topics. CBT offers courses for Microsoft products (Word, Excel, etc.), Internet topics (Internet basics, How to create a Web page, etc.), and more advanced topics, such as Java Script, Visual Basic, object-oriented techniques, and open systems. There are over 800 courses available. This training is free to students. For registration and access to the CBT courses on the Web go to http://oit.utk.edu/cbt/.

Statistical Consulting Center

The center’s mission is to help UT students, faculty, and staff enhance the quality of their research by working together to effectively apply analytical methods, especially statistics. The software we support includes SPSS, SAS, Maple, MATLAB, LabVIEW, QDA Miner, WordStat, Enterprise Miner and Text Miner. The SCC can help you with determining sample sizes, designing surveys and deploying them on web pages, scanning and scoring Scan Forms, acquiring and managing data, analyzing or mining data or text, visualizing data through interactive or presentation graphics, and interpreting the results. Assistance is available by appointment via the Help Desk at 974-9900, by walk-in at 200 SMC, and by e-mail at StatHelp@utk.edu. For details, see http://oit.utk.edu/scc/.

Innovative Technology Center

The Innovative Technology Center (http://itc.utk.edu) provides the leadership, support, resources, and training necessary to help University of Tennessee faculty, graduate teaching assistants, and academic teaching staff make effective use of technology in their teaching, both online and in the classroom. The ITC supports the university’s academic community by providing free production services for the design and development of web-based course materials, implementing faculty grants for instructional technology projects, and administering Online@UT, the university’s Blackboard-powered integrated online academic community. Students can get help with Online@UT/Blackboard by calling the OIT Help Desk at 974-9900.

Psychological Clinic
(College of Arts and Sciences)
Lance Laurence, Director

The Psychological Clinic supports graduate research and training in clinical psychology. Psychological assessment and psychotherapy are offered on an outpatient basis to the general public as well as to university students and staff.
Research Consortiums

The University of Tennessee, Knoxville, is a member of three not-for-profit research consortiums – Oak Ridge Associated Universities (ORAU); Southeastern Universities Research Association (SURA); and Universities Research Association, Inc. (URA).

Oak Ridge Associated Universities (ORAU). Since 1946, students and faculty of the University of Tennessee, Knoxville, have benefited from its membership in Oak Ridge Associated Universities (ORAU). ORAU is a consortium of 91 colleges and universities and a contractor for the U.S. Department of Energy (DOE) located 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 manages, undergraduates, graduates, postgraduates, as well as 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, geological sciences, physics, pharmacology, ocean sciences, biomedical sciences, nuclear chemistry, and mathematics. Appointment and program length range from one month to four years. Many of these programs are especially designed to increase the numbers of under-represented minority students pursuing degrees in science- and engineering-related disciplines. A comprehensive listing 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 Programs, which is available at http://www.orau.gov/orise/educ.htm, or by calling either of the contacts below.

ORAU's Office of Partnership Development seeks opportunities for partnerships and alliances among ORAU's members, private industry, and major federal facilities. Activities include faculty development programs, such as the Ralph E. Powe Junior Faculty Enhancement Awards, the Visiting Industrial Scholars Program, consortium research funding initiatives, faculty research, and support programs as well as services to chief research officers.

For more information about ORAU and its programs, contact Lillian T. Mashburn; Director, Office of Federal Relations; ORAU Councilor for the University of Tennessee or Monnie E. Champion, ORAU Corporate Secretary at (865) 576-3306; or visit the ORAU home page: http://www.orau.org.

Southeastern Universities Research Association (SURA). SURA is a nonprofit consortium of forty-one universities in thirteen Southeastern states and the District of Columbia. SURA's goals are to foster excellence in scientific research, to strengthen the scientific and technical capabilities of the nation and the Southeast, and to provide outstanding training opportunities for the next generation of scientists and engineers. The SURA-Oak Ridge National Laboratory (ORNL) Summer Cooperative Research Program in Materials Science and Engineering was established in 1989 to promote collaborations between individual university investigators and ORNL researchers. The SURA Continuous Electron Beam Accelerator Facility (CEBAF) Graduate Fellowship Program offers awards to promising graduate students enrolled or enrolling in master's or doctoral programs at SURA member institutions and whose research interests correspond to research activities to be conducted at CEBAF (i.e. nuclear and related particle physics, accelerator physics, and associated scientific and engineering fields).

Universities Research Association, Inc. (URA). URA, Inc. is a management operating contractor for the U.S. Department of Energy (DOE) for the design, construction, and operation of the Fermi National Accelerator Laboratory (Fermilab) located near Batavia, Illinois. URA provides funds to support courses for graduate students at Fermilab. Member institutions have graduate study programs in science and are active in particle physics and astrophysics.

Tennessee Water Resources Research Center

(Office of Research)
http://eerc.ra.utk.edu/divisions/WRRC.html
Timothy R. Gangaware, Associate Director
Dr. Bruce A. Tischantz, Senior Research Associate
Ruth Anne Hanahan, Senior Research Associate

The Tennessee Water Resources Research Center, 600 Henley Street, Suite B060, is a federally designated institute for sponsoring and coordinating water research for the state. The mission of the center is: (1) to assist and support all the academic institutions of the state, public and private, in pursuing water resources research which addresses a wide range of problems of interest to the state, region, and nation; (2) to provide for information dissemination and technology transfer services to state and local government bodies, academic institutions, professional groups, environmental organizations, and others, including the general public, who have an interest in water resources matters; and (3) to promote education and training in fields relating to water resources and to encourage the entry of promising students into careers in these fields. The center maintains a technical library that includes numerous water resources-related databases on CD-ROM and other references in support of its broad-based program involving watershed management, water quality education, urban stormwater management, erosion prevention, and sediment control. The center sponsors and conducts training workshops on stormwater management and erosion prevention and sediment control for the state.

Textiles and Nonwovens Development Center

(Office of Research)
Linda R. Painter, Director
G Allan Stahl, Project Director
Jack L. Wyrick, Operations Supervisor

The Textiles and Nonwovens Development Center (TANDEC) is a research and application development facility for melt processed nonwoven fabrics. These are materials used in a variety of products such as disposable diapers, wipes, hospital gowns and drapes, and protective clothing and masks. Officially dedicated in 1990, TANDEC was established through a grant from ExxonMobil Chemical Company. The Center brings together academics and industry to provide leadership in research, education, and industry services, by developing innovative materials, studying basic engineering and scientific aspects of products and processes, building cross-disciplinary research groups, and providing a range of laboratory and pilot scale equipment. Opportunities exist for faculty and students to work with pilot scale processing lines and interact with industrial engineers and scientists.

Tourism Institute

(College of Education, Health, and Human Sciences)
Stephen C. Morse, Director

Through education, research, and public service the Tourism Institute at the University of Tennessee seeks to add value to Tennessee’s largest sector of the economy – hospitality and tourism. Centered in the department of Retail, Hospitality, and Tourism Management in the College of Education, Health and Human Sciences, many research projects involve maintaining databases of tourism trends, econom-
ic impacts and educational issues in management, marketing, and the development of market valued tourism products. The institute will assist public and private tourism professionals in efficient and profitable operational analysis as well as marketing and economic assistance.

Since tourism is a demand driven industry, understanding consumer demand and tourist behavior is essential to expanding markets and increasing demand for the Tennessee tourism product. Recognizing the tourism product includes consumer spending on lodging, retail shopping, food and beverage, transportation, and attractions provides special opportunities to track the impact and growth of these hospitality related industries as a result of tourist spending. It also works with Tennessee and Southeast regional public and private tourism organizations in developing educational, research and service projects to grow the state and regional tourism economy. The institute works with the Tennessee Department of Tourism Development, College of Agriculture and Natural Sciences and other agencies in developing research studies to expand the tourism industry.

The University of Tennessee Space Institute

Donald C. Daniel, Associate Vice President and Chief Operating Officer

The Space Institute is a graduate education and research institution located on a 365-acre lakeshore campus in Middle Tennessee. Established in 1964, UT ISI has evolved into an internationally recognized engineering and science graduate school and a premier research center. The Institutes graduates include award-winning scientists, leaders in the aerospace industry, heads of large engineering companies and space pioneers, including astronauts. The accredited academic programs and educational policies of the Space Institute have their origins in appropriate departments of the University of Tennessee, Knoxville.

The faculty members at the institute carry out the academic programs through classroom teaching, informal seminars, active research, and directing the research of their students in an environment of creative work and advanced study. Programs are available to students devoting full-time or part-time effort toward M.S. and Ph.D. degrees and those who wish to pursue post-doctoral research. Off-campus offerings are made available through the use of distance learning technologies in some academic disciplines.

The Space Institute extends its scope well beyond space-specific disciplines, and offers graduate degree programs in mechanical and aerospace engineering/engineering science (MAES), aviation systems, industrial and information engineering/engineering management, electrical engineering, physics and mathematics.

The institute’s faculty, staff and students are making a difference for our community, state and nation. Within several diverse research areas, faculty-student teams of aerospace engineers, mathematicians, mechanical engineers, physicists, electrical engineers, and materials scientists/engineers perform multidisciplinary research. In addition to the fundamental studies characteristic of each discipline, research opportunities are available in many areas including applied fluid dynamics, biomedical physics, carbon based materials, computational mechanics, laser applications, engineering management and flight systems.

The Center of Excellence in Laser Applications offers graduate studies and research opportunities in laser diagnostics, laser materials interactions, pico-second processes, and coherent and non-linear optic and biophysical applications.

The institute was established in part to increase the research and engineering resources of Tennessee in relevant scientific and technical areas and in part to interface university faculty and student research with the Air Force Arnold Engineering Development Center. The faculty, research activities, and facilities of the Institute, and those available at Arnold Center through appropriate contractual arrangements, provide students an unusual opportunity for significant research in these areas.

Students who enroll at USTI are admitted to graduate study at the University of Tennessee, Knoxville. Graduate Research Assistantships are available for qualified students. Further information may be obtained from the Dean for Academic Affairs, the University of Tennessee Space Institute, Tullahoma, Tennessee 37388.

University Outreach and Continuing Education

Norvel Burkett, Assistant Vice Chancellor

The University of Tennessee, Knoxville, is committed to its land-grant mission of public service. The institution meets that mission by extending its continuing education services and programming resources through outreach initiatives. University Outreach and Continuing Education works with academic departments to offer courses, educational services and programs. The division offers programs using a variety of modes, helping people of all ages achieve degrees and certificates, accomplish professional development goals, and pursue intellectual and self-improvement interests.

Programs and courses are based upon student needs and desires, whether for self-motivated learning; for leisure and recreational programs; or for professional promotion, certification, licensure, re-licensure, or mid-career changes. The division provides these opportunities through program coordination and development of the four departments – Department of Conferences, Department of Distance Education and Independent Study, English Language Institute, and Professional and Personal Development.

For more information, contact

University Outreach and Continuing Education
The University of Tennessee
313 Conference Center Building
Knoxville, Tennessee 37996-4137
Phone (865) 974-3181, fax (865) 974-6629
E-mail outreach@tennessee.edu
Web site www.outreach.tennessee.edu

Department of Conferences

Robert Gibbs, Director

The Department of Conferences, housed in the Conference Center Building in downtown Knoxville, provides management services to university departments and faculty or outside groups that desire to hold an educational meeting anywhere in Tennessee or across the United States.

The department assists organizations in designing and managing programs to meet the needs of attendees. The staff provides professional guidance and management for small group meetings as well as for major conventions of several thousand delegates. Consulting and support services can include planning and budgeting, registration, lodging, food services, promotional materials, meeting-site management and all details to ensure a successful event. Some programs qualify for Continuing Education Units (CEUs), which become a permanent record maintained by the University Outreach and Continuing Education.

Additional information may be obtained from
University of Tennessee Conferences
University Outreach and Continuing Education
The University of Tennessee
P.O. Box 2648
Knoxville, Tennessee 37901
Phone (865) 974-0250, fax (865) 974-0264
E-mail conferences@tennessee.edu
Web site www.outreach.tennessee.edu/conferences
University Conference Center

Robert Gibbs, Director

The University Conference Center, managed by the Department of Conferences, offers quality meeting facilities and service to university units, business and industry groups, professional organizations, and government agencies. Professional groups and interested individuals can request interactive videoconferencing to locations worldwide. The University Conference Center is located at 600 Henley Street in downtown Knoxville.

Additional information may be obtained from
UT Conference Center
University Outreach and Continuing Education
The University of Tennessee
Suite 212
Knoxville, Tennessee 37996
Phone (865) 974-0250, fax (865) 974-0264
E-mail conferences@tennessee.edu
Web site www.outreach.utk.edu/conferences

English Language Institute

Jim Hamrick, Director

The English Language Institute (ELI) offers a non-credit language-study program. It is designed to assist students in their pursuit of career goals or educational objectives in the United States. The courses emphasize development of communicative ability in listening, speaking, reading, and writing. Faculty members are trained in teaching English to speakers of other languages and different national backgrounds.

The curriculum consists of eight proficiency levels: 101-108, Introductory through Pre-Academic.

Classes meet each day with emphasis on English Structure (Grammar); Listening Comprehension, Writing/Composition (Rhetoric), Conversation Practice for Communicative Purposes, Reading and Vocabulary.

Classes also assist students in pronunciation, test-taking strategies, U.S. culture orientation, and university study skills.

ELI offers on and off-campus classes for professional and academic audiences. ELI also offers seminars for international graduate students who need to improve their spoken English or pedagogical skills for the purpose of serving as graduate teaching assistants.

Additional information may be obtained from
English Language Institute
University Outreach and Continuing Education
The University of Tennessee
907 Mountcastle Street
Knoxville, Tennessee 37996-3505
Phone (865) 974-3404
Fax (865) 974-6383
E-mail eli@tennessee.edu
Web site www.outreach.tennessee.edu/eli

Department of Professional and Personal Development

Mary F. Jerger, Director

The Department of Professional and Personal Development provides a comprehensive array of non-credit courses, certificates, and seminars designed to serve the needs of individuals and businesses in Knoxville and surrounding communities. Courses are offered on the university campus, at off-campus locations (including two Oak Ridge classrooms), and online. Classes are taught by university faculty, staff, and community experts. Courses also are delivered on-site for business clients, with instructional services tailored to the needs of each group.

Business topics include professional development, career planning, computer training, and several specialized certificate programs. Personal interest topics range from creative writing to art, dance, gardening, music, and sports. There are also courses that meet requirements of the state or other agencies for certification in real estate and financial planning.

Special programming also includes Kids U which provides summer hands-on workshops for elementary and secondary education students; Seniors for Creative Learning, a membership-based program focusing on issues and courses for senior adults; and the Smoky Mountain Field School, a program sponsored with Great Smoky Mountains National Park.

For further information or to register, contact
Department of Professional and Personal Development
University Outreach and Continuing Education
The University of Tennessee
313 Conference Center Building
Knoxville, Tennessee 37996-4137
Phone (865) 974-0150
Fax (865) 974-0154
E-mail ProfessionalPgms@utk.edu
Web site www.outreach.utk.edu/ppd

Department of Distance Education and Independent Study

George H. Hoemann, Assistant Dean

The Department of Distance Education and Independent Study, in concert with academic departments, offers Internet-based, Web-delivered classes, and programs leading to certificates and degrees. The College of Communication and Information and the College of Engineering offer Master’s degree programs through Web-based courses, while the Departments of Nuclear Engineering and Statistics offer courses leading to degree and certificate programs. Other undergraduate and graduate classes and programs are available, as well as a variety of individual courses in many disciplines. Current course availability can be found on the Web at anywhere.tennessee.edu.

The department provides services and support for faculty, students, and industry interested in flexibly-delivered education. The Internet eLearning Institute provides certificate programs, professional development courses and training.

For information and registration forms, contact the Distance Education Program at
Distance Education and Independent Study
University Outreach and Continuing Education
The University of Tennessee
600 Henley Street, Suite 208
Knoxville, Tennessee 37996-4126
Phone (865) 974-1534 or (800) 670-8657
TDD (865) 974-5078
Fax (865) 974-4684
E-mail DistEducation@tennessee.edu
Web site education@tennessee.edu
Courses of Instruction

REGISTRATION NOTES
(RE) Prerequisite(s) and Corequisite(s) will be enforced by the Registration System in the future. They are currently enforced by the department.
(DE) Prerequisite(s) and Corequisite(s) are enforced by the department.
Registration Restrictions are enforced by the Registration System.

Accounting (009)
502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

507 Financial Reporting Research and Contemporary Issues (3) Theory and practice of contemporary financial reporting issues are covered with an emphasis on researching the authoritative accounting literature. Specific contemporary issues covered vary each semester.
Comment(s): Master of Accountancy admission or consent of instructor required.

518 Professional Standards (3) Basic standards and contemporary issues relevant to assurance providers. Actual practice cases are used to illustrate application.
Comment(s): Master of Accountancy admission or consent of instructor required.

519 Seminar in Business Risk and Assurance Methodology (3) Business risk and emerging methodology used by assurance providers.
Comment(s): Admission to a graduate program or consent of instructor required.

521 Governmental, Not for Profit, and Management Accounting (3) Accounting principles and reporting models for governmental and not-for-profit organizations. Uses of management accounting information in decision making and performance evaluation.
Comment(s): Admission to a graduate program or consent of instructor required.

530 Tax Research, Accounting Practice, and Procedures (3) Methods of researching tax issues within the federal tax system with emphasis on Internet-based research tools. Tax accounting periods and methods. Tax procedures for dealing with the Internal Revenue Service. Tax practice standards and ethical concerns.
Comment(s): Master of Accountancy admission or consent of instructor required.

531 Tax Strategy and Entity Taxation (3) Introduction to tax research. Current issues in tax strategy and planning including investment models, implicit taxes, organizational form, and other selected topics. Income taxation of business entity operations including financial statement implications of income taxes.
Comment(s): Master of Accountancy admission or consent of instructor required.

532 Corporate Taxation and Reorganizations (3) Current issues in corporate taxation including organization and capital structure, distributions, liquidations, acquisitions, and reorganizations. Course emphasizes group projects and presentations. Web-based research tools used extensively.
(DE) Prerequisite: 531.
Comment(s): Master of Accountancy admission or consent of instructor required.

533 Taxation of Partnerships and S Corporations (3) Current issues in partnership and S corporation taxation including partnership formation, operations, allocations, and distributions; LLCs; S corporation election and operations; and comparisons of different flow-through entities. Course emphasizes group projects and presentations. Web-based research tools used extensively.
(DE) Prerequisite or (DE) Corequisite: 531.
Comment(s): Master of Accountancy admission or consent of instructor required.

539 Multi-Jurisdictional Tax Planning and Policy (3) International and state tax law as it pertains to business transactions. Particular emphasis is placed on identifying tax planning opportunities and designing tax strategies to meet planning objectives.
Comment(s): Master of Accountancy admission or consent of instructor required.

592 Graduate Internship in Accounting (3) Full-time resident professional employment for one academic semester involving qualified job experience, written report of responsibilities, and evaluation of student performance.
Comment(s): Master of Accountancy admission or consent of Master of Accountancy advisor required.

593 Individual Research in Accounting (3) Directed research in topic of mutual interest.
Repeatability: May be repeated. Maximum 6 hours.
Comment(s): Master of Accountancy admission or consent of Master of Accountancy advisor required.

600 Doctoral Research and Dissertation (3-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

611 Doctoral Seminar in Accounting (3) Analysis of issues reflected in accounting literature.
Registration Restriction: Consent of PhD program advisor.

612 Doctoral Seminar in Accounting (3) Analysis of issues reflected in accounting literature.
Registration Restriction: Consent of PhD program advisor.

619 Doctoral Research in Accounting (3) Study of research methodology and application of various research methods in accounting literature.
Registration Restriction: Consent of PhD program advisor.

621 Accounting Colloquium (1) Research and discussion of contemporary issues in practice of accounting.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 4 hours.
Registration Restriction: Consent of PhD program advisor.

622 Accounting Colloquium (1) Research and discussion of contemporary issues in practice of accounting.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 4 hours.
Registration Restriction: Consent of PhD program advisor.
Advertising (012)

490 Special Topics (3) Detailed study of a specialized area of advertising. Topics vary by semester and include advanced media strategy, advanced creative strategy, direct marketing, and multicultural advertising.

500 Thesis (1-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when the student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: Not may be used toward degree requirements.

510 Advertising and Society (3) Analysis of advertising as institution in a free-enterprise democratic society and its relation to social, legal, cultural, and economic institutions.

520 Advertising and Communications Theory (3) Application of contemporary communications theories of attitude change, information-processing, and persuasion as applied to creative strategy decisions.
Comment(s): Admission to the program or consent of the instructor required.

530 Advertising and Public Relations Research (3) Nature, scope, and application of research function to advertising and public relations decisions.
(DE) Prerequisite(s): Statistics 531 or equivalent.

540 Advertising Decision Making (3) Analysis of decision making in budgeting, creative strategy, media strategy, research, evaluation, and agency-client relationships. Advertising response functions.
Comment(s): Admission to the program or consent of instructor required.

580 Project (3) Capstone project under guidance of faculty. Application of principles from previous coursework.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 6 hours.

597 Independent Study (3)
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

Aerospace Engineering (018)

Not all the courses listed below are available at both the University of Tennessee, Knoxville, and UTSI campuses.

422 Aerodynamics (3) Theory and design of aerodynamic bodies for desired characteristics. Potential flow theory, viscous effects, and compressibility effects. Subsonic, transonic, and supersonic airfoils.
(DE) Prerequisite(s): 351 and 370.

424 Astronautics (4) Solar system, orbital mechanics, propulsion, atmospheric entry including thermal protection materials, human factors in space flight, the space environment, and current topics.
(DE) Corequisite(s): Mechanical Engineering 331.

(DE) Prerequisite(s): 351.

426 Introduction to Aerospace Design (2) Design process, synthesis, design studies. Individual design reports required.
(DE) Prerequisite(s): 351, 370, and 363.
(DE) Corequisite(s): Mechanical Engineering 344.

429 Aerospace System Design (3) Synthesis and design of a complete aerospace system. Participation in team design effort including formal presentations and design report.
(DE) Prerequisite(s): 422, 425, and 426.

449 Aerospace Engineering Laboratory (3) Designing, conducting, and reporting results of experimental exercises. Test standards and specifications. Analysis of data and formation of conclusions.
(DE) Prerequisite(s): 345, 351, and 425.

494 Selected Topics in Aerospace Engineering (1-4) Problems and topics related to developments and practice in aerospace engineering.
Repeatability: Not repeatable. May be taken once for 1 – 4 hours.
Registration Permission: Consent of instructor.

495 Selected Topics in Aerospace Engineering (1-4) Problems and topics related to developments and practice in aerospace engineering.
Repeatability: Not repeatable. May be taken once for 1 – 4 hours.
Registration Permission: Consent of instructor.

500 Thesis (1-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when the student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: Not may be used toward degree requirements.

509 Multidisciplinary Project (1) (See Industrial Engineering 509.)

511 Inviscid Flow (3) Kinematics and dynamics of inviscid fluids; potential flow about body, conformal mapping.
(DE) Prerequisite(s): 422 or 541, and Mathematics 425.

512 Viscous Flow (3) Derivation of fundamental equations of compressible viscous flow; boundary conditions for viscous heat-conducting flow; exact solutions for Newtonian viscous flow (Navier-Stokes) equations for special cases; similarity solutions. Thermal boundary layers, stability of laminar flows, transition to turbulence, 2-D turbulent boundary layer equations. Incompressible-turbulent mean flow, and compressible boundary layer flow.
Grading Restriction: Consent of instructor.

513 Experimental Methods in Fluid Mechanics (3) Experimental techniques with laboratory experiments; representative experiments; hot wire anemometry and turbulence measurements, flow visualization, wind tunnel tests, water table experiments, supersonic flow experiments, boundary layer measurements, laser-optical measurements.
(DE) Prerequisite(s): 422 or 541.

515 Air Vehicle Aerodynamics and Performance (3) Application of aerodynamics principles to air vehicles to provide estimates of performance, stability, and control characteristics for subsonic to hypersonic speeds. Relations among thrust, drag, lift and altitude, propulsion systems, vehicle performance characteristics, and trajectory optimization.
(DE) Prerequisite(s): 422.

516 Air Vehicle Aerodynamics and Performance (3) Application of aerodynamics principles to air vehicles to provide estimates of performance, stability, and control characteristics for subsonic to hypersonic speeds. Relations among thrust, drag, lift and altitude, propulsion systems, vehicle performance characteristics, and trajectory optimization.
(DE) Prerequisite(s): 515.

521 Aerodynamics of Compressible Fluids (3) One-dimensional internal and external flow; waves; small perturbation theory; slender body theory; similarity rules; method of characteristics.
(DE) Prerequisite(s): 422.

522 Aerodynamics of Compressible Fluids (3) One-dimensional internal and external flow; waves; small perturbation theory; slender body theory; similarity rules; method of characteristics.
(DE) Prerequisite(s): 521.

525 Hypersonic Flow (3) Slender body flow; similitude; Newtonian theory; blunt body flow; viscous interactions; free molecule and rarefied gas flow.
(DE) Prerequisite(s): 512.

527 Aerospace Ground Test Facilities (3) Atmospheric models and similarity considerations; aerodynamic test facilities: continuous and intermittent wind tunnels and ballistic ranges; propulsion test facilities or air breathing and rocket engines; space environment and space vehicle test facilities.
(DE) Prerequisite(s): 521, 541, and Mechanical Engineering 522.

531 Magnetohydrodynamics (3) Electromagnetic field theory; chemical kinetics; thermodynamic and thermophysical properties of gas plasmas; governing equations and applications.
(DE) Prerequisite(s): 422 and Mathematics 471.

532 Introduction to Turbulence (3) Macroscopic effects, analogies, statistical treatment; correlation functions, energy spectra, diffusion; application of turbulent jets and pipe flow.
(DE) Prerequisite(s): 511 and 512.

533 Dynamics (3) (See Mechanical Engineering 533.)

534 Atmospheric Entry (3) Reentry trajectories; lift and drag during reentry; vehicle motion and stability during reentry; aerodynamic heating and heat protection systems.
(DE) Prerequisite(s): 512.
Recommended Background: 522.
535 Mechanical Vibrations (3) (See Mechanical Engineering 534.)
539 Continuum Mechanics (3) (See Engineering Science 539.)
541 Fluid Mechanics I (3) (See Mechanical Engineering 541.)
542 Fluid Mechanics II (3) (See Mechanical Engineering 542.)
544 Transonic Flow (3) Nature of flow at transonic speeds; small disturbance theory; shock wave properties; shock-free flows; strong viscous interaction phenomena; solution techniques. (DE) Prerequisite(s): 522.
551 Aerospace Mechanics (3) Principles of mechanics applicable to aerospace vehicles, equations of motion, multibody problems and trajectory analysis. (DE) Prerequisite(s): Mathematics 471.
554 Aerospace Vehicle Stability and Control (3) Static and dynamic longitudinal directional and lateral stability and control. Coupled modes. Motion with free and fixed flight control surfaces. Automatic control systems. (DE) Prerequisite(s): 423 and 551.
555 Human Vibrations Analysis and Protection (3) (See Biomedical Engineering 555.)
559 Advanced Mechanics of Materials I (3) (See Mechanical Engineering 559.)
571 Finite Elements for Engineering Applications (3) (See Engineering Science 551.)
572 Computational Fluid-Thermal Systems (3) (See Engineering Science 552.)
573 Computational Solid Mechanics (3) (See Engineering Science 553.)
590 Selected Engineering Problems (2-6) Repeatability: May be repeated. Maximum 6 hours. Comment(s): Enrollment limited to students in problems option. Registration Permission: Consent of advisor.
595 Seminar (1) All phases of aerospace engineering, reports on current research at the University of Tennessee, Knoxville, and UTSI. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 20 hours.
599 Special Topics in Aerospace Engineering (1-3) Repeatability: May be repeated. Maximum 6 hours.
600 Doctoral Research and Dissertation (3-15) Grading Restriction: P/NP only. Repeatability: May be repeated.
642 Physical Gas Dynamics (3) High speed, high temperature gas flow from molecular point of view. Kinetic theory, statistical mechanics, equilibrium flow, vibrational and chemical rate processes, non-equilibrium vibrational and chemical flow, non-equilibrium kinetic theory, flow with translational non-equilibrium. (DE) Prerequisite(s): 522 and Mechanical Engineering 522.
645 Theory of Turbulence (3) (See Engineering Science 645.)
659 Advanced Mechanics of Materials II (3) (See Mechanical Engineering 659.)
661 Advanced Topics in Computational Fluid Dynamics (3) (See Engineering Science 651.)
662 Advanced Topics in Computational Fluid Dynamics (3) (See Engineering Science 652.)
690 Advanced Topics in Aerospace Engineering (3) Repeatability: May be repeated. Maximum 9 hours. Registration Permission: Consent of instructor.
522 Educational Technology in Agricultural and Extension Educa-
tion (3) Advanced concepts and methods relevant to both formal and
non-formal instructional methodologies. Processes by which profession-
inal change agents influence the introduction, adoption, and diffusion of
technological change.
(DE) Prerequisite(s): 435 and 436 or consent of instructor.

524 Research Methodology (3) Social science research methods relat-
ed to research in agricultural and extension education. Issues: research
design, reliability and validity in measurement, sampling procedures,
logic of analysis, scaling and measurement, and selection and interpri-
tation of appropriate inferential tests of significance.
(DE) Prerequisite(s): 435 and 436 or consent of instructor.

525 Curriculum Development in Agricultural and Extension Educa-
tion (3) Models, principles, and procedures for developing curricula in
agriculture and extension education programs and scheduling learning
activities used to implement these planned programs.
(DE) Prerequisite(s): 435 and 436 or consent of instructor.

526 Agricultural Education for First-Year Teachers (2) Developing
competencies needed by first-year teachers for planning, organizing and
conducting program of vocational agriculture in local community. Group
meetings in selected centers and visits by instructor.
(DE) Prerequisite(s): 435 and 436.

527 Adult Education Strategies in Agricultural and Extension Educa-
tion (3) Methods of developing and implementing educational programs for
adults in agricultural and extension education and related contexts: differ-
ent learning of adults and children (andragogy vs. pedagogy); understand-
ing and determining adult needs, priorities and motivation for participating in
educational programs; adoption of new ideas by adult learners; methods
and materials effective in teaching adults; developing favorable attitudes
toward post-secondary education and life-long learning.
(DE) Prerequisite(s): 211 and 511 or 346 or consent of instructor.

530 Special Topics in Agricultural and Extension Education (1-3)
Current issues.
Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

532 Managing Organizations, Programs and Personnel (3) Theory
and principles of management for individual and organizational effective-
ness of agricultural organizations.
(DE) Prerequisite(s): 511 and 521 or consent of instructor.

592 Internship in Agricultural and Extension Education (1-3) Practi-
cal field experience in selected setting under supervision of local practi-
tioner and departmental representative.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 3 hours.
Registration Permission: Consent of instructor.

593 Special Problems in Agricultural and Extension Education (1-4)
Special research and/or special reports based on supervised independ-
ent study.
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

Agricultural Economics (047)

412 Agricultural Finance (3) Macro-finance, financial objectives, acqui-
sition of debt and equity funds, capital investments, capital allocation,
debt repayment, credit analysis, borrower and lender loan application
analysis, insurance strategies, computer applications, kinds and sources of
agricultural credit, and financial intermediation.

420 International Agricultural Trade and Marketing (3) Introduction to
real and monetary aspects of international trade effect on agricultural
commodity flows; partial equilibrium analysis of international trade in agri-
cultural products; institutional aspects of international marketing of agri-
cultural products.

430 Agricultural Policy (3) Values, goals and policy process. Economic
rationale and effects of policy. Historical development and current char-
acteristics of commodity, credit, food, and trade policy.

442 Agribusiness Management (3) Advanced concepts in developing
business and marketing plans and in applied management principles
such as inventory control and pricing techniques. Discussion of manage-
ment issues including going international, employee supervision, man-
agement succession and guerilla marketing. Teamwork emphasized in
managing an agribusiness firm through game simulation. Written and oral
presentation required.

450 Agricultural Industry Analysis and Forecasting (3) Analytical
tools for decision making in the agricultural sector; analysis of commodi-
ity supply and demand conditions; economic modeling; market forecast-
ing, analysis of temporal and spatial patterns.

470 Natural Resource Economics (3) Nature of natural resources; eco-
nomic efficiency as basis for natural resource use; externalities in natural
resource use; factors influencing environmental quality; alternative public
policy tools for influencing natural resource use or improving environ-
mental quality.

500 Thesis (1-15) Grading Restriction: P/NP only.
Repeatability: May be repeated.
Registration Restriction: Master of Science – agricultural economics major.

502 Registration for Use of Facilities (1-15) Required for the student
not otherwise registered during any semester when student uses univer-
sity facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

503 Managerial Economics for Agribusiness (3) Practical application
of economic concepts to agribusiness management and marketing deci-
sions. Topics include supply and demand analysis, demand estimation,
production economics, cost analysis, pricing decisions, break-even
analysis, capital budgeting, time value of money, and risk and uncertain-
ty. Students will use Microsoft Excel to analyze managerial economic
questions.

505 Microeconomic Analysis (3) Theory of utility maximization and de-
mand, production, cost, firm behavior, and supply; price in product and
factor markets; efficiency and welfare.
Recommended Background: Calculus and intermediate microeconomics courses.

512 Advanced Agribusiness Finance (3) Financial and investment
analysis tools and concepts and their application to decisions faced by agri-
business. Emphasis on financial analysis and planning principles,
capital budgeting, debt structure and financing, options, present value
concepts, and risk analysis.
Recommended Background: Senior-level finance course.

520 Research Methods in Agricultural Economics (1) An overview of
the logic and process of economic inquiry. Topics covered include the rela-
tionship between theory and applied research, research formulation,
definition of research problems, development of research problem state-
ments with goals and objectives, and presentation and interpretation of
results.

524 Econometric Methods in Agricultural Economics (3) Application
of statistical methods to agricultural economic models; estimation of sup-
ply, demand and production functions; microeconomic forecasting mod-
els; interpretation of results.
Recommended Background: Calculus and statistics courses.

525 Agribusiness Operations Research Methods (3) Applications of
operations research methods and concepts for agribusiness. Theoretical
background and applied considerations of each technique with emphasis on
applications. Computer and other applications of each technique for
relevant agribusiness problems.
Recommended Background: Calculus and intermediate microeconomics courses.

530 Agricultural Policy Analysis (3) Evaluation of public policy as relat-
ed to agricultural industry and natural areas.

542 Advanced Agribusiness Production Decisions (3) Decision theo-
ry concepts and tools for analyzing agribusiness decision problems;
modeling choices using decision trees and sensitivity analysis; incorpo-
rating uncertainty into decision models using probability theory and sim-
ulation; modeling preferences using utility theory and risk attitudes.
(REA) Prerequisite(s): 505 or 503.

550 Advanced Agribusiness Marketing (3) Use of economic concepts
in agribusiness marketing decisions. Analysis of agricultural markets;
behavior of firms in food and fiber markets; competitive environment.
Profitability analysis of marketing and distribution decisions; market planning
and strategy; product evaluation and new product introduction; pricing
decisions.
(REA) Prerequisite(s): 505 or 503.

552 Advanced Agribusiness Seminar (3) A capstone course for stu-
dents in the Master of Science non-thesis agribusiness concentration.
The course centers on discussion and analysis of real-world manage-
ment case studies. Students are responsible for the development of a
comprehensive written case study analyzing a real-world agribusi-
ness management problem. Major writing and oral presentation em-
phasis.
Recommended Background: 2 completed semesters of the agricultural econom-
ics MS program.

570 Advanced Natural Resource Economics (3) Analysis of natural re-
source allocation issues; applied welfare economics, external effects and
evaluation of public policy.
Agriculture and Natural Resources (088)
491 International Experience in Agriculture and Natural Resources (1-12) Credit for formalized international experiences related to agricultural sciences and natural resources. Determination of credit based on nature of the proposed experience. Student should discuss the opportunity with their faculty advisor prior to the trip to determine if it is appropriate for credit. Credit hours will be determined by the department and college depending on the extent of activity and types of projects and/or presentations to be completed by the student upon return.
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 2 hours for MS students and maximum 4 hours for PhD students.
512 Teaching Internship in Agriculture and Natural Resources (1) Supervised experience in teaching – test preparation and evaluation of agriculture students.
Repeatability: May be repeated. Maximum 6 hours.

Animal Science (113)
420 Advanced Reproduction (3) Collection, evaluation, and preservation of ova, spermatozoa and embryos; application of methods of natural breeding and techniques of artificial insemination and embryo transfer; herd sire and dam evaluation; pregnancy determination; gestation and parturition; infertility; recent advances in theriogenology.
Contact Hour Distribution: 1 hour and 2 labs.
(DE) Prerequisite(s): 320 or equivalent.
430 Nutrient Evaluation and Ration Formulation (3) Ration nutrient analysis and formulation for beef and dairy cattle, sheep, horses, swine, poultry, laboratory, zoo, and companion animals. Mathematical and computer solutions and applications to formulating complex rations with constraints.
Contact Hour Distribution: 2 hours and 1 lab.
(DE) Prerequisite(s): 330 or equivalent and an introductory computer science course.
481 Beef Cattle Production and Management (3) Integration of principles of nutrition, breeding, physiology, and marketing into complete production and management programs. Structure of industry, enterprise establishment, systems of production, production practices, and improvement programs. Management evaluated in terms of production response and economic returns. Comparisons made to small ruminant, forage-based production systems.
Contact Hour Distribution: 2 hours and 1 lab.
Recommended Background: Completion of animal science sophomore and junior core courses or consent of instructor.
482 Dairy Cattle Production and Management (3) Integration of principles of nutrition, breeding, physiology, and marketing into complete production and management programs. Structure of industry, enterprise establishment, systems of production, production practices, and herd improvement programs. Alternatives evaluated in terms of production responses and economic returns.
Contact Hour Distribution: 2 hours and 1 lab.
Recommended Background: Completion of 300-level courses or consent of instructor.

American Studies (099)
423 Geography of American Popular Culture (3) (See Geography 423.)
442 American Humor (3) (See English 442.)
510 Special Topics (3) Repeatability: May be repeated. Maximum 6 hours.

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483 Pork Production and Management (3) Integration of principles of nutrition, breeding, physiology, and marketing into complete production and management programs. Structure of industry, enterprise establishment, systems of production, production practices, and improvement program. Management evaluated in terms of production responses and economic returns.
Contact Hour Distribution: 2 hours and 1 lab.
Recommended Background: Completion of 300-level core courses or consent of instructor.
484 Poultry Production and Management (3) Integration of principles of nutrition, breeding, physiology, and marketing into complete production and management programs. Structure of industry, enterprise establishment, systems of production, production practices, and improvement programs. Management evaluated in terms of production responses and economic returns.
Contact Hour Distribution: 2 hours and 1 lab.
Recommended Background: Completion of 300-level core courses or consent of instructor.
500 Thesis (1-15) Grading Restriction: P/NP only.
Repeatability: May be repeated.
502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.
511 Special Problems in Animal Science (1-4) Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.
Recommended Background: General undergraduate coursework in anatomy/physiology and biochemistry or consent of instructor.
523 Advanced Mammalian Reproduction (3) Current topics and new frontiers in reproductive biology.
(DE) Prerequisite(s): 320.
530 Animal Nutrition and Metabolism (4) Comparative digestive physiology, digestion, absorption and metabolism of nutrients in ruminant and nonruminant species. Concepts and methodologies of animal growth and nutrient requirements; interrelationships, availability and deficiencies of nutrients.
Recommended Background: Animal nutrition, feeds, and ration formulation course or consent of instructor.
535 Ruminology (2) Anatomy, physiology, and microbiology of rumen ecosystem: microbial fermentation and metabolism of polysaccharides, lipids and nitrogen.
(DE) Prerequisite(s): 330 or consent of instructor.
536 Ecology of Grazing Land Systems (3) (See Plant Sciences 536.)
571 Design and Analysis of Biological Research (3) Experimental design and procedures; selection of experimental units; analysis and interpretation of data; statistical models and contrasts, analyses of variance: covariates, treatment arrangements, mean separation and regression. (Same as Plant Sciences 571.)
Recommended Background: 3 hours of statistics.
572 Least Squares Analysis (3) Least squares estimation and hypothesis testing procedures for linear models; mixed model methodology; full rank and non-full rank situations; covariance structures; estimation of variance components.
Contact Hour Distribution: 2 hours and 1 lab.
Recommended Background: 6 hours of statistics.
596 Seminar on Advanced Topics in Animal Science (1) Required of all first- and second-year MS students.
Repeatability: May be repeated. Maximum 2 hours.
600 Doctoral Research and Dissertation (3-15) P/NP only.
Grading Restriction: P/NP only.
Repeatability: May be repeated.
621 Advanced Topics in Animal Physiology (1-4) Recent advances and concepts, research techniques, current problems.
Repeatability: May be repeated. Maximum 6 hours.
631 Advanced Topics in Animal Nutrition (1-4) Recent advances and concepts, research techniques, current problems.
Repeatability: May be repeated. Maximum 6 hours.
652 Disorders of the Endocrine System (2) Pathological and physiological aspects of diseases; endocrine glands of various animal species. (Same as Comparative and Experimental Medicine – Veterinary Medicine 652.)
  Recommended Background: 3 hours of physiology.

681 Advanced Topics in Animal Health and Well-Being (1-4) Recent advances and concepts, research techniques, and current problems associated with animal health and behavior.
  Repeatability: May be repeated. Maximum 6 hours.

696 Seminar (1) Advanced topics in animal science. Required of all first- and second-year PhD students.
  Repeatability: May be repeated. Maximum 2 hours.

Anthropology (122)

410 Principles of Cultural Anthropology (3) Exploration and illustration of major concepts, theories, and methods in cultural anthropology, with application to analysis of specific ethnographies.
  (DE) Prerequisite(s): 130.

411 Linguistic Anthropology (3) Basic linguistic concepts applied to research in cultural anthropology, particularly investigation of relationships between language and culture. (Same as Linguistics 411.)
  (DE) Prerequisite(s): 130 or Linguistics 200.

412 Folklore in Anthropology (3) Introduction to anthropological study of folklore, using folklore and folklore materials from various tribal, peasant, and complex societies.
  (DE) Prerequisite(s): 130 or consent of instructor.

413 Dynamics of Culture (3) Definition and in-depth study of major forms of culture change, ranging from evolution and diffusion to religious revitalization and political revolt. Continuity and change in diverse cultural settings examined through use of archaeological, ethnohistoric, and contemporary cases.
  (DE) Prerequisite(s): 130 or consent of instructor.

414 Political Anthropology (3) Examination of the organization and dynamics of power and politics in both stateless and state-level societies. Role of symbols, rituals, and ideologies in producing and reproducing power relations. The relationship between actors (individuals) and structures. The encapsulation of traditional political forms and systems within modern states.
  (DE) Prerequisite(s): 130 or consent of instructor.

415 Environmental Anthropology (3) Overview of theoretical and methodological approaches to the study of human / environmental interactions. Impacts of environmental change on society and culture; human impacts on environmental change.
  (DE) Prerequisite(s): 130.
  Registration Permission: Consent of instructor.

416 Applied Anthropology (3) Introduction to principles, practice and ethics of anthropology applied to practical problems in non-academic settings. Overview of career opportunities in various domains of applied anthropology.
  (DE) Prerequisite(s): 130 or consent of instructor.

431 Ethnographic Research (3) Conceptual and practical exploration of methods and techniques cultural anthropologists use in fieldwork.
  (DE) Prerequisite(s): 130 or consent of instructor.

432 Anthropology of Warfare and Violence (3) Origins and tactics of warfare; overview of cultural foundations of warfare and structural violence; and effects on communities, social institutions, environments, and social organization.
  (DE) Prerequisite(s): 130.
  Registration Permission: Consent of instructor.

435 Historical Archaeology Laboratory (3) Laboratory procedures for processing, identification, and interpretation of artifacts from historical sites. Artifactual material from historic East Tennessee sites used for class projects.
  Recommended Background: 361.

436 Cities and Sanctuaries of the Greek and Roman World (3) (See Classics 436.)

442 Intensive Survey of the Archaeology of the Prehistoric Aegean (3) (See Classics 442.)

443 Intensive Survey of the Archaeology of Greece (3) (See Classics 443.)

444 Intensive Survey of the Archaeology of Etruria and Rome (3) (See Classics 444.)

462 Early European Prehistory (3) Origins and evolution of human culture in Europe through beginnings of settled life. Primary focus on Paleolithic/Mesolithic chronology and lifeways.
  (DE) Prerequisite(s): 120 or consent of instructor.

463 Rise of Complex Civilizations (3) Development of complex societies in old world from origins of agricultural economics to rise of states. Focus on Mesolithic, Neolithic, and Metal Age lifeways in Africa, Europe, and Asia.
  (DE) Prerequisite(s): 120 or consent of instructor.

464 Principles of Zooarchaeology (3) Basic osteological studies of major vertebrate groups; with emphasis on the aboriginal's use of animal subsistence and culture. Identification and interpretation of archaeologically derived molluscan and vertebrate remains; with introduction to laboratory use of comparative collections.
  (DE) Prerequisite(s): 120 or consent of instructor.

465 Urban Archaeology (3) Field archaeology and interpretation of archaeological remains on historic urban sites in the United States. Course content will include lectures and field and laboratory research on urban sites in East Tennessee.
  Recommended Background: 361.

480 Human Osteology (4) Intensive examination of the human skeleton.
  Contact Hour Distribution: 3 hours and 1 lab.
  (DE) Prerequisite(s): 110 or consent of instructor.

481 Museum Studies I: Museums, Purpose and Function (3) (See Art 481.)

482 Museum Studies II: Exhibition Planning and Installation (3) (See Art 482.)

484 Museum Studies III: Field Projects (1-12) (See Art 484.)

485 Oral Biology (4) Intense examination of human dentition and oral skeletal structures; including dento-facial embryology/growth, histology, gross tooth morphology and pathology.

490 Primate Evolution (3) Living and fossil primate taxonomy, ecology, and comparative anatomy. Survey of primate fossil record with emphasis on the origin or major primate lineages.
  (DE) Prerequisite(s): 110.

494 Primate Behavior (3) Social organization and behavior of selected primates: group composition, size, and structure; patterns of mating; other social interactions; communication; and cultural behavior. Application of primate studies to human ethology.
  (DE) Prerequisite(s): 110 or consent of instructor.

500 Thesis (1-15)
  Grading Restriction: P/NP grading only.
  Repeatability: May be repeated.

501 Graduate Research (1-9)
  Independent investigation of special problems in anthropology.
  Repeatability: May be repeated. Maximum 18 hours.

502 Registration for Use of Facilities (1-15)
  Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
  Grading Restriction: Satisfactory/No Credit grading only.
  Repeatability: May be repeated.
  Credit Restriction: May not be used toward degree requirements.

510 Method and Theory in Cultural Anthropology (3) Development of primary theoretical orientations by cultural anthropologists; formulation of research problems and methods of collecting, organizing, and utilizing data.
  Registration Permission: Consent of instructor.

511 Special Topics in Cultural Anthropology (3) Seminars for advanced students on topics of special interest: ethnomedicine, psychological anthropology, comparative social organization, religion, and art.
  Repeatability: May be repeated. Maximum 9 hours.
  Registration Permission: Consent of instructor.

512 Urban Studies in Anthropology (3) Process of urbanization examined cross-culturally; theory and method in researching urban communities; urban problems and applied anthropology.

515 Medical Anthropology (3) Cultural impact on disease patterning, theories of disease causation, and models of therapy. Theoretical and applied aspects of the anthropological study of health and disease.

517 Forms of Social Inequality (3) Anthropological perspectives on societies stratified along lines of rank, caste, race, ethnicity, and class; inequalities engendered by sex role structure. Construction of social distinctions before and after rise and consolidation of modern world system. Intersections of race and ethnicity with class and gender.

520 Seminar in Zooarchaeology (3) Approaches to analysis and interpretation of archaeological fauna. Intensive reading; evaluation and discussion of major faunal studies; guides to identification, methods of presenting faunal data.
  Repeatability: May be repeated. Maximum 6 hours.
521 Laboratory Studies in Zooarchaeology (4) Examination and comparison of skeletons of major vertebrate groups, shells of terrestrial and aquatic mollusks, in relation to animal remains from archaeological contexts. Basic osteology and shell characters of species encountered in aboriginal sites; use of comparative collections. 
Repeatability: May be repeated. Maximum 8 hours.

522 Seminar in Archaeology (3) Theoretical and practical issues in contemporary archaeology: ethnoarchaeology, paleoethnobotany, taphonomy, ceramic analysis, agricultural origins, and regional archaeological cultures.
Repeatability: May be repeated. Maximum 9 hours.

530 Fieldwork in Archaeology (3-9) Practicum in surveying, excavating, processing, and analysis of archaeological data.
Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

550 Contemporary Issues in Anthropology (1-3) Review of recent directions in method and theory in anthropology.
Repeatability: May be repeated. Maximum 6 hours.

560 Theory in Archaeology (3) Detailed consideration of theory in contemporary archaeology: models of scientific explanation, research design, archaeological formation processes, and methods of analysis and interpretation.

561 Archaeological Resource Management (3) Federal legislation and regulations affecting identification, protection, and management of archaeological resources. Professional ethics and responsibilities and relationship of federal and state agencies, public interest groups, and professional archaeologists in conduct of federally sponsored archaeology.
Repeatability: May be repeated. Maximum 6 hours.

562 Special Topics in Mediterranean Archaeology (3) (See Classics 562.)

563 Lithic Artifact Analysis (3) Methods for analyzing prehistoric stone tools in practical laboratory/lecture format. Stone tool production, use, stylistic variability, and discard processes.

564 Archaeology of Southeastern United States (3) Archaeological research on prehistoric American Indian cultures in Southeastern United States; Tennessee prehistory.

565 Graduate Seminar in Ancient Mediterranean Civilization (3) (See Classics 565.)

580 Advanced Human Variation (3) Genetic and morphological variation among extant human groups; relationships of variation to geography, ecology and subsistence.

(DE) Prerequisite(s): 480.

582 Paleoanthropology (4) Fossil record from origin of hominids to appearance of anatomically modern humans. Functional morphology and phylogenetic relationships of fossil humans.
(DE) Prerequisite(s): 480.

583 Skeletal Biology (3) Practical and theoretical approaches to analysis of prehistoric human skeletal remains. Demography, vital statistics, pathology, nutrition, and measures of biological relationships as related to population as adaptive unit.
(DE) Prerequisite(s): 480.

585 Laboratory Studies in Biological Anthropology (3) Topical coverage of laboratory methods in biological anthropology.
Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

590 Method and Theory in Biological Anthropology (3) Current methods of analysis in biological anthropology and of past and current history of theoretical perspectives. Paleoanthropology, human osteology, and human variation and population structure.
Registration Permission: Consent of instructor.

591 Foreign Study (1-15) 
Repeatability: May be repeated. Maximum 15 hours.

592 Off-Campus Study (1-15) 
Repeatability: May be repeated. Maximum 15 hours.

593 Independent Study (1-15) 
Repeatability: May be repeated. Maximum 15 hours.

600 Doctoral Research and Dissertation (3-15) 
Grading Restriction: P/NP only.
Repeatability: May be repeated.

601 Advanced Graduate Research (1-6) Independent investigation of special problems in anthropology by advanced graduate students.
Repeatability: May be repeated. Maximum 12 hours.

611 Advanced Seminar in Cultural Anthropology (3) Critical evaluation of current issues in theory and data interpretation.
Repeatability: May be repeated. Maximum 6 hours.

660 Advanced Seminar in Archaeology (3) Selected topics in prehistoric and historic archaeology.
Repeatability: May be repeated. Maximum 6 hours.

690 Selected Topics in Physical Anthropology (3) 
Repeatability: May be repeated. Maximum 6 hours.
Comment(s): For doctoral students in biological anthropology concentration.

691 Selected Topics in Paleoanthropology (3) 
Repeatability: May be repeated. Maximum 6 hours.

695 Gross Human Anatomy (9) Skeleton, muscles, and cardiovascular system. Dissection of cadavers.
Contact Hour Distribution: 5 hours and 5 labs.
(DE) Prerequisite(s): 480 or human biology course.

Architecture (133)

403 Introduction to Preservation (3) History, theory, and legal aspects of architectural preservation and restoration.

404 Preservation Technology (3) Techniques of preservation. Methods of analysis, history of materials and technology used in old buildings.
(DE) Prerequisite(s): 403.

406 Ideas in Architecture (3) Historical and critical review of major ideas of architecture through the ages.
Comment(s): Open to all students.

410 History and Theory of Urban Form (3) Patterns of community development. Selected historical and contemporary examples. Basic urban design issues and exemplary design approaches examined through lectures, readings, essays, and sketch studies including historical change in urban form and design.

412 Non-Western and Indigenous Architecture (3) Building responsive to climate, material availability, and economic level, as designed by anonymous builders. Examples from prehistoric times to present including the fertile crescent; the Indus Valley; Hindu, Buddhist, and Mughal architecture of India, China, and Japan.

415 Medieval Architecture (3) History of architecture from decline of Rome to beginning of Renaissance. (Same as Medieval Studies 415.)

417 The International Style (3) Survey of architecture of the early modern movement, primarily in Europe and America, covering the years 1900 to 1940.

420 History of American Architecture (3) Consideration of architecture and city planning in the United States from the pre-Columbian period until the mid-20th century.

425 Special Topics in Architecture (1-6) Faculty-initiated courses. Topics vary.
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of instructor.

432 Computer Applications in Design II (3) Advanced computer-aided design using three-dimensional modeling software. Design analysis using computer animation, rendering techniques, visualization, and video.
(DE) Prerequisite(s): 231 or consent of instructor.

433 Computer Applications in Design III (3) Advanced course that integrates three-dimensional modeling and technical analysis with computers to augment building design. Independent studies under faculty direction.
Registration Permission: Consent of instructor.

445 Advanced Lighting (3) In-depth analysis and innovative concepts in design of lighting.
(DE) Prerequisite(s): 342.

463 Architectural Development (3) Principles and practice of the architect as a developer. Impact of economics, finance and urban policy on the design and development of real estate.
Comment(s): Open to all students.

473 Architectural Photography (3) Photography as a design, research, and presentation medium. Application of photographic techniques, printing and processing. Color, black and white.

500 Thesis (1-15) 
Grading Restriction: P/NP only.
Repeatability: May be repeated.
502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

503 Modern Architecture: Histories and Theories (3) History and theory of modern architecture: late 19th and 20th centuries through broad-based examinations of question of modernity and specific case studies of buildings, projects, landscapes and theories.

507 Architecture, Culture and Modernity (3) Scope of ideas generated in architecture’s recent history to reveal and explain production and reception of architecture: historical background necessary to understand those concepts. Complements history sequence but in specialized field of theory.

509 Seminar in Architectural Technology (3) Technological aspects influencing building form. Role of technical aspects of structural, environmental and building infrastructure as integrated systems supporting access use and expression of building.

514 Seminar in Ethical Imperatives (3) Social, cultural, philosophical and moral issues which impact professional responsibilities. Attitudes, values, and ideas that address formation of profession’s ethos.

515 Seminar in Issues in Urban Design (3) Investigations of urban forms, patterns, and attitudes that have shaped towns and cities.
Registration Permission: Consent of instructor.

516 Materials and Methods of Construction (3) Properties of interior and exterior building materials and their relation to construction methods and detailing. Theory of materials selection and application and role materials and methods play in design process.

521 Principles of Architectural Form (3) Historical and contemporary architectural theory through investigation of literature and related examples. Theories of understanding and theories of application related to generation of architectural form and space in response to both cultural and environmental focus.
Registration Restriction(s): Master of Architecture – architecture major.

525 Special Topics in Architecture (1-3) Student- or instructor-initiated course.
Grading Restriction: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 9 hours.

526 Directed Readings in Architecture (3) Readings on topics of interest: primary texts, history, theory, urban issues, technology and professional practice.
Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

528 Topics in Architectural History and Theory (3) Historic topics, ideas, and theories in architecture.
Registration Permission: Consent of instructor.

535 Presentation Design I (3) Basic techniques and understanding of graphic presentation design within the profession of architecture. Addresses fundamental design principles, page layout, image manipulation and typography, employing computer software applications. Conducted through lectures, assigned projects, assigned readings, labs, exams and/or critiques.
(CE) Prerequisite: 231.
Registration Permission: Consent of instructor.

536 Presentation Design II (3) Advanced techniques and understanding of graphic presentation design within the profession of architecture. Addresses document design, layout and binding, image manipulation and typography, employing computer software applications. Conducted through lectures, assigned projects, assigned readings, labs, exams and/or critiques.
(CE) Prerequisite: 535.
Registration Permission: Consent of instructor.

545 Principles of Environmental Control I (3) Introduction to heating, ventilating, air conditioning, solar energy, plumbing, and fire-protection systems.
(CE) Prerequisite(s): 180.
Comment(s): Enrollment is limited to Master of Architecture students.

551 Research Methods (3) Quantitative and qualitative methods of research in architectural inquiry. Systematic study and application of applied and speculative investigations in field of architectural research. Review and identification of techniques and methodologies and applications for architectural research and scholarship.

553 Advanced Topics in Architectural Technology (3) In-depth investigations and analysis: architectural technology lighting, structure, enclosure, mechanical and other architectural technologies.
Registration Permission: Consent of instructor.

562 Professional Practice (3) Management and organizational theories and practices for delivering professional design services: assessment of building industry and its influence on practice; analysis of basic management principles, professional practice, legal and ethical concerns facing practitioners today; and introduction to special obligations and privileges of design professional.

571 Architectural Design Studio: Building Groups/Complexes (6) Investigations analyzing cultural and contextual influences and precedents informing architectural form, space and structure in communal complex of buildings. Design of residential, recreational, educational, religious and communal facilities comprising distinctive/individual and modular/repetitive units.
(CE) Prerequisite(s): 282.

(CE) Prerequisite(s): 571.

(CE) Prerequisite(s): 572.

(CE) Prerequisite(s): 551.

589 Urban Site Planning Workshop (4) Explores ideas, vocabulary, conventions, and technical skills essential to a critical understanding of how design and planning operate within the various scales of urban and ecological context. Examines both underlying terrain elements (landform, vegetation, water, climate) and human site interventions (urban infrastructure, buildings, and landscape). Strategies and analysis techniques for reading, mapping, and analyzing urban sites are introduced, as are issues, language, and principles of site design in urbanized landscapes.
Comment(s): Open to all majors.
Registration Permission: Consent of instructor.

591 Foreign Study (1-9)
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission(s): Consent of instructor and approval of graduate program in architecture.

592 Off-Campus Study (1-9)
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission(s): Consent of instructor and approval of graduate program in architecture.

593 Independent Study (1-9)
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission(s): Consent of instructor and approval of graduate program in architecture.

Art (140)

481 Museum Studies I: Museums, Purpose and Function (3) Purposes, functions, and development of museums of art, history, natural and applied science. (Same as Anthropology 481.)

482 Museum Studies II: Exhibition, Planning and Installation (3) Exhibition concept development and implementation. Exhibition design and installation techniques. Publicity, production, matting and framing, shipping and storage. (Same as Anthropology 482.)
(CE) Prerequisite(s): 481 or consent of instructor.

484 Museum Studies III: Field Projects (1-12) Special field projects including restoration, preservation, registration, and other related research off campus. (Same as Anthropology 484.)
Repeatability: May be repeated. Maximum 12 hours.
(CE) Prerequisite(s): 481 and 482.
Registration Permission: Consent of instructor.

499 Special Topics (3) Student- or instructor-initiated course offered at convenience of department.
Repeatability: May be repeated. Maximum 12 hours.
502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Credit Restriction: May not be used toward degree requirements.

507 Professional Practices: Teaching Internship (1) Individual study in development of skills and methodology in teaching studio courses.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 4 hours.
Credit Restriction(s): May not be applied toward degree requirements.
Comment(s): Enrollment is limited to students who are not GTAs.
Registration Permission: Consent of instructor.

591 Foreign Study (1-6)
Repeatability: May be repeated. Maximum 15 hours.

592 Off-Campus Study (1-6)
Repeatability: May be repeated. Maximum 15 hours.

593 Independent Study (1-4)
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Consent of instructor.

595 Visiting Artist Seminar (2) Contemporary art issues by different visiting artists.
Repeatability: May be repeated. Maximum 8 hours.
Credit Restriction: May not be applied toward the art history requirement.

Art Ceramics (135)

421 Ceramics: Advanced Handbuilding (6) Continued investigation of ceramic form with an emphasis on the development of individual direction.
(DE) Prerequisite(s): 321 and 322.
Repeatability: May be repeated. Maximum 12 hours.

422 Ceramics: Advanced Throwing (6) Continued, in-depth investigation of ceramic form: emphasis on the development of individual direction.
Repeatability: May be repeated. Maximum 12 hours.
(DE) Prerequisite(s): 321 and 322.

424 Ceramics: Clays and Glazes (3) Clay chemistry, clay bodies, glaze theory, and calculation. Formulating, mixing and testing of clay bodies and glaze formulas.
(DE) Prerequisite(s): 320.

429 Ceramics: Special Topics (3) Student- or instructor-initiated courses to be offered at convenience of department.
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of instructor.

521 Graduate Ceramics I (2-5)
Repeatability: May be repeated. Maximum 10 hours.

525 Graduate Ceramics II (2-5)
Repeatability: May be repeated. Maximum 10 hours.

593 Independent Study (1-4)
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Consent of instructor.

595 Visiting Artist Seminar (2) Contemporary art issues by different visiting artists.
Repeatability: May be repeated. Maximum 8 hours.
Credit Restriction: May not be applied toward the art history requirement.

599 Projects in Lieu of Thesis (10)
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 20 hours.
Comment(s): Completion of all graduate coursework and successful second-year evaluation by graduate faculty required.

Art Design/Graphic (136)

400 Typography (3) Principles of typography as well as classical and contemporary type forms, as vehicles for communication. An intensive introduction to the fundamentals of type, from individual letterforms to large bodies of textual information. Attention to formal, technological, rhetorical and historical issues.
(DE) Prerequisite(s): Art 295 and Art Design/Graphic 251.

405 Computer Enhanced Graphic Design (3) Exploration of new technologies and their significance to graphic design.
Repeatability: May be repeated. Maximum 12 hours.
(DE) Prerequisite(s): 351 and 356 with a grade of C or better.
Registration Permission: Consent of instructor.

410 Advanced Typographic Investigation (3) Expands on principles introduced in Typography (Art Design/Graphic 400). Projects will include work in reflective as well as electronic environments with an emphasis on personal exploration.
(DE) Prerequisite(s): Art Design/Graphic 400.

425 Illustration (3) Develops skills and critical analysis for effective visual communication. Projects will explore the relationship between image and meaning. Students will explore a variety of media as they develop a personal visual vocabulary.
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): Art 295 and Art Design/Graphic 251.

451 Advanced Graphic Design (3) Theory and techniques of visual problem-solving as applied to advanced applications of graphic design.
(DE) Prerequisite(s): 352 with a grade of C or better.

452 Graphic Design Seminar (3) Discussion of design and professional issues including politics, economics, and ethics for the graphic designer. Culminates in a student-initiated project.
(DE) Prerequisite(s): 451 with a grade of C or better.

456 Graphic Design Practicum (1-12) Practical work experience in the graphic design field. Must be prearranged with department.
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of instructor.

459 Special Topics in Graphic Design (3) Student- or instructor-initiated course offered at convenience of department.
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of instructor.

550 Studies in Graphic Design/Illustration History (3) Design and illustration c. 1850 to present.
Repeatability: May be repeated. Maximum 6 hours.
Comment(s): Enrollment is limited to MFA candidates.

551 Graphic Design I (2-6)
Repeatability: May be repeated. Maximum 10 hours.

552 Graphic Design II (2-6)
Repeatability: May be repeated. Maximum 10 hours.

553 Computer Enhanced Design (2-6)
Repeatability: May be repeated. Maximum 10 hours.
Registration Permission: Consent of instructor.

593 Independent Study (1-4)
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Consent of instructor.

595 Visiting Artist Seminar (2) Contemporary art issues by different visiting artists.
Repeatability: May be repeated. Maximum 8 hours.
Credit Restriction: May not be applied toward the art history requirement.

599 Projects in Lieu of Thesis (10)
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 20 hours.
Comment(s): Completion of all graduate coursework and successful second-year evaluation by graduate faculty required.

Art Drawing (137)

419 Special Topics in Drawing and Painting (3) Student- or instructor-initiated course offered at convenience of department to enhance and expand the painting, drawing, and watercolor curriculum.
Repeatability: May be repeated. Maximum 20 hours.
Registration Permission: Consent of instructor.

511 Graduate Drawing I (2-6)
Repeatability: May be repeated. Maximum 10 hours.

512 Graduate Drawing II (2-6)
Repeatability: May be repeated. Maximum 10 hours.

593 Independent Study (1-4)
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Consent of instructor.

595 Visiting Artist Seminar (2) Contemporary art issues by different visiting artists.
Repeatability: May be repeated. Maximum 8 hours.
Credit Restriction: May not be applied toward the art history requirement.

599 Projects in Lieu of Thesis (10)
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 20 hours.
Comment(s): Completion of all graduate coursework and successful second-year evaluation by graduate faculty required.
Art Education (141)
510 History and Philosophy of Art Education (3) United States from 1860s to present. Registration Permission: Consent of instructor.
520 Studies in Art Education (3) Issues and topics current to the field of art education. Registration Permission: Consent of instructor.
530 Production and Critical Pedagogy in Art (3) Relationship of production to aesthetics and critical analysis of works of art.
540 Use and Construction of Instructional Materials for Teaching Art (3) Examination and construction of curriculum and instructional aids related to teaching strategies in art education.

Art History (139)
403 History of Photography (3) Survey of history of photography from introduction of daguerreotype and calotype to more recent trends. Emphasis will be placed on aesthetics and the use of photography as a medium for artistic expression.
411 Art of South and Southeast Asia (3) Survey of art and architecture of the Indian subcontinent and Southeast Asia from 2000 BC to the 20th century. The major achievements of each period are examined in relation to their religious, political, and social contexts.
415 Art of China (3) Survey of art and architecture of China from the Neolithic period to the 20th century. The major achievements of each period are examined in relation to their religious, political, and social contexts.
416 Chinese Art of the 20th and 21st Centuries (3) Survey of Chinese art from the late 19th century through the present. Hong Kong, Taiwanese, and expatriate artists are also considered.
419 Art of Japan (3) Survey of the art and architecture of Japan from the Neolithic period to the 20th century. The major achievements of each period are examined in relation to their religious, political, and social contexts.
425 Early Christian and Byzantine Art to 1350 (3) Art in Italy and the Eastern Empire from the beginnings of Christian art to c. 1350. Mosaic and painting, sculpture and architecture. (Same as Judaic Studies 425.)
431 Medieval Art of the West, 800-1400 (3) Western European art of the Dark Ages, Romanesque, and Gothic periods. (Same as Judaic Studies 431; Medieval Studies 431.)
441 Northern European Painting, 1350-1600 (3) From courtly art of late Middle Ages to Northern Renaissance. Jan van Eyck, Roger van der Weyden, and Dürer; early printmakers. (Same as Medieval Studies 441.)
442 Art of Northern Europe, 1600-1675 (3) Concentrated study of Bruegel, Rubens, Rembrandt, Georges de La Tour, Vermeer, Poussin, and Hals.
451 Art of Italy, 1250-1450 (3) Development of exploration of naturalism. Revival of antiquity and development of theories of perspective in the Early Renaissance. Including Duccio, Giotto, Masaccio, Donatello, Botticelli. (Same as Medieval Studies 451.)
453 Art of Southern Europe, 1575-1700 (3) Concentrated study of Caravaggio, Bernini, and Italian Baroque developments in all media. Spanish Baroque painting and sculpture with special attention to Velázquez.
454 Renaissance and Baroque Theory (3) Addresses the theory of Western art in the early modern period with emphasis on the development and evolution in European Art during the Renaissance and Baroque periods. (DE) Prerequisite(s): 172 and 173 or consent of instructor.
461 Art of Northern and Eastern Africa (3) Art traditions of the eastern and southern regions of Africa. Sculpture, painting, pottery, textiles, architecture and human adornment will be examined. Some ancient Stone and Iron Age traditions will be examined, but the main emphasis will be on the diverse ethnic and regional art traditions practiced in the area from 19th century to present. (Same as Africana Studies 461.)
462 Art and Archeology of Ancient Africa (3) Historical art traditions of sub-Saharan Africa. Topics to be covered include prehistoric rock paintings; art from archaeological sites and ancient kingdoms. The time period covered ranges from the first and second millennia BC for some of the early terracotta sculpture and rock paintings, the 11th through 19th centuries AD for the later ancient kingdoms. (Same as Africana Studies 462.)
463 Arts of the African Diaspora (3) Examines the aesthetic, philosophical and religious patterns of the African descendants of Brazil, Surinam, the Caribbean and the United States. Emphasis will be placed on the full range of art forms, including the sculptural and performance traditions, as well as architecture, textile, basketry and pottery art forms. (Same as Africana Studies 463.)
464 Oceanic Art (3) Concentrated study of selected sculpture, textiles, and other traditional art forms of Polynesia, Micronesia, and Melanesia. Objects are discussed on the basis of style, style relationship, iconography and the uses to which they were put in their traditional religious, political and social contexts.
470 African-American Art (3) Traces the artistic and social legacy of African-American art from the eighteenth century to the present day. Specifically, this class will focus on the ways in which artists used creativity to confront, deny, or complicate understandings of racial identity and racism. Examines broad scope of artistic production including painting, sculpture, photography, multi-media, fiction writing, and video art. (Same as Africana Studies 470.)
472 History of 20th-Century American Art (3) Developments in architecture, painting, and design from 1900.
473 19th-Century American Art (3) Examines painting, sculpture, and print culture from the Revolutionary War to the turn of the 20th century.
474 Theory of 20th-Century Art in Europe and America (3) Addresses the theoretical basis for the modern movement. Emphasis on analyzing and discussing individual works of art in light of contemporary writings by artists and theorists. (DE) Prerequisite(s): 172 and 173 or consent of instructor.
476 History of 20th-Century Painting and Sculpture in Europe (3) Development of the Modern and Post-Modern movements in Europe. Investigation of progression of abstraction through more recent conceptual trends. Analysis of the work of individual artists such as Picasso, Matisse, and many others.
479 Special Topics in Art History (3) Student- or instructor-initiated course offered at convenience of department. Repeatability: May be repeated. Maximum 12 hours.
483 History of American Sculpture (3) American sculpture from prehistory to the 1960s.
489 Studies in Art History (3) Concentration in individually selected area. Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of instructor.
511 Studies in Medieval Art (3) Art and architecture of the Middle Ages – major monuments from Byzantium or western Europe. Repeatability: May be repeated with consent of department. Maximum 6 hours. Comment(s): For MFA candidates.
521 Studies in Italian Renaissance Art (3) Art and architecture of the 14th, 15th, and/or 16th centuries in Italy. Early or High Renaissance or Manьерist periods. Repeatability: May be repeated with consent of department. Maximum 6 hours. Comment(s): For MFA candidates.
527 Studies in Baroque Art (3) Seventeenth century art and architecture – major artists and works from southern or northern Europe. Repeatability: May be repeated with consent of department. Maximum 6 hours. Comment(s): For MFA candidates.
574 Studies in Modern Western Art (3) Selected topics in 19th- and 20th-century western art. Repeatability: May be repeated with consent of department. Maximum 6 hours. Comment(s): For MFA candidates.
575 Studies in Modern American Art (3) Selected topics in 19th- and 20th-century American art. Repeatability: May be repeated with consent of department. Maximum 6 hours. Comment(s): For MFA candidates.
576 Studies in Asian Art (3) Selected topics in Japanese or Chinese Art. Repeatability: May be repeated with consent of department. Maximum 6 hours. Comment(s): For MFA candidates.
579 Special Topics in Art History (3) Student- or instructor-initiated course offered at convenience of department. Repeatability: May be repeated with consent of department. Maximum 9 hours. Comment(s): For MFA candidates.
Art Media Arts (134)

431 Photography III (3-6) Individual development of photographic problems and techniques. Repeatable: May be repeated. Maximum 12 hours. (DE) Prerequisite(s): 231, 330, and 331.

433 History of Film and Modern Art (3) Study of the development and interaction between cinematic arts and visual arts within the context of modern art history. (Same as Cinema Studies 433.) Comment(s): Available for art history credit.

435 Cinematography as Art (4) Continued development of concepts and techniques for the creation of film as an art form with an emphasis on individual projects. (Same as Cinema Studies 435.) Repeatable: May be repeated. Maximum 12 hours. (DE) Prerequisite(s): 235 and 330 or consent of instructor.

436 Video Art (4) Continued development of concepts and techniques for the creation of video works as an art form with emphasis on individual projects. (Same as Cinema Studies 436.) Repeatable: May be repeated. Maximum 12 hours. (DE) Prerequisite(s): 235 and 330 or consent of instructor.

439 Special Topics in Media Arts (3) Student- or instructor-initiated course offered at convenience of department. Repeatable: May be repeated. Maximum 12 hours.

441 Digital Photography II (4) Continuation of exploration and implications of use of computer in photography. (DE) Prerequisite(s): 330 and 341. Registration Permission: Consent of instructor.

531 Photography I (2-6) Repeatable: May be repeated. Maximum 10 hours.

532 Photography II (2-6) Repeatable: May be repeated. Maximum 10 hours.

535 Media Arts I (1-6) Repeatable: May be repeated. Maximum 10 hours.

536 Media Arts II (2-6) Repeatable: May be repeated. Maximum 10 hours.

577 Studies in Media as Art (3) Selected topics in theory and history of media as art form. Repeatable: May be repeated. Maximum 9 hours.

593 Independent Study (1-4) Repeatable: May be repeated. Maximum 15 hours. Registration Permission: Consent of instructor.

595 Visiting Artist Seminar (2) Contemporary art issues by different visiting artists. Repeatable: May be repeated. Maximum 8 hours. Credit Restriction(s): May not be applied toward the art history requirement.

599 Projects in Lieu of Thesis (10) Grading Restriction: Satisfactory/No Credit grading only. Repeatable: May be repeated. Maximum 20 hours. Comment(s): Completion of all graduate coursework and successful second-year evaluation by graduate faculty required.

Art Printmaking (132)

449 Special Topics in Printmaking (3-6) Student- or instructor-initiated course offered at convenience of department. Repeatable: May be repeated. Maximum 12 hours. (DE) Prerequisite(s): 315.

541 Graduate Sculpture I (2-6) Individual development of sculptural problems and techniques. Students work independently while participating in group projects, critique, and discussion. Repeatable: May be repeated. Maximum 12 hours. Recommended Background: 6 hours of 300-level sculpture.

449 Special Topics in Sculpture (3) Student- or instructor-initiated course offered at convenience of department. Repeatable: May be repeated. Maximum 12 hours. Recommended Background: Successful completion of any portfolio review.

542 Graduate Sculpture II (2-6) Repeatable: May be repeated. Maximum 10 hours.

593 Independent Study (1-4) Repeatable: May be repeated. Maximum 15 hours. Registration Permission: Consent of instructor.

595 Visiting Artist Seminar (2) Contemporary art issues by different visiting artists. Repeatable: May be repeated. Maximum 8 hours. Credit Restriction: May not be applied toward the art history requirement.
Asian Languages (144)

431 Readings in Chinese Literature (3) (Same as Chinese 431.)
Repeatability: May be repeated. Maximum 9 hours.
Recommended Background: Mastery of intermediate-level Chinese or consent of instructor.

451 Readings in Pre-Modern Japanese Literature (3) (Same as Japanese 451.)
Repeatability: May be repeated. Maximum 9 hours.
Recommended Background: Mastery of intermediate-level Japanese or consent of instructor.

452 Readings in Modern Japanese Literature (3) (Same as Japanese 452.)
Repeatability: May be repeated. Maximum 9 hours.
Recommended Background: Mastery of intermediate-level Japanese or consent of instructor.

Asian Studies (145)

471 Selected Topics in Asian Studies (3) Content varies.
Repeatability: May be repeated. Maximum 6 hours.

Astronomy (150)

411 Astrophysics (3) Development of analytical physical models of galactic structure of the universe, stellar and interstellar matter, and planetary systems. Topical and interdisciplinary approach includes consideration of quasars, pulsars, black holes and current developments in the field. Acceptable for credit toward the physics major.
(DE) Prerequisite(s): Physics 136 or 138 or 222 or 232.
Registration Permission: Consent of instructor.

490 Special Topics in Astronomy (1-3) Topics of current interest in astronomy and astrophysics. Acceptable for graduate credit in physics with consent of department.
Repeatability: May be repeated with consent of department. Maximum 9 hours.
600 Doctoral Research and Dissertation (3-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

601 Experimental Phonetics (3) Acoustical and perceptual analyses of speech production and overall oral communication.
Registration Permission: Consent of instructor.

602 Psychoacoustics (3) Auditory perception and reception of acoustic stimuli.
(DE) Prerequisite(s): 507 or consent of instructor.

604 Molecular Genetics and Pharmacology of Hearing (3) Study of genetics, pharmacology, and general cellular processes as they relate to hearing.
(DE) Prerequisite(s): 507 or consent of instructor.

605 Speech Perception and Hearing Impairment (3) Study of perception of speech stimuli, with particular emphases on the effects of hearing impairment on perception.

611 Experimental Design in Speech and Hearing (3) Analysis of experimental design in theses and related journals. Generation of experimental designs.
Registration Permission: Consent of instructor.

613 Externship in Audiology (1-9) Off-campus clinical training experience.
Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of academic advisor.

626 Advanced Seminar in Neurologically-based Communication Disorders (3) Topics vary.
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): 518 and 526.

650 Advanced Seminar in Audiology (3-6) Topics vary.
Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

655 Practicum in College Teaching (1-3) Supervised experience in college teaching.
Grading Restriction: Satisfactory/No Credit grading only.
Registration Permission: Consent of instructor.

656 Directed Research (1-4) Participation in ongoing or non-dissertational research.
Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

657 Directed Study in Speech Pathology (1-3) Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

658 Directed Study in Audiology (1-3) Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

659 Directed Study in Speech Science (1-3) Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

660 Directed Study in Hearing Science (1-3) Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

661 Advanced Seminar: Language Disorders in Children (3) Topics vary.
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): 561 or consent of instructor.

662 Advanced Seminar in Audiologic Assessment (3) Synthesis of information on audiologic and vestibular assessment and application of clinical cases.
(DE) Prerequisite(s): 542, 546, 574, 576, and 577 or consent of instructor.

663 Advanced Seminar in Aural Habilitation/Rehabilitation (3) Synthesis of information on audiologic habilitation and rehabilitation cases.
(DE) Prerequisite(s): 543, 544, 584, and 594 or consent of instructor.

664 Advanced Seminar in Amplification (3) Synthesis of information on amplification technology, amplification for adults with hearing impairment, and case studies.
(DE) Prerequisite(s): 543, 544, 584, and 594 or consent of instructor.

**Aviation Systems (169)**

500 Thesis (1-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

501 Aviation Systems: An Overview (3) Aviation systems, present and future. Socioeconomic, aerospace, and propulsion technology, meteorology, air traffic control, airport community interface, and technological trends and developments pertinent to present status, and future development of air transportation.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

503 Air Vehicles (3) Current capabilities and future requirements for civilian and military air vehicles. Parameters significant for air vehicle type selection. Integration of air vehicle into aviation systems.
(DE) Prerequisite(s): 501.

504 Airports of the Community (3) Structure of airports and their communities. Technology and economics of cargo, baggage, ticket, and passenger handling. Airport management, economics and logistics. Interfaces with community. Plans, programs and developments for collecting and distributing passengers and freight from various types of airports. Types of airport developments and their projections.

506 Aircraft Design (3) Design process, compromise of conflicting requirements, economical, industrial, and legal aspects. Definition of mission requirements, synthesis and optimization techniques, safety and reliability, systems integration, standards and regulations, teamwork, and decision-making process.

507 Introduction to Airborne Radar (3) Theory and application of airborne radar. Radar detection and measurement techniques through aviation systems applications. Ground effects on radar signals of multipath and clutter. Pulsed operation, coding, filters, processing techniques, Doppler effects. Problems of range and range rate and tracking. Methods and techniques for reducing radar cross section.

508 Flight Test Instrumentation (3) Principles of measurement, measuring devices with views toward both ground and flight aerospace testing: measurement fundamentals, sensors for specific parameters (e.g. temperature, heat flux, flow rate, pressure, acceleration, vibration, strain, and humidity), data bus integration, signal condition, telemetry, and fabrication.

509 Introduction to Aircraft Structures (3) Design and analysis of structures: light-weight and modern materials used for aircraft structures. Topics: load determination and aviation regulations, airworthiness, ultimate loads, limit loads, load factors; simplifying assumptions to safe side; basics of stress and strain, elasticity, shear, bending, torsion; statically indeterminate systems, frames; structural instabilities, buckling of columns, thin plates; tension field beams; principles of stressed skin construction; open, closed, thin-walled beams; tapered beams, fuse-lages and frames, wings and ribs; laminated composite structures; elementary aeroelasticity.

510 Special Topics in Aviation Systems (3) Current problems.
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Consent of instructor.
Credit Restriction: Maximum of 12 hours may be applied toward degree requirements.

511 Theory and Aviation Applications of GPS (3) Global Positioning System (GPS) for improved navigation and situational awareness for civil and military applications. GPS theory: geometric dilution of precision, satellite positioning, ionospheric delay, differential GPS, and GPS errors. Applications for navigation and aircraft flight-testing. Integration of GPS for aviation infrastructure and for air vehicle navigation, concepts of WAAS and LAAS.

512 Helicopter Performance Flight Test Techniques (3) Experimental test techniques for helicopter performance flight testing. Theoretical derivation of flight test techniques. Participation in series of flight test experiments demonstrating acquisition of flight test data. Instrumentation and data reduction techniques.

513 Helicopter Stability and Control Flight Test Techniques (3) Experimental test techniques for helicopter stability and control flight testing. Theoretical derivation of flight test techniques. Participation in series of flight test experiments demonstrating acquisition of flight test data.
514 Systems Flight Testing (3) Experimental test techniques for helicopter and airplane flight systems. Approach and design for testing airborne systems. Theory and operation of typical flight systems: aircraft systems, navigation systems, communications systems, and specific mission systems.

515 Aviation Human Factors (3) Human factors pertinent to aviation: concept of human factors, human error, fatigue, body rhythms, performance, motivation, information, vision, and visual illusions, communication, attitudes, training and devices, displays and controls, space and layout, anthropometry, flight deck design and evaluation, aircraft cabin design and evaluation, flying qualities evaluation, and performance measurement techniques. Applied aviation systems.

516 Aircraft Flight Controls (3) Feedback control concepts, root locus techniques, bode analysis, PID control design, and controller and observer design concepts applied to aircraft. Complex analysis and matrix algebra.

521 Experimental Flight Mechanics (3) Performance. Experimental techniques for flight mechanics. Specially equipped airborne laboratory: student participation in series of experiments demonstrating acquisition of flight test data. Necessary theory supports class experiments. Tests cover broad range of aircraft performance, stability and control characteristics in addition to instrumentation and data reduction methods.

522 Experimental Flight Mechanics (3) Stability and control. Experimental techniques for flight mechanics. Specially equipped airborne laboratory: student participation in series of experiments demonstrating acquisition of flight test data. Necessary theory supports class experiments. Tests cover broad range of aircraft performance, stability and control characteristics in addition to instrumentation and data reduction methods.


(DE) Prerequisite(s): 422.

550 Project in Aviation Systems (3) Repeatability: May be repeated. Maximum 15 hours. Credit Restriction: Maximum of 3 hours may be applied toward degree requirements. Comment(s): Non-thesis aviation systems majors only.

Biochemistry and Cellular and Molecular Biology (188)

401 Biochemistry-Molecular Biology I (4) First semester of a two-course sequence providing in-depth coverage of biochemistry and molecular biology. Covers amino acid structure and chemistry, protein structure and chemistry, protein folding, enzyme behavior and function, reaction mechanisms, catalabolism and energy transfer, synthetic metabolism including photosynthesis, and protein transport.

(DE) Prerequisite(s): Biology 240 and Chemistry 350, 360, and 369.

402 Biochemistry-Molecular Biology II (4) Second semester of a two-course sequence providing in-depth coverage of biochemistry and molecular biology. Covers structure of DNA and RNA, experimental methods of analyzing nucleic acids, mechanisms of RNA and protein synthesis, mechanisms of DNA replication, repair and recombination, chromosome structure and function, regulation of gene expression, genome structure and genomics, and mechanisms of biological regulation.

(DE) Prerequisite(s): Biology 240 and Chemistry 350, 360, and 369.

403 Advanced Genetics Laboratory (3) Experiments illustrating methods in modern genetics. Techniques in classical, cyto-molecular, and developmental genetics. Using model organisms, especially Drosophila and mouse.

(DE) Prerequisite(s): Biology 240 and Chemistry 350, 360, and 369.

404 Plant Molecular Biology (4) Introduction to current research approaches and methodologies in plant developmental biology and molecular genetics.

Contact Hour Distribution: Laboratory and lecture.

(DE) Prerequisite(s): Biology 140 and 240.

419 Cellular and Comparative Biochemistry Lab (2) Experiments with enzymes, nucleic acids, and membranes and organelles. Chromatography, kinetics, hybridization, sequencing, and immunochemoical methods.

(DE) Prerequisite or (DE) Corequisite: 401 or 410.

421 Cell and Tissue Structure and Function (4) Study of animal cells and tissues at light and electron microscope levels.

Contact Hour Distribution: 2 hours and 2 labs.

(DE) Prerequisite(s): Biology 140.

440 General Physiology (3) Principles of cellular and organ-system animal physiology.

(DE) Prerequisite(s): Biology 140.

465 Human Genetics (3) Genetic and molecular principles and problems of human inheritance.

(DE) Prerequisite(s): Biology 240.

471 Biophysical Chemistry (3) Physicochemical principles with applications to biological systems. Thermodynamics; chemical equilibrium; solution chemistry; transport; electrochemistry; kinetics; enzyme catalyzed reactions. Same as Chemistry 471.

(DE) Prerequisite(s): Chemistry 350 and 360, Mathematics 125, and general biology or consent of instructor.

480 Physiology of Exercise (3) (See Exercise Science 480.)

481 Biophysical Chemistry (3) Physicochemical principles with applications to biological systems. Elementary quantum chemistry; interactions of light with biological molecules; optical and magnetic spectroscopy; light scattering; case studies of selected macromolecules. Same as Chemistry 481.

(DE) Prerequisite(s): Chemistry 350 and 360, Mathematics 125, and general biology or consent of instructor.

500 Thesis (1-15)

Grading Restriction: PNP only. Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.

Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated.

Credit Restriction: May not be used toward degree requirements.

510 Computational Structural Biochemistry (1) Introduction to computational tools, internet resources and databases for biological research to analyze and model protein structures and to study protein-ligand interactions.

(DE) Prerequisite(s): 511.

Registration Permission: Consent of instructor.

511 Advanced Protein Chemistry and Cellular Biology (3) Cellular structure and function at molecular and supramolecular level in progression: protein structure and function; membrane structure and function; bioenergetics and membrane proteins.

(DE) Corequisite(s): 510.

Recommended Background: Prior knowledge of cell biology and biochemistry.

Registration Permission: Consent of instructor.

512 Advanced Molecular Biology (3) Regulation of nucleic acid expression and protein activity. Nucleic acid structure and function; replication and repair of nucleic acids; gene expression; protein synthesis; post-translational protein modification; mitosis and meiosis; cell cycle and cell growth.

(DE) Prerequisite(s): 511 or consent of instructor.

513 Advanced Protein Biochemistry and Cell Biology II (3) Advanced topics of cellular function and regulation of cell division and growth, and structure and function of supramolecular structures; cytoskeleton and cell junctions and adhesions.

(DE) Prerequisite(s): 511.

515 Experimental Techniques I (2-4) Introduction to modern experimental methodology and instrumentation in biochemistry, molecular biology and cell biology, including cell culture; spectrophotometry; microscopy; nucleic acid purification and analysis; protein assays; enzyme purification; electrophysiology; computer analysis of nucleic acid and protein sequences. Team-taught lecture/demonstration format.

Repeatability: May be repeated. Maximum 6 hours.

Comment(s): Primarily for departmental graduate students.

516 Experimental Techniques II (2-4) Laboratory rotations. Students work in laboratory of faculty member on clearly defined project. Written proposal and oral report required.

Repeatability: May be repeated. Maximum 8 hours.

(DE) Prerequisite(s): 515.

Comment(s): Primarily for departmental graduate students.

517 Physical Biochemistry (3) Physics and chemistry of biological systems and molecules. Thermodynamics; diffusion and transport; physical chemistry of macromolecules; enzyme kinetics; binding reactions; spectroscopy; electrophysiology.

(DE) Prerequisite(s): 511 or consent of instructor.

520 Special Topics (1-3) Selected directed readings or special course in topics of current interest. Consult departmental listings for offerings.

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated with consent of instructor. Maximum 6 hours.

(De) Prerequisite(s): 401 and one semester of introductory plant physiology or cell biology.

523 Advanced Plant Physiology II (3) Growth and differentiation of plants at molecular, cellular and organismal levels. Regulation of development; macromolecular interpretation of differentiation, dormancy, germination, flowering, and senescence.

(De) Prerequisite(s): 401 and one semester of introductory plant physiology or cell biology.

525 Graduate Research Participation (3-12) Tutorial laboratory experiences. Specific subject area to be announced.

Repeatability: May be repeated. Maximum 12 hours.

530 Experimental Design and Analysis (2) Development of skills in strategies of experimental design and interpretation of experimental results. Critical discussion of research articles illustrating issues in experimental design. Preparation of grant proposal in standard format to be read and discussed by class and by panel of faculty expert in area of proposal. Registration Permission: Consent of instructor.

550 Advanced Concepts in Neurobiology/Physiology (3) Concepts related to neurobiology/physiology with information taken from current literature. Predominantly lecture format with student participation. Specific subject area to be announced.

Registration Permission: Consent of instructor.

552 Physiology of Hormones (3) Cellular and organismal action of hormones in invertebrate and vertebrate animals.

Contact Hour Distribution: 2 hours and 1 lab.

Recommended Background: 410.

Registration Permission: Consent of instructor.

559 Biophysical Crystallography (3) Theories and practices of X-ray diffraction, neutron diffraction and neutron scattering to elucidate the structure of nucleic acids, proteins, nucleosomes, ribosomes and viruses. Application of 3-D structures in designing drugs against AIDS, cancer, cardiaic disease and neurodegenerative disorders.

Recommended Background: 401 or two 300-level chemistry courses or Physics 240.

Registration Permission: Consent of instructor.

560 Advanced Concepts in Structural Biology/Biochemistry (3) Concepts related to structural biology/biochemistry with information taken from current literature. Predominantly lecture format with student participation. Specific subject area to be announced.

Repeatability: May be repeated. Maximum 12 hours.

562 Introduction to Electron Microscopy – Transmission Electron Microscope (4) Practical introduction to techniques of electron microscopy. Use of microscope and ancillary equipment, darkroom techniques, preparation of materials for publication and special project.

Contact Hour Distribution: Two 3-hour labs.

Comment(s): Approved graduate students in department only.

564 Introduction to Electron Microscopy-Scanning Electron Microscope (3) Practical introduction to techniques of electron microscopy and to scanning electron microscope. Use of microscope, introduction to darkroom techniques and digital image processing, preparation of samples for observation, and special project.

Contact Hour Distribution: 2 hours and 1 lab.

Registration Permission: Consent of instructor.

570 Advanced Concepts in Cellular/Molecular Biology (3) Concepts related to cellular/molecular biology with information taken from current literature. Predominantly lecture format with student participation. Specific subject area to be announced.

Repeatability: May be repeated. Maximum 12 hours.


Repeatability: May be repeated. Maximum 12 hours.

581 Departmental Seminar (1) Invited speakers. Topics posted in advance. Required every semester in residence.

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated. Maximum 15 hours.

600 Doctoral Research and Dissertation (3-15) Grading Restriction: P/NP only.

Repeatability: May be repeated.

601 Departmental Seminar (1) Invited speakers. Topics posted in advance. Required every semester in residence.

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated. Maximum 15 hours.

603 Graduate Research Colloquium (1) Seminars and lectures dealing with current advances in fields of biochemical and biophysical methods. Mechanisms of enzyme catalysis, gene expression, membrane structure and function, metabolic regulation, physical biochemistry, molecular genetics, cell biology, neurobiology, and related topics. Topics posted in advance. Required every semester in residence.

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated. Maximum 15 hours.

605 Journal Club in Neurophysiology/Physiology (1) Readings and discussion based on current literature.

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated. Maximum 12 hours.

606 Journal Club in Structural Biology/Biochemistry (1) Readings and discussion based on current literature.

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated. Maximum 12 hours.

607 Journal Club in Cellular/Molecular Biology (1) Readings and discussion based on current literature.

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated. Maximum 12 hours.

608 Journal Club in Genetics/Developmental Biology (1) Readings and discussion based on current literature.

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated. Maximum 12 hours.

610 Current Topics in Biochemistry, Cellular, and Molecular Biology (1-3) Critical reviews of research problems and methods in biochemistry, cell biology and/or molecular biology. Oral presentations, written reports, computer simulations by faculty and students.

Repeatability: May be repeated. Maximum 4 hours.

Registration Permission: Consent of instructor.

612 Advanced Topics in Environmental Toxicology (1-3) (See Ecology and Evolutionary Biology 612.)

615 Special Topics in Biochemistry, Cellular, and Molecular Biology (3) Biochemical and biophysical methods, mechanisms of enzyme catalysis, gene expression, membrane structure and function, metabolic regulation, physical biochemistry, molecular genetics, cell ultrastructure and physiology, neurobiology, and related topics.

Repeatability: May be repeated. Maximum 9 hours.

(De) Prerequisite(s): 511 and 512 or consent of instructor.

Biomedical Engineering (192)

408 Cell and Tissue Engineering (3) Mammalian cell culture. Effects of mechanical forces on cells. Tissue engineering of cardiovascular and orthopedic devices.

(De) Prerequisite(s): 310 and Biology 140.

430 Biomedical Engineering Laboratory (4) Experience with the unique problems associated with making measurements and interpreting data in living systems. Experiments may include mechanical testing of biological materials, imaging and physiological measurements (EMG, ECG, etc.).

(De) Prerequisite(s): 310 and 346 or consent of instructor.

473 Applied Biomechanics (3) Applications of biomechanics to the industrial and orthopedic area. Design of orthopedic implant devices; biomechanics of injury and protection.

(De) Prerequisite(s): Mechanical Engineering 321.

(De) Corequisite(s): 310 and Materials Science and Engineering 474.

475 Design of Artificial Internal Organs (3) Design, development and evaluation of artificial internal organs; analysis of transport processes in therapeutic devices for design optimization; current research and development needs. Ethical considerations.

(De) Prerequisite(s): Aerospace Engineering 341 and Mathematics 231.

494 Special Project in Biomedical Engineering (1-3) Problems related to recent developments and practice.

Repeatability: May be repeated. Maximum 6 hours.

495 Special Project in Biomedical Engineering (1-3) Problems related to recent developments and practice.

Repeatability: May be repeated. Maximum 6 hours.
500 Thesis (1-15)
- Grading Restriction: P/NP only.
- Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15)
- Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
- Grading Restriction: Satisfactory/No Credit grading only.
- Repeatability: May be repeated.
- Credit Restriction: May not be used toward degree requirements.

507 Application of Linear Algebra in Engineering Systems (3)
- (See Chemical Engineering 507.)

509 Multidisciplinary Project (1)
- (See Industrial Engineering 509.)

511 Biotransport Processes (3)
- Cellular transport and electrical properties from a combined biological, physical, and engineering point of view. Matter transport across cellular membranes involving diffusion, osmosis, coupled solute and solvent transport, carrier-mediated transport, and ion transport. Homeostatic mechanisms involved in maintaining cellular solute concentrations, volume, and potential. Electrically inexorable and excitable cells, lumped parameter and distributed-parameter cell models, linear electric properties of cells, and voltage gated ion channels.
- (DE) Prerequisite(s): Electrical and Computer Engineering 301 or consent of instructor.

531 Advanced Biomechanics I (3)
- Derivation of mathematical models of the human body using Kane’s Method of Dynamics to create system equations of motions. Mathematical models will pertain to human non-implanted and implanted joints. Models will be created by hand and using the symbolic manipulation algorithm Autolev. (Same as Mechanical Engineering 531.)
- (DE) Prerequisite(s): Mechanical Engineering 231.

534 Mechanical Vibrations (3)
- (See Mechanical Engineering 534.)

538 Ultrasonic Methods and Bioinstrumentation (3)
- Basic ultrasound principles including wave equation, impedance, acoustic properties of biological tissues, etc. Transducers, beam patterns, resolution, and diagnostic imaging configurations for static and dynamic real-time imaging principles. Doppler physics, Doppler spectral analysis, image quality, image artifacts, clinical safety and measurement techniques, and quality control.
- Registration Permission: Consent of instructor.

539 Continuum Mechanics (3)
- (See Engineering Science 539.)

541 Fluid Mechanics I (3)
- (See Mechanical Engineering 541.)

548 Optimization Techniques in Biomedical Engineering (3)
- Current techniques in optimization. Emphasis on applying optimization techniques to problems in biomedical imaging.
- Registration Permission: Consent of instructor.

552 Computational Biomechanics (3)
- Practical use of general-purpose commercial finite element packages for simulations related to orthopedic and sport biomechanics. Prediction of failure and performance of bone, joints and prosthetic devices.
- (DE) Prerequisite(s): Mechanical Engineering 231 and 321.

555 Human Vibrations Analysis and Protection (3)
- Concepts of whole body vibrations, background information on the development of ANSI and ISO Standards for the protections of workers from whole body vibrations; how to apply the standards to meet the EU requirements; measurement methods and signal processing requirements for whole body vibration; background information on the development of ANSI and ISO Standards for the protections of workers for vibration white finger syndrome; development criteria for current ANSI, ISO, and EU standards; measurements methods and requirements, effectiveness of anti-vibration gloves. (Same as Aerospace Engineering 555; Mechanical Engineering 555.)
- (DE) Prerequisite(s): Mechanical Engineering 363 and 534.
- Registration Permission: Consent of instructor.

559 Advanced Mechanics of Materials I (3)
- (See Mechanical Engineering 559.)

561 Finite Elements for Engineering Applications (3)
- (See Engineering Science 551.)

562 Computational Fluid-Thermal Systems (3)
- (See Engineering Science 552.)

571 Biomechanics of Hard and Soft Tissue (3)
- (See Engineering Science 571.)

572 Biomedical Fluid Mechanics (3)
- (See Engineering Science 572.)

574 Multidimensional Medical Image Analysis (3)
- Applied mathematical and physical principles for different medical imaging modalities, image formation, reconstruction, enhancement and filtering, representation and analysis, registration and camera calibration models, shape and texture, transforms, features extraction, segmentation, clustering, introduction to pattern recognition and classification based on non-parametric techniques, parametric techniques, and neural networks models, 2D matching, introduction to biometrics, application in medical image segmentation, classification, and computerized medical diagnosis of diseases.
- (DE) Prerequisite(s): 572, and Electrical and Computer Engineering 472.

577 Neural Networks in Engineering (3)
- (See Nuclear Engineering 577.)

582 Micro-electromechanical Systems in Biomedical Engineering (3)
- Examines physical principles, design techniques, fabrication techniques, and testing technologies needed for the modern biomedical engineer working in the microfabrication field in miniaturized environments. This is a hands-on hardware and software course that includes some laboratory experiments and use of MEMS design software.
- Registration Permission: Consent of instructor.

587 Dynamic Modeling and Simulation (3)
- (See Mechanical Engineering 587.)

590 Selected Biomedical Engineering Problems (2-6)
- Grading Restriction: Satisfactory/No Credit grading only.
- Repeatability: May be repeated. Maximum 8 hours.
- Registration Permission: Consent of instructor.
- Comment(s): Enrollment is limited to students in the non-thesis option.

595 Seminar (1)
- All phases of biomedical engineering, reports on current research at UTK and UTSA.
- Grading Restriction: P/NP only.
- Repeatability: May be repeated. Maximum 20 hours.

600 Doctoral Research and Dissertation (3-15)
- Repeatability: May be repeated. Maximum 60 hours.

610 Advanced Topics in BME (3)
- Current research topics of interest in biomedical engineering.
- Repeatability: May be repeated. Maximum 9 hours.
- Registration Permission: Consent of instructor.

611 Fields, Forces and Flows in Cells and Tissues (3)
- Applications of equilibrium and non-equilibrium thermodynamics to rate processes and forces in cells and tissues. Fields in heterogeneous media, electrical double layers, and electromechanical forces in physiological systems. Fluid and solid continuum mechanics of porous hydrated biological tissues. Electrokinetic, electroosmotic flows, and diffusion-reaction. Electrochemical and physicochemical interactions in biomaterials and cells. Case studies in membrane transport, electrode interfaces, electrical, mechanical, and chemical transduction in tissues. Cardiovascular, orthopedic and other clinical examples.
- (DE) Prerequisite(s): 511 or consent of instructor.

631 Advanced Biomechanics II (3)
- Using the symbolic manipulation algorithm, difficult systems pertaining to the human body will be modeled. A more in depth analysis of Kane’s method of multibody dynamics will also be implemented in these models. Each student will focus on one complex model that pertains to an orthopedic complication that the orthopedic industry needs solved. (Same as Mechanical Engineering 631.)
- (DE) Prerequisite(s): 531.

632 Biomechanics Design (3)
- Design of an implant, orthopaedic mechanical device, orthopaedic instrument or a rehabilitation device for a sponsoring orthopaedic company. The design project will include patent searches, literature searches and a final report.
- (DE) Prerequisite(s): 531.

659 Advanced Mechanics of Materials II (3)
- (See Mechanical Engineering 659.)

674 Neuro-Fuzzy Pattern Recognition in Medicine (3)
- Pattern recognition and computer vision fundamentals, human vision system, principles of image formation and human perception, camera models, sampling and quantization and image transforms. Applications of neuro-fuzzy systems in medicine.
- (DE) Prerequisite(s): 574.

682 Biological Applications of Micro and Nanoscale Systems (3)
- Emerging techniques in biological and biomedical research on the micro and nanoscale. Biomaterials, soft lithography, nanomedicine, microfluidic principles, sensor principles and microsensors, microelectrodes and drug delivery, polymerase chain reactions, and DNA microarrays.
- (DE) Prerequisite(s): 582.
Biosystems Engineering (196)

411 Mechanical Systems Engineering (3) Fundamentals of power delivery systems and simple mechanisms; selection and design of mechanical, hydraulic, and tractive power transmission systems. Emphasis on off-road vehicles and bioprocessing systems.

Contact Hour Distribution: 2 hours and 1 lab.
Recommended Background: Rigid-body dynamics, mechanics of materials.

416 Hydrologic and Water Quality Engineering (3) An introduction to hydrology including: hydrologic variability, precipitation, evapotranspiration, infiltration, runoff, erosion, water quality and non-point pollution, energy dissipation, streamflow measurement, hydrographs, routing, open channel flow, and urban hydrology. (Same as Civil Engineering 416.)
Recommended Background: Hydraulics or fluid mechanics.

431 Bioprocess Engineering (3) Development of interdisciplinary bioprocess engineering; basics of biology in an engineering perspective; enzymatic reaction kinetics; metabolism and bioenergetics; cell growth kinetics and product formation; engineering principles applied to bioprocess engineering including mass balance, energy balance, and reaction kinetics; reactor design and systems; introduction to bioseparations; practical aspects of bioprocess engineers and process development.

Contact Hour Distribution: 2 hours and 1 lab.
Recommended Background: Thermodynamics, heat and mass transfer.

451 Electronic Systems (4) Basic electronics with biological applications. Analog and digital electronics; sensing and controlling physical and environmental parameters; sensor selection and interfacing; signal conditioning; process control. Includes laboratory experiments and design projects.

Contact Hour Distribution: 3 hours and 1 lab.
Recommended background: Electrical circuits.

500 Thesis (1-15)
Grading Restriction: P/NP only.
Repeatable: May be repeated.
Registration Restriction(s): Master of Science – biosystems engineering major.

502 Registration for Use of Facilities (1-15)
Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatable: May be repeated.
Credit Restriction: May not be used toward degree requirements.

503 Seminar (1) (See Environmental and Soil Sciences 503.)

519 Modeling Techniques and Applications (3) Engineering approach to mathematical modeling of physical phenomena. Systems definitions and boundaries; types and formulation of models and solution techniques; verification and calibration techniques; model applications and case studies.

Contact Hour Distribution: 2 hours and 1 lab.
Comment(s): Graduate standing in engineering required.

525 Soil Erosion and Sediment Yield (3) (See Environmental Engineering 525.)

530 Research Problems in Biosystems Engineering (1-3) Theoretical and experimental studies relating to current problems in agricultural engineering.
Repeatable: May be repeated. Maximum 6 hours.

532 On-Site Domestic Wastewater Treatment, Disposal and Reuse (3) Design and management of on-site wastewater treatment and disposal systems, use of the soil as a medium for final treatment and for wastewater disposal, concepts of the decentralization of domestic wastewater management, and reuse of treated water for irrigation. (Same as Biosystems Engineering Technology 532.)

(3E) Prerequisite(s): Civil Engineering 395 or consent of instructor.

543 Instrumentation and Measurement (3) Modern instrumentation techniques. Static and dynamic response of instrumentation; signal conditioning; temperature, moisture, optical radiation, displacement, strain, pressure, velocity, acceleration, and flow measurements; digital data acquisition and control. (Same as Environmental Engineering 543.)

Contact Hour Distribution: 2 hours and 1 lab.
(3E) Prerequisite(s): 451 or coursework in electronics and computer circuits.

552 Biological Treatment Theory (3) (See Environmental Engineering 552.)

555 GIS and GPS Applications to Biosystems (3) Theory and applications of Geographical Information Systems (GIS) and Global Positioning Systems (GPS); acquiring, managing, and analyzing spatially-varying data. Site-specific agriculture, environmental site assessment, natural resource management, and hydrology. (Same as Biosystems Engineering Technology 555.)

Contact Hour Distribution: 2 hours and 1 lab.
Comment(s): Students with graduate standing in engineering, biological or physical sciences only.

562 Selected Topics in Natural Resource Engineering (3) Topics in engineering for the characterization, conservation, and protection of soil, water, and air resources in spite of human activities such as off-road vehicle use, agriculture, mining, construction and land development, or waste application.
Repeatable: May be repeated. Maximum 12 hours.

572 Selected Topics in Machinery, Control, and Instrumentation Systems (3) Topics in the engineering of machinery, sensors, and data collection and analysis systems, and the use of these systems in ways that enhance productivity, increase efficiency, boost economic return, and protect environmental resources.
Repeatable: May be repeated. Maximum 12 hours.

582 Selected Topics in Processing (3) Topics in the engineering of biological and physical processes and of biological systems, from the production of raw materials through to high-demand value-added products.
Repeatable: May be repeated. Maximum 12 hours.

575 Applied Microbiology and Bioengineering (3) (See Chemical Engineering 575.)

591 Environmentally-Sensitive Spraying Applications (3) Develops the concepts of spray drift causes and corrective actions to lessen the effects of pesticides in the environment. Concepts are based on factors related to dosage transfer and the competing physics of droplet delivery under a variety of atmospheric conditions. Mass balance procedures are emphasized to validate measures of spray drift. Sprayer equipment components and operation factors affecting spray drift are introduced as operator controlled measures to minimize spray drift. The role of pesticide label language is incorporated into course concepts. Best management practices are developed to ensure practical applications of course concepts are emphasized. The student will learn how to implement spray drift reduction practices as well as make objective conclusions about spray drift test data.
Registration Permission: Consent of instructor.

600 Doctoral Research and Dissertation (3-15)
Grading Restriction: P/NP only.
Repeatable: May be repeated.
Registration Restriction(s): Doctor of Philosophy – biosystems engineering major.

603 Seminar (1) (See Environmental and Soil Sciences 603.)

619 Mathematical Modeling for Engineers (3) Describing physical and biological processes with mathematical expressions. Applying dimensional analysis, linear and nonlinear ordinary differential equations, partial differential equations, systems of linear equations, linearization, moving boundary problems, and series solutions to solve mathematical expressions. (RE) Prerequisite(s): 519.

650 Selected Topics (1-3) Lecture, group discussion, and individual study on specialized developments.
Repeatable: May be repeated. Maximum 6 hours.

Biosystems Engineering Technology (194)

422 Food and Process Engineering Technology (3) Application of basic engineering principles to agricultural and food processes. Fluid handling, drying, evaporation, thermal processing, heating and cooling, refrigeration systems, and materials handling.

Contact Hour Distribution: 2 hours and 1 lab.
Recommended Background: General physics.

432 Agricultural Machinery and Tractors (3) Functions, selection, matching, and management of agricultural machinery systems. Tractor power ratings, engine and transmission systems, hydraulic systems, hitching, and ballasting. Field and material capacity, field efficiency, cost analyses, and machinery replacement strategies. Functional analyses of tillage operations, planters and drills, no-tillage systems, hay harvest systems, forage and small grain harvesting, and cotton harvesting. Crop drying processes, off-road machinery safety considerations, and operator ergonomics.

Contact Hour Distribution: 2 hours and 1 lab.
Recommended Background: 2 semesters of calculus.
442 Agricultural Waste Management and Pollution Control (3) Waste renovation fundamentals; characteristics of animal manure; techniques for collection, transporting, storing, and utilizing livestock waste. Recommended Background: 2 semesters of calculus.

452 Small Internal Combustion Engines (3) Theory, concepts, and mechanics of small internal combustion engines; theoretical cycles; selection, operation, adjustment, troubleshooting and repair of single-cylinder engines. Contact Hour Distribution: 2 hours and 1 lab. Recommended Background: 2 semesters of calculus.

462 Agricultural Chemical Application Technology (3) Equipment for application of liquid, solid, and gaseous agricultural chemicals; system components; operational characteristics; calibration; selection and management; safety considerations; materials handling and disposal methods. Contact Hour Distribution: 2 hours and 1 lab. Recommended Background: 2 semesters of calculus.

500 Thesis (1-15) Grading Restriction: P/INP only. Registration Restriction(s): Master of Science – biosystems engineering major.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Credit Restriction: May not be used toward degree requirements.

503 Seminar (1) (See Environmental and Soil Sciences 503.)

506 Engineering Principles (3) Properties of materials, fundamentals of hydraulics, principles of electricity, thermal phenomena, applications in biological systems. Contact Hour Distribution: 2 hours and 1 lab.

508 Special Problems in Biosystems Engineering Technology (1-3) Individual studies of current problems. Repeatability: May be repeated. Maximum 6 hours.

514 CAD Applications to Biosystems Engineering Technology (3) Computer Aided Drafting (CAD) applications in agriculture and environmental science. Essentials of CAD software to create drawings of components, systems, flow charts, and process diagrams. Applications in mechanical, structural, and biosystems. 2-D applications with limited exposure to 3-D applications. Computer intensive course. Hands-on experience. Contact Hour Distribution: Two 2-hour labs. Credit Restriction: Students cannot receive credit for both 514 and 514. Registration Restriction(s): Minimum student level – graduate.

532 On-Site Domestic Wastewater Treatment, Dispersal, and Reuse (3) (See Biosystems Engineering 532.)

534 Production Monitoring and Automation (3) Precision technologies for monitoring and control of agricultural systems. Applications include: yield monitoring, variable rate control and sensing systems for planters, sprayers, soil applied nutrients, water management, crop health, and pest pressure; electronic information transfer, and GPS-based vehicle guidance. Contact Hour Distribution: 2 hours and 1 lab. Credit Restriction: Students cannot receive credit for both 534 and 534. Registration Restriction(s): Minimum student level – graduate.

555 GIS and GPS Applications to Biosystems (3) (See Biosystems Engineering 555.)

562 Selected Topics in Biosystems Engineering Technology (1-3) Lecture/group discussion on specialized topics. Repeatability: May be repeated. Maximum 6 hours.

574 Environmental Instrumentation and Monitoring (3) Equipment and techniques commonly used to measure all aspects of hydrologic cycle: precipitation, runoff, streamflow, subsurface water movement. Sampling of all flows for contaminants. Design of monitoring systems. Analysis of data. Contact Hour Distribution: 2 hours and 1 lab. Credit Restriction: Students cannot receive credit for both 574 and 574. (RE) Prerequisite(s): 506. Recommended Background: Hydrology. Registration Restriction(s): Minimum student level – graduate.

477 Honors: Applied Process Automation Laboratory (3) Interfacing flexible batch continuous processes to automation systems. Top down analysis with bottom up implementation, hierarchical structures and object oriented concepts are used to design automation solutions including human-machine-interfaces. Workstations with modern industrial equipment, provide an interactive graphics, and visualization environment. 
(DE) Prerequisite(s): 360 and consent of instructor.

483 Introduction to Reliability Engineering (3) (See Nuclear Engineering 483.)

484 Introduction to Maintainability Engineering (3) (See Nuclear Engineering 484.)

500 Thesis (1-15) Grading Restriction: P/np only. Repeatability: May be repeated.

501 Graduate Seminar (1) Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 20 hours.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.

505 Engineering Analysis (3) Formulation and solution of problems in chemical engineering and materials areas, ordinary and partial differential equations; types of ODE, PDE and solution techniques; transform methods; conformal mapping; variational methods; introduction to numerical methods. (Same as Materials Science and Engineering 505.)

507 Application of Linear Algebra in Engineering Systems (3) Fundamental concepts of linear algebra to problems in engineering systems: steady state and dynamic systems. Geometric and physical interpretations of relevant concepts: least square problems, LU, QR, and SVD decompositions of system matrix, eigenvalue problems, and similarity transformations in solving difference and differential equations; numerical stability aspects of various algorithms; application of linear algebra concepts in control and optimization studies; introduction to linear programming, Computer projects. (Same as Biomedical Engineering 507; Electrical and Computer Engineering 507; Industrial Engineering 507; Materials Science and Engineering 507; Mechanical Engineering 507.)

509 Multidisciplinary Project (1) (See Industrial Engineering 509.)

531 Advanced Chemical Engineering Thermodynamics (3) Phase equilibrium in ideal and non-ideal solution; composition relationship between phases, solution behavior, and application to macromolecules; introduction to microscopic approach to thermodynamics.


541 Polymer Rheology (3) (See Materials Science and Engineering 541.)

542 Diffusive and Stagewise Mass Transfer Operations (3) Analysis of mass transfer phenomena, coupled mass transfer and reaction, mass transfer operations in packed towers and agitated vessels, membrane separations. Equilibrium stage concepts applied to mass transfer operation, emphasizing nonisothermal and multicomponent systems.

547 Transport Phenomena I (3) Unified treatment of momentum transport (fluid flow), energy transport (heat conduction, convection, and radiation), and mass transport (diffusion). Fundamental basis of transport phenomena and momentum transport: viscous, viscoelastic, and potential flows.

548 Transport Phenomena II (3) Unified treatment of momentum transport (fluid flow), energy transport (heat conduction, convection, and radiation), and mass transport (diffusion). Energy transport and mass transport in closed and flow systems, interrelationships between transport processes, and prediction of transport parameters.

551 Chemical Reactor Analysis (3) Rate models for heterogeneous reactions, properties of porous catalysts, catalyst deactivation, fluid-fluid and fluid-solid reactors.

556 Data Mining in Engineering and Manufacturing (3) (See Industrial Engineering 556.)
Comment(s): Graduate standing or consent of the instructor required.

575 Applied Microbiology and Bioengineering (3) Cross-disciplinary course combining basic concepts in microbiology, biochemistry, reaction kinetics, and biochemical and environmental engineering. Commercial processes, biodegradation/wastewater treatment, analysis of basic bioreactor systems, biosensors, and immobilization methods. (Same as Systems Engineering 575; Environmental Engineering 575; Microbiology 575.)

580 Technical Review and Assessment (3) Preparation of critical review of literature in area related to chemical engineering. Comment(s): Enrollment is limited to students in the non-thesis option. Registration Permission: Consent of advisor.

581 Green Engineering (3) Principles and practical aspects of the design, commercialization, and use of processes and products that are feasible and economical while minimizing the generation of pollution at the source and risk to human health and environment. (Same as Engineering Science 585; Environmental Engineering 581.)
Comment(s): Graduate standing in engineering or consent of the instructor required.

585 Process System Reliability and Safety (3) (See Nuclear Engineering 585.)

590 Special Topics in Chemical Engineering (3) Repeatability: May be repeated. Maximum 6 hours.

594 Culminating Integrated Project Report (3) (See Mechanical Engineering 594.)

600 Doctoral Research and Dissertation (3-15) Grading Restriction: P/NP only. Repeatability: May be repeated.

631 Advanced Topics in Statistical Thermodynamics and Molecular Dynamics (3) Statistical thermodynamics, molecular based computer simulations, Monte Carlo and molecular dynamics calculations; applications to complex materials and energy-relevant and biological systems. (DE) Prerequisite(s): 532.

632 Nonequilibrium Thermodynamics (3) Unified treatment of non-equilibrium thermodynamics from the perspective of a general mathematical framework, applicable at all levels of system description from microscopic to macroscopic. Statistical and continuum mechanical descriptions of irreversible thermodynamic systems, with applications to complex fluids, are emphasized. (DE) Prerequisite(s): 531 and 532.

633 Multiscale Materials Modeling (3) Development of multiscale simulation strategies for engineering of advanced micro- and nanostructured materials via integration of essential information from different scales, i.e., molecular, mesoscopic and continuum. (DE) Prerequisite(s): 505, 531, and 547. Registration Permission: Consent of instructor.

647 Advanced Transport Phenomena (3) Derivation and solution of coupled mass, momentum and energy evolution equations; application to complex materials and energy-relevant and biological systems. (DE) Prerequisite(s): 547 and 548.

652 Sustainable Energy Production (3) Emerging technologies in energy capture, including photovoltaic cells and bio-based fuels and in energy production, including fuel cells. Study of fundamental mechanisms. Comparative analysis of the alternatives, including current technical barriers to commercialization. (DE) Prerequisite(s): 505.

661 Advanced Topics in Process Dynamics and Control (3) Multiloop and multivariable control, model predictive control, process identification and monitoring, plantwide control, etc. Repeatability: May be repeated. Maximum 6 hours. (DE) Prerequisite(s): 505.

662 Chaos and Engineering Applications (3) Chaos and nonlinear dynamics: analysis of time series for understanding, development, and control of complex engineering systems; systems with continuous multi-scale temporal and spatial variations; review of standard analysis techniques; applications to bubble formation, distillation, fluidization, combustion, fermentation, patterns (nonwoven fabrics, nanotubes), molecular self-organization, cardiac control, and bioinformatics. (DE) Prerequisite(s): 505. Recommended Background: Programming.

671 Advanced Biomolecular Engineering (3) Current science and technology at the interface of engineering and biology, focusing at the molecular level. Topics include enzyme-based sensors, molecular-level engineering for bio-based energy production, genetic engineering for protein expression in non-native hosts, modeling of metabolic networks and gene expression. (DE) Prerequisite(s): 575. Recommended Background: Working knowledge of undergraduate level biochemistry and cellular biology; graduate chemical engineering core coursework. Registration Permission: Consent of instructor.

672 Computational Bioinformatics (3) Modeling and analysis of DNA/RNA and protein sequences. Topics include STR and SNP DNA measurement data for human identification; dynamic programming; distance measures, clusters, and link analysis and discovery; clustering algorithms; data mining using SVD method; dynamic indexing of data collections using clustering; probability theory; Bayesian and maximum likelihood estimation; entropy as a measure of information content and inductive inference; parallel computation. Applications to biological molecules will be studied. (DE) Prerequisite(s): Statistics 505 and 507. Recommended Background: Programming skills.

691 Advanced Topics in Chemical Engineering (3) Repeatability: May be repeated. Maximum 6 hours.

Chemistry (235)

430 Advanced Inorganic Chemistry (3) Atomic and molecular structure, bonding theories, descriptive chemistry of the elements, kinetics and mechanism of inorganic reactions, applications of modern techniques for characterization, coordination and organometallic chemistry. (DE) Prerequisite(s): 230.

450 Advanced Organic Chemistry (3) Modern organic reactions of mechanistic, synthetic, and theoretical interest. Content reflects current trends in the area. (DE) Prerequisite(s): 360.

471 Biophysical Chemistry (3) (See Biochemistry and Molecular Biology 471.)

473 Physical Chemistry I (3) Properties of gases; first, second and third laws of thermodynamics; chemical equilibria; simple phase equilibria; properties of solutions.
Credit Restriction: Students may not receive credit for both 471 and 473. (DE) Prerequisite(s): 130 or 138 and Physics 136 or 138 or 232 or 231 and Mathematics 241, 247.

479 Physical Chemistry Laboratory I (2) Experiments on topics discussed in 471 or 473. Contact Hour Distribution: 1 lab. (DE) Prerequisite(s) or (DE) Corequisite(s): 471 or 473.

481 Biophysical Chemistry (3) (See Biochemistry and Molecular Biology 481.)

483 Physical Chemistry II (3) Introduction to statistical thermodynamics; kinetics of chemical reactions; introduction to quantum mechanics and applications to electronic structure of atoms and molecules; molecular spectroscopy.
Credit Restriction: Students may not receive credit for both 481 and 483. (DE) Prerequisite(s): 130 or 138 and Physics 136 or 138 or 222 or 231 and Mathematics 241, 247.

489 Physical Chemistry Laboratory II (2) Experiments on topics discussed in 481 or 483. Contact Hour Distribution: 1 lab. (DE) Prerequisite(s) or (DE) Corequisite(s): 481 or 483.

500 Thesis (1-15) Grading Restriction: P/NP only. Repeatability: May be repeated.

501 Chemistry Seminar (1) Lectures and discussion on current research. Continuous registration is required for resident graduate students. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 14 hours.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Credit Restriction: May not be used toward degree requirements.
515 Children in Contemporary Society (3) Theory and research on environmental and developmental issues in contemporary family situations and educational environments for children from infancy through middle childhood. Implications for programs and policy.

522 Naturalistic Interventions for Parents and Teachers of Young Children (3) Common problems faced by parents and teachers; methods available to modify problem behavior.

525 Seminar on Play (3) Comparison and contrast of theoretical framework and research methodologies on play. Developmental perspective on play.

530 Families of Children with Disabilities (3) Developmental nature of families' experiences in caring for handicapped children, especially during infancy and early childhood.


Recommendation Background: 6 hours of graduate coursework in child and family studies.

550 Theory and Research in Family Studies (3) Research in various major topics in family studies and application of theoretical models to understanding research.

552 Diversity in Children and Families (3) Diversity in family configurations in contemporary U.S. society. Variations of family patterns by race, ethnicity, religion, and social class; social dynamics of family formation, composition, and patterning.

(TE) Prerequisite(s): 550.

562 Families and Children Coping with Stress (3) Processes used by children and families during times of stress. Theoretical contributions to study of impact of developmental stressors and catastrophes on children and families.

(TE) Prerequisite(s): 550.

563 Family Life Education Programs (4) Programs in family life education, including human sexuality, family resource management, and parethood education.

(TE) Prerequisite(s): 550.

564 Practicum in Human Development or Family Studies I (3) School and community programs. Education for human development and family living.

Grading Restriction: Satisfactory/No Credit grading only.
Registration Permission: Consent of instructor.

565 Practicum in Human Development or Family Studies II (3) School and community programs concerned with education for human development and family living. Committee approved and supervised written project.

Grading Restriction: Satisfactory/No Credit grading only.

566 Approaches to Family Intervention and Counseling (3) Various theoretical approaches for family intervention and counseling. Structural, strategic, experiential and social learning schools of practice. Effects of intervention from perspective of their impact on family functioning and communication. (Same as Counselor Education 566.)

(TE) Prerequisite(s): 550.

567 Family Violence (3) Theory and research on initiation, maintenance and cessation of violent behaviors in intimate family contexts, and assessment of responses to violent family behaviors, perpetrators, victims, and family systems.

(TE) Prerequisite(s): 550.

569 Action Research in Early Childhood Education (3) Principles and methodologies of action research for practitioners in early childhood and school settings.

Comment(s): Requires admission to the early childhood education graduate concentration in the College of Education, Health, and Human Sciences.


Recommended Background: 9 graduate hours in the major.

572 Professional Socialization (2) Behaviors and practices appropriate to a professional researcher and practitioner in the field of Child and Family Studies; understanding and working within the university environment, maintaining ethical standards, complying with human subjects protocols, making public presentations, and networking with peers.

574 Analysis of Teaching for Professional Development (1-2) Strategies to document and analyze effectiveness of teaching and of professional development. Study and application of various approaches.

(TE) Corequisite(s): 575.
670 Issues in Study Design and Data Analysis (3) Applications in analysis of social science data, including study design, sampling, measurement, data collection, evaluation, management, and analysis. (DE) Prerequisites: 510, 511, 550, and 570. Repetitability: May be repeated if topic differs. Maximum 9 hours. Recommended Background: Completion of graduate level statistics sequence. Registration Permission: Consent of instructor.

680 Knox Area Family and Child Study (KAFACS) Research Practica I (3) Faculty-directed collaborative original research, including problem definition, instrumentation, data collection, data analysis, and report writing on a panel or sample of families and children in the Knox County area. (DE) Prerequisite(s): 570.

681 Knox Area Family and Child Study (KAFACS) Research Practica II (3) Faculty-directed collaborative original research, including problem definition, instrumentation, data collection, data analysis, and report writing on a panel or sample of families and children in the Knox County area. (DE) Prerequisite(s): 570.

Chinese (249)
431 Readings in Chinese Literature (3) (See Asian Languages 431.)

Cinema Studies (251)
400 Special Topics (3) Repetitability: May be repeated. Maximum 6 hours.
420 French Cinema (3) (See French 420.)
422 Topics in Italian Cinema (3) (See Italian 422.)
433 History of Film and Modern Art (3) (See Art Media Arts 433.)
434 Hispanic Culture Through Film (3) (See Spanish 434.)
435 Cinematography as Art (4) (See Art Media Arts 435.)
436 Video Art (4) (See Art Media Arts 436.)
465 Latin American Film and Culture (3) (See Spanish 465.)
469 Sexuality and Cinema (3) (See Women’s Studies 469.)
482 Special Topics in Global Cinema (3) (See Modern Foreign Languages and Literatures 482.)
489 Special Topics in Film (3) (See English 489.)
510 Special Topics (3) Repetitability: May be repeated. Maximum 6 hours.
582 Special Topics in Global Cinema (3) (See Modern Foreign Languages and Literatures 582.)

Civil Engineering (254)
416 Hydrologic and Water Quality Engineering (3) (See Biosystems Engineering 416.)
451 Highway Engineering (3) Design, construction, operation, and maintenance of highway facilities; includes application of various engineering principles and techniques to process of planning, locating and design of highway facilities. Covers both geometric and pavement design. (DE) Prerequisite(s): 352.
453 Airport/Railroad Planning and Design (3) Airport master planning and railroad engineering. Runway configuration, airfield capacity, geometrics, and terminal layout and design. Railroad capacity, geometrics and system layout and design. (DE) Prerequisite(s): 352.
472 Steel Design (3) Design of plate girders and composite beams. Consideration of members subjected to combined stresses. Design of a typical framed building including connections. (DE) Prerequisite(s): 471.
474 Reinforced Concrete Design (3) Design of continuous beams, floor slabs, columns with combined axial loads and bending, and footings. Design for torsion. (DE) Prerequisite(s): 471.
485 Principles of Hydrogeology (3) (See Geology 485.)
490 Water Resources Engineering (3) Application of hydrologic-hydraulic principles for development of water resource project design and management of water resources. Assessment of environmental impacts to surface water and groundwater. Regulatory framework for water supply and water quality. (DE) Prerequisite(s): 390 and 395 or 416.

500 Thesis (1-15) Grading Restriction: P/NP only. Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Credit Restriction: May not be used toward degree requirements.

510 Urban Systems: Engineering and Management (3) Various urban systems usually under responsibility of city manager and/or city engineer: streets, lighting, water, sewerage, refuse collection. Personnel management, finance, planning and public relations. (DE) Prerequisite(s): Graduate standing or consent of instructor required.

521 Pavement Design (3) Empirical and theoretical based methods of pavement design and analysis, strengthening existing pavements, pavement distress and economical design alternatives. (DE) Prerequisite(s): 321 and 330.

522 Mix Design for Asphaltic and Portland-Cement Concrete (3) Aggregate properties and tests, asphalt binder properties and tests, mix design methods for asphaltic mixtures, hot-mix asphalt (HMA) mixture production and construction, Portland-cement concrete (PCC) mix design, additives and admixtures for PCC, special types of PCC, PCC production and construction. (DE) Prerequisite(s): 321.

525 Pavement Materials Characterization (3) Material modeling, laboratory and in-situ characterization of unbound granular, stabilized base, hot-mix asphalt mixtures, Portland cement concrete, and other paving materials; performance prediction for flexible and rigid pavements. (DE) Prerequisite(s): 321 and 330.


531 Soil Stabilization (3) Mechanical stabilization of soils by compaction, drainage, and blending; chemical stabilization of soils with admixtures, waterproofing and modifying soils and additives. Reinforced earth and stabilization with geosynthetics. (DE) Prerequisite(s): 330.

532 Rock Mechanics and Rock Engineering (3) Engineering properties and characterization of rock and rock masses. Discontinuity analysis, stress and strain, keyblock theory. Applications to rock slopes, underground excavations, foundations and groundwater flow. (DE) Prerequisite(s): 330 or consent of instructor.

533 Advanced Laboratory and Insitu Testing of Soil (3) Instruments for measurement of electrical signals, static and dynamic transducers, data acquisition and control, insitu measurement of stress, pore pressure, deformation, load deformation behavior (seismic methods, static methods), advanced laboratory shear strength and compressibility testing. Contact Hour Distribution: 2 hours and 1 lab. (DE) Prerequisite(s): 330.


538 Finite Element Applications in Geotechnical Engineering (3) Application of finite element method to typical problems in geotechnical engineering. Confined and unconfined flow through porous media; two-dimensional stress and strain; two-dimensional elements; representation of nonlinear soil behavior with elastic and elastic-plastic models. Taught concurrently with 561. Credit Restriction: Students may not receive credit for both 538 and 561. Recommended Background: Coursework in soil behavior and matrix computation.

539 Geotechnology Seminar (1) Seminar topics in geotechnical and geological engineering. Research contributions and case histories by graduate students and engineers and scientists from surrounding community. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 10 hours. Comment(s): Enrollment limited to students with graduate standing. Registration Permission: Consent of advisor.
540 Construction Management I (3) Management and organization of heavy and building construction projects.
(DE) Prerequisite(s): 442.

541 Construction Management II (3) Management organization of heavy and building construction projects.
(DE) Prerequisite(s): 442.

543 Construction Estimating (3) Project costs, estimating and takeoff techniques, market cost conditions, and feasibility of design to cost.
(DE) Prerequisite(s): 442.

550 Transportation Seminar (1) Seminar topics in transportation engineering. Research contributions and case histories by graduate students and engineers and scientists from the professional community.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 10 hours.
Comment(s): Minimum student level – senior.
Registration Permission: Consent of instructor.

551 Traffic Engineering: Characteristics (3) Characteristics of human, vehicle, and roadway in transportation system: microscopic and macroscopic traffic models; elements of transportation/highway safety.
(DE) Prerequisite(s): 352.

552 Traffic Engineering: Operations (3) Operation and management of the surface transportation system including freeways and arterials; traffic control systems including traffic signal design and operation; traffic control devices including signing and markings.
(DE) Prerequisite(s): 551.

553 Geometric Design and Layout of Roadways and Community Facilities (3) Functional and geometric design and rural and urban roads of all classes; subdivision layout; configuration of urban roads of all classes; techniques for access control; freeway interchanges and street intersections; and parking.
(DE) Prerequisite(s): 451 or consent of instructor.

556 Traffic Accident Reconstruction (3) Data collection and analysis as basis for accident prevention on control programs; roadside hardware design and crash testing.
(DE) Prerequisite(s): 452 or graduate standing.

557 Transportation Planning and Operations with Micro-Computer Applications (3) Hands-on laboratory and field experiences in computer and information technology for modeling and analysis of transportation problems.
Contact Hour Distribution: Lecture and lab.
(DE) Prerequisite(s): 551.

558 Planning and Transportation (3) Preparation of transportation as elements of comprehensive development plans. Analysis of relationship between various transportation modes and between transportation and other community features. Use of planning process to establish existing travel patterns, modeling of demand, proposing alternatives and evaluation. (Same as Political Science 555.)
Comment(s): Enrollment limited to students with graduate standing.

559 Intermodal Transportation (3) Technical and institutional aspects of intermodal transportation system for passengers and freight providing intercity and urban service; characteristics of individual modes and strategies for their coordination: functional design and operation of transportation terminals including seaports and air cargo terminals; safety and security issues.
Comment(s): Minimum student level – senior.

561 Finite Element Applications in Structural Engineering (3) Application of finite element method to typical problems in structural engineering. Truss, beam and plate elements; two-dimensional stress and strain; two-dimensional elements; representation of nonlinear material behavior with elastic and elastic-plastic models. Taught concurrently with 538.
Credit Restriction: Students may not receive credit for both 561 and 538.
Recommended Background: Structural analysis and matrix computation course.

562 Structural Systems (3) Structural system analysis and design; dead, live, wind, and earthquake loads on buildings; vertical and lateral load resisting systems; use of computers in analysis and design.
(DE) Prerequisite(s): 471.

565 Structural Dynamics (3) Analysis of free and forced vibrations, and transient response of structures having many degrees of freedom; elastoplastic behavior considered for structural systems; earthquake design and response of structures.
(DE) Prerequisite(s): 471.

571 Behavior of Steel Structures (3) Behavior of structural steel members due to static and fatigue loading; relation between research results and current specifications for design.
(DE) Prerequisite(s): 471.

572 Fracture Analysis (3) (See Geology 572.)

573 Prestressed Concrete (3) Properties of prestressing materials; methods of pretensioning and posttensioning; analysis and design of simple and continuous beams and slabs.
(DE) Prerequisite(s): 471.

574 Behavior of Reinforced Concrete Members (3) Moment-curvature and load-deflection relationships for reinforced concrete beams; combined bending and axial load; shear and torsion; relation between research results and specifications for design.
(DE) Prerequisite(s): 471.

576 Masonry Design (3) Clay and concrete masonry materials; unreinforced masonry design; reinforced masonry design; seismic behavior of masonry structures.
(DE) Prerequisite(s): 471.

590 Special Problems in Civil Engineering (3)
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 6 hours.
Comment(s): Enrollment limited to students in non-thesis option only.

595 Special Topics (1-4) Problems and topics related to current developments in field.
Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

600 Doctoral Research and Dissertation (3-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated. Maximum 9 hours.

631 Soil Dynamics (3) Introductory and advanced topics: vibrations of elementary systems, foundations subjected to repeated and impulse loading, wave propagation theory and applications, and site response to dynamic loading.
(DE) Prerequisite(s): 435.

651 Analysis Techniques for Transportation Systems I (3) Topics on mathematical, statistical, operations research, or computer science techniques that may be applied to modeling and analysis of transportation systems.
Registration Permission: Consent of instructor.

652 Analysis Techniques for Transportation Systems II (3) Advanced topics of application of mathematical, statistical and computer science techniques in modeling and analysis of transportation systems.
(DE) Prerequisite(s): 651.

671 Behavior of Steel Bridges and Buildings (3) Behavior, analysis and design of plate girders, columns, and composite members subjected to static and dynamic loading.
(DE) Prerequisite(s): 571.

674 Behavior of Reinforced Concrete Beams and Slabs (3) Strength and behavior of statically indeterminate reinforced concrete beams and frames; limit analysis; behavior, analysis, and design of reinforced concrete slabs: yield-line theory, finite element solutions, and ACI Code Method.
(DE) Prerequisite(s): 574.

691 Special Topics in Civil Engineering (3) Selected advanced problems of current interest.
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

Classics (257)

401 Greek Poetry (3) Epic, lyric, drama. Authors vary.
(de) Prerequisite(s): 261.

402 Greek Prose (3) History, philosophy, and oratory. Authors vary.
(de) Prerequisite(s): 261.

405 Selected Readings from Greek Literature (3) For advanced students in Greek. The study of plays, historical writings, and poetry of ancient Greece in the original Greek.
(de) Prerequisite(s): 401 and 402 or consent of instructor.

406 Selected Readings from Greek Literature (3) For advanced students in Greek. The study of plays, historical writings, and poetry of ancient Greece in the original Greek.
(repeatability: May be repeated. Maximum 9 hours.
(de) Prerequisite(s): 401 and 402 or consent of instructor.

414 Cicero and Techniques of Latin Prose Composition (3) For advanced students in Latin. Practice in prose composition, the writings of Cicero the model.
(de) Prerequisite(s): 351 and 352 or consent of instructor.
431 Selected Readings from Latin Literature (3) For advanced students in Latin. Oratory, historical writings, poetry of ancient Rome in the original Latin.
Repeatability: May be repeated. Maximum 9 hours.
(DE) Prerequisite(s): 351 and 352 or consent of instructor.

432 Selected Readings from Latin Literature (3) For advanced students in Latin. Oratory, historical writings, poetry of ancient Rome in the original Latin.
Repeatability: May be repeated. Maximum 9 hours.
(DE) Prerequisite(s): 351 and 352 or consent of instructor.

435 Medieval Latin (3) Selected readings from the Latin prose and poetry of medieval Europe.
Registration Permission: Consent of instructor.

436 Cities and Sanctuaries of the Greek and Roman World (3) Major cities and sanctuaries in Greece, the Greek colonies, and the Roman Empire. Approach is archaeological, focusing on physical evidence - landscape, architecture and artifacts - as well as description by ancient authors. Cities include various types: planned and unplanned, seaports, caravan centers, government and commercial centers. The sanctuaries also vary in function, including prophetic centers, athletic centers, theater centers, and healing centers. (Same as Anthropology 436.)

441 Special Topics in Classical Civilization (3) Topics in art, literature, religion, and society of Greece and Rome.
Repeatability: May be repeated with consent of department. Maximum 9 hours.

442 Intensive Survey of the Archaeology of the Prehistoric Aegean (3) Survey of archaeology and art of the Aegean from the earliest humans to the rise of the Greek polis in the 8th century BC. Highlights include Early Cycladic art, Minoan and Mycenaean complex societies, Thera, Phoenician interactions with Egypt, and the Near East, and the Trojan War. Emphasis on anthropological and modern art-historical approaches. (Same as Anthropology 442.)

443 Intensive Survey of the Archaeology of Greece (3) Survey of the archaeology and art of Greece and the Greek-speaking areas from the Orientalizing through Hellenistic periods (c. 700–30 BC). Developments in architecture, sculpture, and vase painting seen in the context of changes in society. Archaeological evidence for daily life, economy, and political institutions. (Same as Anthropology 443.)

444 Intensive Survey of the Archaeology of Etruria and Rome (3) Survey of the archaeology of Italy and the Roman world from prehistoric times to the fall of the Roman Empire (1000 BC–AD 476). Highlights are the rise and decline of Etruscan culture; the development of Roman architecture, art, and urban planning; art and architecture used for political propaganda; and Roman cosmopolitan culture during the Empire. (Same as Anthropology 444.)

562 Special Topics in Mediterranean Archaeology (3) Selected topics in archaeology or art of the prehistoric Aegean, historic Greece or Rome. Lectures, discussions, student presentations, and papers. (Same as Anthropology 562.)
Repeatability: May be repeated. Maximum 9 hours.

565 Graduate Seminar in Ancient Mediterranean Civilization (3) Theoretical and practical issues in the civilizations of the prehistoric Aegean or historic Greece. Study and discussions conducted in seminar format. Emphasis on developing students' skills in research and oral as well as written presentation. (Same as Anthropology 565.)
Repeatability: May be repeated. Maximum 15 hours.

591 Foreign Study (1-15)
Repeatability: May be repeated. Maximum 15 hours.

592 Off-Campus Study (1-15)
Repeatability: May be repeated. Maximum 15 hours.

593 Independent Study (1-6)
Repeatability: May be repeated. Maximum 15 hours.

Communication and Information (248)

501 Orientation to Graduate Study (1) Overview of the communication and information discipline. Orientation to resources needed for successful graduate study.
Grading Restriction: Satisfactory/No Credit grading only.
Comment(s): Enrollment is limited to students admitted to the program.

540 Communication Theory (3) Overview of theory-building process and theories in communication.
Comment(s): Enrollment is limited to students admitted to the program or by consent of the instructor.

600 Doctoral Research and Dissertation (3-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

610 Perspectives on Communication and Information Knowledge and Research I (6) Examination of the paradigmatic underpinnings that drive research in positivistic traditions. Integrative study of the role of theory, various theoretical traditions and methods within positivistic communication and information research. Emphasis on classic and contemporary literature and on conducting primary research across the various fields represented by the college.
Comment(s): Requires admission to the program or consent of instructor.

615 Perspectives on Communication and Information Knowledge and Research II (6) Examination of the paradigmatic underpinnings that drive research in interpretivist traditions. Integrative study of the role of theory, various theoretical traditions and methods within interpretivist communication and information research. Emphasis on classic and contemporary literature and on conducting primary research across the various fields represented by the college.
(DE) Prerequisite(s): 610.
Registration Permission: Consent of instructor.

620 Communication and Information Professional Development Seminar (1-3) Seminar examining the role and scope of communication and information teaching, research and other professional development topics.
Repeatability: May be repeated. Maximum 4 hours.
Comment(s): Requires admission to the program or consent of instructor.

630 Theory and Literature in Communication and Information Disciplines (3) Topics covering specific areas in communication and information. Theory intensive.
Repeatability: May be repeated. Maximum 12 hours.
(DE) Prerequisite(s): 610 and 615.
Registration Permission: Consent of instructor.

640 Advanced Communication and Information Research Methods (3) Topics in communication and information research design, methodology, analysis. Methods intensive.
Repeatability: May be repeated. Maximum 12 hours.
(DE) Prerequisite(s): 610 and 615.
Registration Permission: Consent of instructor.

643 Qualitative Research (3) Theory and application of qualitative research methods to communication and information research. Theoretical considerations underlying symbolic interactionism as translated into research strategies of participant observation, life history, interviewing, archival analysis, and case studies.
(DE) Prerequisite: 615.
Registration Permission: Consent of instructor.

644 Quantitative Research (3) Discussion of issues and best practices in quantitative research, including measurement, sampling, and research design strategies. Focus on techniques and uses of survey, content analysis, experimental designs, and secondary analysis. Assessment of reliability and validity. Use of data analysis for hypothesis testing and inference.
(DE) Prerequisites: 610.
Registration Permission: Consent of instructor.

651 Contemporary Issues in Science, Technology, Engineering, and Medical Communication and Information (3) Integrative approach to the role of communication and information in the study of STEM topics.
Repeatability: May be repeated. Maximum 12 hours.
(DE) Prerequisite(s): 610 and 615.
Registration Permission: Consent of instructor.

653 Contemporary Issues in Law, Policy, and Ethics in Communication and Information (3) Integrative approach to law, policy, and ethics in communication and information topics.
Repeatability: May be repeated. Maximum 12 hours.
(DE) Prerequisite(s): 610 and 615.
Registration Permission: Consent of instructor.

654 Contemporary Issues in Management of Communication and Information within Organizations (3) Integrative approach to the role of communication and information in organizational management.
Repeatability: May be repeated. Maximum 12 hours.
(DE) Prerequisite(s): 610 and 615.
Registration Permission: Consent of instructor.

655 Contemporary Issues in International and Intercultural Communication and Information (3) Integrative approach to international and intercultural communication and information topics.
Repeatability: May be repeated. Maximum 12 hours.
(DE) Prerequisite(s): 610 and 615.
Registration Permission: Consent of instructor.

697 Independent Study (3) Directed research in a topic of mutual interest.
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.
Communication Studies (250)

500 Thesis (1-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

505 Human Communication Research Methods (3) Understanding of wide array of data collection and analysis procedures used in human communication research.

520 Survey of Interpersonal Communication (3) Identifies and addresses theory and research in human communication.

525 Survey of Interpersonal Health Communication (3) Identifies and addresses theories and research concerning how people communicate about health.

540 Survey of Organizational and Team Communication (3) Identifies and addresses theories and research in human interactions in organizations and teams.

542 Communication and Ethnography (3) Theory and application of qualitative approaches to communication research. Emphasis is on ethnographic methods to obtain in-depth information about behaviors and beliefs of people in natural settings. Use of methods: structured interviews using heuristic elicitation methodology, participant/observation and case studies.

560 Special Topics in Communication Studies (3) Contemporary Topics.
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

580 Survey of Public Communication (3) Identifies and addresses theories and research in public discourse.

590 Project (3) Capstone project under guidance of faculty. Application of principles from previous coursework.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 6 hours.

591 Foreign Study (1-15) Independent study outside U.S. Prior to departure student must have plan of study approved by department head and supervising faculty member. Credit given only upon fulfilling all requirements set by department.
Repeatability: May be repeated. Maximum 15 hours.

592 Off-Campus Study/Internship (1-6) Independent study outside traditional classroom setting: community involvement and/or work experiences. Credit given only upon fulfilling all requirements set by department.
Repeatability: May be repeated. Maximum 6 hours.

593 Independent Study (1-6) independent study by individual under direction of faculty member.
Repeatability: May be repeated. Maximum 6 hours.
Comment(s): Approval of faculty member and department must be obtained prior to registration.

Comparative and Experimental Medicine – Graduate School of Medicine (262)

500 Thesis (1-15)
Grading Restriction: P/NP only.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

508 Graduate Research Participation (3) Advanced research techniques while conducting individual biomedical research projects under supervision of faculty.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 9 hours.
Comment(s): Open to all graduate students.
Registration Permission: Consent of instructor.

541 Cellular and Molecular Basis of Disease (4) Disease at molecular level. Changes in molecular events in cells that lead to disease and occur as result of disease. Correlation with clinical and pathological states. (DE) Prerequisite(s): Biochemistry and Cellular and Molecular Biology 410 and 419.

600 Doctoral Research and Dissertation (3-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

601 Journal Club in Comparative and Experimental Medicine (1) Readings and discussions based on current literature.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 12 hours.

610 Medical Biology Seminar (1) Invited speakers. Topics posted in advance.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.

611 Advanced Topics in Medical Science (1-3) New developments in biological research applicable to clinical medicine.
Repeatability: May be repeated. Maximum 12 hours.
Comment(s): Primarily for doctoral candidates in comparative and experimental medicine.
Registration Permission: Consent of instructor.

Comparative and Experimental Medicine – Veterinary Medicine (261)

Participating departments include Animal Science, Comparative Medicine, Microbiology, Pathobiology, Large Animal Clinical Sciences, and Small Animal Clinical Sciences. See Microbiology for additional courses.

500 Thesis (1-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

501 Special Topics in Comparative and Experimental Medicine (1-6) Specialized experience in comparative and experimental medicine.
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

504 Descriptive and Applied Epidemiology (3) Principles of epidemiology as well as historic and modern applications to human and animal diseases. Host-agent relationships, measurement of disease frequency, disease monitoring and control in human and animal populations, field investigations, animal health economics and production.
Registration Permission: Consent of instructor.

505 Laboratory Animal Care and Use (2) Review of basic laboratory animal care and use as prerequisite to conducting research using animal subjects. Compliance issues and techniques.

Contact Hour Distribution: 1 hour and 2 labs.
Recommended Background: Coursework in embryology, parasitology, and physiology and/or consent of instructor.

530 Wildlife Diseases (2) (See Wildlife and Fisheries Science 530.)

561 Pharmacology (4) Principles of pharmacokinetics and pharmacodynamics properties of drugs: mode of action, pharmacokinetic effects, chemical and physical properties, metabolism, toxicities, important idiosyncrasies, and clinical applications.
Registration Permission: Consent of instructor.

600 Doctoral Research and Dissertation (3-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

602 Surgical Pathology (1-2) Examination of biopsy specimens and interpretation of observations. Preparation of specimens for sectioning.
Repeatability: May be repeated. Maximum 3 hours.
Registration Permission: Consent of instructor.

603 Correlative Post-Mortem Pathology (1-3) Gross and microscopic post-mortem examination of animals. Correlative interpretation of clinical diseases and lesions.
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.
606 Clinical Epidemiology (3) Theory and principles of design implementation and analysis of clinical research. Lab: appraisal of biomedical literature and design of proposal for clinical research project.
Recommended Background: Consent of instructor.
Registration Permission: Consent of instructor.

607 Diagnosis and Pathogenesis of Virus Diseases of Domestic Animals (3) Advanced study of virus diseases important to domestic animals: virus biology, pathogenesis, pathology and diagnosis technical training in virus diseases diagnosis. Contact Hour Distribution: 2 hours and 1 lab.
Registration Permission: Consent of instructor.

609 Mechanisms of Disease (3) Advanced topics in pathology and mechanisms of disease: pathophysiology, cellular degeneration, inflammation, immunopathology, hemostasis. Principal biochemical and morphologic responses of various cells, tissues, and organs to injury and other metabolic derangements. Selected contemporary topics from current literature and textbooks.
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

610 Advanced Topics in Comparative and Experimental Medicine (1-3) Specialized in-depth experience in various disciplines. Current and future research methodology, recent advanced in instrumentation in analytical techniques for comparative medicine.
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of instructor.

611 Journal Club in Emerging Infectious Diseases (1) Readings and discussions based on current literature.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 12 hours.

612 Journal Club in Pathobiology (1) Readings and discussions based on current literature.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 12 hours.

613 Journal Club in Large Animal Clinical Sciences (1) Readings and discussions based on current literature.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 12 hours.
Comment(s): DVM or equivalent degree.

614 Journal Club in Small Animal Clinical Sciences (1) Readings and discussions based on current literature.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 12 hours.
Comment(s): DVM or equivalent degree.

652 Disorders of the Endocrine System (2) (See Animal Science 652.)

Comparative Literature (260)
401 Special Topics in Comparative Literature (3)
Repeatability: May be repeated. Maximum 9 hours.

402 Special Topics in Comparative Literature (3) Content varies.
Repeatability: May be repeated. Maximum 9 hours.

452 Modern Drama (3) (See English 452.)

454 Twentieth-Century International Novel (3) (See English 454.)

510 Special Topics (3)
Repeatability: May be repeated. Maximum 6 hours.

Computer Science (266)
420 Advanced Topics in Machine Intelligence (3) Topics such as search, learning, expert systems, neural networks, pattern recognition and natural language processing. Emphasis on faculty research.
Repeatability: May be repeated. Maximum 9 hours.
Recommended Background: Completion of core curriculum or consent of instructor.

430 Advanced Topics in Hardware Systems (3) Topics such as architecture, parallel processors, microprogramming, networks, and communications. Emphasis on faculty research.
Repeatability: May be repeated. Maximum 9 hours.
Recommended Background: Completion of core curriculum or consent of instructor.

460 Advanced Topics in Software Systems (3) Topics such as operating systems, compilers, parallel computation, software engineering, database systems, and programming languages. Emphasis on faculty research.
Repeatability: May be repeated. Maximum 9 hours.
Recommended Background: Completion of core curriculum or consent of instructor.

470 Advanced Topics in Scientific Computation (3) Topics such as numerical methods, supercomputers and computer modeling and simulation of physical systems. Emphasis on faculty research.
Repeatability: May be repeated. Maximum 9 hours.
Recommended Background: Completion of core curriculum or consent of instructor.

471 Numerical Analysis (3) (See Mathematics 471.)

472 Numerical Algebra (3) (See Mathematics 472.)

480 Advanced Topics in Theoretical Computer Science (3) Topics such as theory of computation, complexity theory, formal languages and graph theory and its applications. Emphasis on faculty research.
Repeatability: May be repeated. Maximum 9 hours.
Recommended Background: Completion of core curriculum or consent of instructor.

494 Special Topics in Computer Science (1-3)
Repeatability: May be repeated. Maximum 9 hours.

500 Thesis (1-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

522 Cybernetics (3) Various functions in living systems and their actual or potential realization in computers.
Recommended Background: Coursework in discrete structures.

525 Software Engineering (3) Survey of key ideas in software engineering: formal methods, tools, testing, reliability, structured design and development, metrics, management, and history of the field.

530 Computer Systems Organization (3) Architectures and systems organization for serial and parallel machines.
Recommended Background: Coursework in architecture or machine organization.

541 Database Management Systems (3) Data model theory, optimization, and normalization; intelligent database systems; comparison of implementations; analysis of distributed and networked databases. Techniques for evaluation of performance, integrity, security and reliability.
Recommended Background: Coursework in discrete structures.

551 Pattern Analysis (3) Decision-theoretic and structural pattern analysis. Deterministic and statistical decision rules, feature extraction and representation; syntactic and semantic methods, relational models.
Recommended Background: Coursework in discrete structures and probability or statistics.

552 Image Analysis (3) Enhancement and restoration of digital images. 2-D transforms. Segmentation and description. Computational procedures for image reconstruction.
Recommended Background: 1 year of calculus and coursework in discrete structures.

560 Software Systems (3) Design and implementation of compilers, software systems; optimization, run-time storage administration. Software system design issues; description, structure and design of contemporary software systems.
Recommended Background: Coursework in systems programming.

571 Numerical Mathematics I (3) (See Mathematics 571.)

572 Numerical Mathematics II (3) (See Mathematics 572.)

574 Finite Element Methods (3) (See Mathematics 574.)

575 Matrix Theory and Techniques in Numerical Analysis (3) (See Mathematics 575.)

576 Sparse Matrix Computations (3) Solution of large sparse linear systems: graph models, reordering techniques, symbolic factorizations, data structures, numerical algorithms, complexity analyses, parallel algorithms.
Recommended Background: Numerical linear algebra course.

580 Foundations (3) Foundations of computer science, including Turing machines, computability and computational complexity.
Recommended Background: Automata theory course.

581 Algorithms (3) Analysis of algorithms and relevance of analysis to design of efficient computing algorithms. Sorting, searching, graph algorithms, pattern matching, dynamic programming, efficient approximation algorithms.
Recommended Background: Fundamental algorithms course.
392 Off-campus Study (1-6)
  Repeatability: May be repeated. Maximum 6 hours.

393 Independent Study (1-15)
  Repeatability: May be repeated. Maximum 45 hours.

394 Special Topics in Computer Science (1-3)
  Repeatability: May be repeated. Maximum 45 hours.

600 Doctoral Research and Dissertation (3-15)
  Grading Restriction: P/NP only.
  Repeatability: May be repeated.

620 Advanced Topics in Intelligent Systems (1-6)
  Repeatability: May be repeated. Maximum 45 hours.
  Registration Permission: Consent of instructor.

650 Advanced Topics in Pattern/Image Analysis (1-6)
  Repeatability: May be repeated. Maximum 45 hours.
  Registration Permission: Consent of instructor.

660 Advanced Topics in Software Systems (1-6)
  Repeatability: May be repeated. Maximum 45 hours.
  Registration Permission: Consent of instructor.

670 Advanced Topics in Scientific Computing (1-6)
  Repeatability: May be repeated. Maximum 45 hours.
  Registration Permission: Consent of instructor.

680 Advanced Topics in Theory and Foundations (1-6)
  Repeatability: May be repeated. Maximum 45 hours.
  Registration Permission: Consent of instructor.

690 Advanced Topics in Computer Science (1-6)
  Repeatability: May be repeated. Maximum 45 hours.
  Registration Permission: Consent of instructor.

Counselor Education (255)

410 Sex Role Development: Implications for Education and Counseling (3)
  Theories and research concerning the development of sexual role and
  its relevance in educational and counseling settings. (Same as Women's Studies 410.)

431 Personality and Mental Health (3)
  Perspectives of mental health with applications to education and other social institutions. (Same as Educational Psychology 431.)

480 Interviewing and Counseling Techniques (3)
  An introduction to basic helping skills necessary to the preparation of counselors, teachers, and others involved in human service delivery.

500 Thesis (1-15)
  Grading Restriction: P/NP only.
  Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15)
  Required for the student not otherwise registered during any semester when student uses univer-
  sity facilities and/or faculty time before degree is completed.
  Grading Restriction: Satisfactory/No Credit grading only.
  Repeatability: May be repeated. Credit Restriction: May not be used toward degree requirements.

503 Problems in Lieu of Thesis (2-3)
  Grading Restriction: Satisfactory/No Credit grading only.
  Repeatability: May be repeated. Maximum 9 hours.

504 Special Topics (1-3)
  Instructor-initiated course offered at convenience of academic unit on topics of current interest.
  Grading Restriction: Satisfactory/No Credit or letter grade.
  Repeatability: May be repeated. Maximum 15 hours.

518 Educational Specialist Research and Thesis (3)
  Grading Restriction: P/NP only.
  Repeatability: May be repeated.

521 Mental Health Consultation (3)
  Intended for advanced students in the helping professions, especially mental health counseling. Its main goal is to prepare students for providing mental health consultation and collaboration in the field.

525 Formal Measurement in Education and Counseling (3)
  Principles of test construction and item analysis. Survey of standardized tests of intelligence, achievement, aptitude, vocational interest, attitudes and personality.

535 Ethical, Legal, and Professional Issues in Counseling (3)
  Professional practice issues in school and community counseling and related fields: education, research, standards of practice, credentialing, and policy.
  Comment(s): Requires admission to the counseling program or consent of instructor.

550 Foundations in School Counseling (3)
  History, philosophy, professional standards, counselor role in relation to school staff and mental health professionals, and ethics of profession.

551 Theory and Practice of Counseling (3)
  Philosophical bases of helping relationships; development of counselor and client self-awareness; counseling theory/techniques.

552 Career Development: Vocational Theory, Research and Practice (3)
  Relationship of vocational theory, career development research, and societal factors to life career roles.

554 Group Dynamics and Methods (3)
  Theory and types of groups, descriptions of group practices, methods, dynamics, and facilitative skills, supervision of leadership skills. (Same as Psychology 567.)

555 Practicum in Counseling (3)
  Supervised practice and application of counseling skills with individual clients. (Same as Psychology 569.)
  Repeatability: May be repeated. Maximum 9 hours.
  (DE) Prerequisite(s): 480, 551, 550 or 556, and 554.
  Comment(s): Admission to school counseling or mental health counseling program required.
  Registration Permission: Consent of instructor.

556 Orientation to Mental Health Counseling (3)
  Mental health counseling as profession; professional organizations, work settings, code of ethics, certification requirements, and role identity.

558 Internship in School Counseling (1-6)
  Supervised post-practicum employment at academic unit approved site.
  Grading Restriction: Satisfactory/No Credit grading only.
  Repeatability: May be repeated. Maximum 12 hours.
  (DE) Prerequisite(s): 525 and 555.
  Comment(s): Admission to mental health counseling program required.
  Registration Permission: Consent of instructor.

559 Internship in Mental Health Counseling (1-6)
  Supervised post-practicum employment at academic unit approved human services agency.
  Grading Restriction: Satisfactory/No Credit grading only.
  Repeatability: May be repeated. Maximum 12 hours.
  (DE) Prerequisite(s): 525 and 555.
  Comment(s): Admission to mental health counseling program required.
  Registration Permission: Consent of instructor.

561 Development and Operation of School Counseling Programs (3)
  Management of comprehensive school counseling programs to include needs assessment, program goals, resource identification, evaluations, and use of computer-based program management software.
  (DE) Prerequisite(s): 550.

565 Facilitation of Technical Task Groups (3)
  Technical and social aspects of group dynamics in context of technical task groups. Application of counseling techniques to facilitation of workplace teams.

566 Approaches to Family Intervention and Counseling (3)
  (See Child and Family Studies 566.)

570 Cross-Cultural Counseling: Theory and Research (3)
  Theory and research on issues and problems in counseling of clients from different cultural backgrounds in U.S. and abroad. (Same as Psychology 574.)

580 Case Management Process in Mental Health Counseling (3)
  Introduction and application of knowledge and skills of the case management process: assessment, planning, and service provision/coordination.

585 Seminar in Gerontology (1)
  (See Health 585.)

593 Independent Study (1-3)
  Grading: Satisfactory/No Credit or letter grade.
  Repeatability: May be repeated. Maximum 15 hours.

600 Doctoral Research and Dissertation (3-15)
  Grading Restriction: P/NP only.
  Repeatability: May be repeated.

601 Professional Seminar (1)
  (See Educational Psychology 601.)

602 Directed Research (1-3)
  Instructor- or student-initiated group investigation of empirical and theoretical problems in educational and counseling psychology.
  Grading Restriction: Satisfactory/No Credit grading only.
  Repeatability: May be repeated. Maximum 12 hours.

604 Special Topics (1-3)
  Instructor-initiated courses offered at convenience of academic unit on topics of interest.
  Grading: Satisfactory/No Credit or letter grade.
  Repeatability: May be repeated. Maximum 15 hours.

625 Advanced Study in Personality (3)
  (See Psychology 625.)

635 Ethical, Legal, and Professional Issues in Psychology (3)
  (See Psychology 635.)
### Courses of Instruction

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>590</td>
<td>Cultural Studies Seminar (2)</td>
<td>Two-semester sequence (fall and spring); ongoing discussion about cultural studies; popular culture, interdisciplinary work, social justice issues. Presentations, videos, readings. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 4 hours.</td>
</tr>
<tr>
<td>591</td>
<td>Issues in Cultural Studies (3)</td>
<td>Combination of theoretical readings in cultural studies and service learning for social justice project. Discussion of interdisciplinary, social justice and activism. Links between theory and practice of cultural studies.</td>
</tr>
<tr>
<td>592</td>
<td>Social Justice and Education (3)</td>
<td>Social justice issues: education practices. Social justice, moral commitments to others in educational settings, and equal opportunity to acquire social goods and benefits.</td>
</tr>
<tr>
<td>607</td>
<td>Advanced Seminar in the Social Foundations of Education (3)</td>
<td>Interdisciplinary team-taught seminar. Readings selected by faculty and participants from classic studies and current periodical literature in anthropology, sociology, history, and philosophy of education. Part of the general core for the PhD program.</td>
</tr>
<tr>
<td>625</td>
<td>Seminar in History of Education (3)</td>
<td>Selected historical issues in education. Repeatability: May be repeated. Maximum 6 hours. Recommended Background: 2 courses in the history or philosophy of education.</td>
</tr>
</tbody>
</table>

### Cultural Studies in Education (271)

- **504 Teachers, School, and Society (3)**: Critical interdisciplinary examination of selected policies and assumptions about education in America with a focus on teachers, students, and the relationship between schools and the broader society.
- **512 History of Women’s Education (3)**: Historical study of the institutions and philosophies of education that have shaped the education of girls and women in the United States. (Same as Women’s Studies 512.)
- **526 Philosophy of Education (3)**: Description, interpretation, and critique of philosophical/theoretical arguments: truths, knowledge, and values in relation to education.
- **539 Development of Education Thought (3)**: Historic and philosophic approach to lives and writing of influential educators: Plato, Quintillian, Comenius, Rosseau, Pestalozzi, Froebel, Dewey.
- **544 Survey of Contemporary Philosophies in Education (3)**: Current debates within various philosophical fields of study related to education.
- **545 Educational Sociology (3)**: Sociological analysis of American education system. Controversial social issues that affect educational system and potential solutions offered by various programs.
- **548 Transforming Critical Thinking: Constructive Thinking and Educational Implications (3)**: Critique and transformation of critical thinking to more holistic, relational, and aesthetic model of multicultural and gender-sensitive constructive thinking; confronting power and addressing educational implications. (Same as Women’s Studies 548.)
- **549 Topics in International Education (3)**: Historical, philosophical, and sociological foundations; selected nations and their cultures.
- **550 Multicultural Education (3)**: Introduction to history, varieties, theory and practice of multiculturalism and multicultural education. Addresses the promotion and critique of multicultural education and related concepts in theory and educational practice.
- **560 Introduction to Qualitative Research in Education (3)**: Fundamentals of qualitative research methods and development of skills needed for qualitative research proposals. Overview of qualitative research methods: ethnography, case study, historiography, biography, oral and life history. Critical reading and evaluation of qualitative research studies.
- **561 Qualitative Research in Education Settings (3)**: Implementing and writing qualitative studies in educational settings. Qualitative data collection, analysis, and report writing. (DE) Prerequisite(s): 560 or equivalent.

### Dance (274)

- **415 Teaching Creative Dance for Children (2)**: Theory, methods, materials, and practical experience in presentation and integration of creative dance in grades K-6. A mini-teaching experience is involved in this class.
- **480 Dance History through the 19th Century (3)**: Survey of the dance of various societies and cultures from pre-history through the 19th century.
- **490 Dance in the 20th Century (3)**: Survey of the history and philosophy of dance in the 20th century.
- **495 Dance Pedagogy (3)**: Principles and methods of teaching dance with practical application in a mini-teaching experience. Different level of performance is expected of those registered for graduate credit.
- **510 Ballet: Level IV (2)**: Instruction and practice in advanced classical ballet techniques. Repeatability: May be repeated. Maximum 8 hours. Registration Permission: Consent of instructor.
520 Jazz: Level IV (2) Instruction and practice in advanced jazz styles and techniques.
Repeatability: May be repeated. Maximum 8 hours.
Registration Permission: Consent of instructor.

530 Modern: Level IV (2) Instruction and practice in advanced modern dance techniques.
Repeatability: May be repeated. Maximum 8 hours.
Registration Permission: Consent of instructor.

593 Independent Study (1-3)
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 12 hours.

Ecology and Evolutionary Biology (278)

410 Plant Evolutionary Morphology (4) Morphology, development, natural history, and evolution of fungi, cyanobacteria, non-vascular plants (algae and bryophytes), and vascular plants (ferns, fern allies, gymnosperms, and flowering plants). (DE) Corequisite(s): Biology 102 or 110 or 130.

412 Minicourse in Ecology and Evolutionary Biology (2) Selected advanced topics in ecology, behavior, and evolutionary biology, concentrated in time and subject matter. Consult departmental listing for topics offered.
Repeatability: May be repeated. Maximum 4 hours.
Credit Restriction(s): Maximum 4 hours may be applied toward departmental major.

414 Plant Anatomy (3) Cells, tissues and organs. Their development in vegetative and reproductive structures of vascular plants. Emphasis on seed plants. (DE) Prerequisite(s): Biology 111 and 112 or Biology 130 and 140.

419 Science as Method (3) The dynamic process of scientific discovery as opposed to a static body of knowledge. Topics included will be comparisons of science, nonscience, pseudoscience, successful and unsuccessful science, the ethics of scientific research, and the philosophical aspects of the scientific enterprise. Implications for teaching and writing about science will be covered. (Same as Philosophy 419.) Recommended Background: Introductory science or philosophy course or consent of instructor.

421 Community Ecology (3) Interactions between individuals, species, communities, and environments, including competition, coexistence, predation, herbivory. Causes and consequences of biological diversity; biological invasions. Application of advanced sampling and analysis techniques. Local to global environmental change. Includes periodic field trips or laboratories. (DE) Prerequisite(s): Biology 250 or equivalent.

433 Plant Ecology (3) Interactions between individuals, species, communities and their environments. Circulation of energy and matter in ecosystems. Includes weekly field trips or laboratory periods and at least two weekend field trips. (DE) Prerequisite(s): 330 or equivalent.

446 Introduction to Oceanography (4) Basic oceanography: including physical, chemical, geological and biological processes and patterns. Emphasis on oceanic subsystems such as upwellings, polar oceans, hydrothermal vents, gyres, coral reefs, estuaries, and coastal regions. Field trip to coast required. (DE) Prerequisite(s): General biology and Chemistry 120 and 130. Recommended Background: Biology 250.

450 Comparative Animal Behavior (3) Principles and methods of ethology: emphasis on ecological, developmental, physiological, and evolutionary aspects. (Same as Psychology 450.)

459 Comparative Animal Behavior Laboratory (3) Introduction to observational and experimental research in ethology. (Same as Psychology 459.) (DE) Corequisite(s): 450.

460 Evolution (3) Principles, facts, and theories regarding biological evolution. Concepts, processes, and product in development of organic diversity. Historical development of ideas concerning biological evolution. (DE) Prerequisite(s): Biology 240 or consent of instructor.

461 Special Topics in Organismal Biology (3) Evolution, ecology, biogeography, classification, and anatomy of selected animal and plant taxa. Repeatability: May be repeated if topic differs. Maximum 12 hours. (DE) Prerequisite(s): Biology 250 or consent of instructor.

465 Evolutionary and Functional Vertebrate Morphology (4) A detailed study of the structure and function of the vertebrates. Analysis of evolutionary patterns of vertebrates using the comparative method and data from anatomy, developmental biology and functional morphology within a phylogenetic context. Laboratory requires intensive dissection to learn vertebrate anatomy, evolutionary trends and specializations.
Contact Hour Distribution: 2 hours and 2 labs. (DE) Prerequisite(s): Biology 250 or consent of instructor. Recommended Background: Physics 221.

470 Aquatic Ecology (3) Introduction to the physio-chemical nature of inland waters with description of biotic communities and their interrelationships.
Contact Hour Distribution: 2 hours and 1 lab. (DE) Prerequisite(s): Chemistry 120 and 130 and Biology 250.

474 Ichthyology (4) Evolution, classification, collection and identification, distribution and biology of fishes with emphasis on freshwater fauna of Eastern North America. Contact Hour Distribution: 2 hours and 2 lab. (DE) Prerequisite(s): Biology 250 or consent of instructor.

484 Conservation Biology (3) Application of principles and techniques of ecological research to conservation of biological diversity at genetic, population, community, and ecosystem levels. (DE) Prerequisite(s): Biology 240 and 250.

500 Thesis (1-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

503 Ecology and Evolutionary Biology Seminar (1) Advanced topics in ecology, behavior, and evolutionary biology. Required of all first- and second-year graduate students. Senior departmental majors are encouraged to enroll.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 16 hours.
Credit Restriction: Only 4 hours can be applied towards a graduate degree in ecology and evolutionary biology.

504 Special Topics (1-3) Selected directed readings or special course in topics of current interest. Consult departmental listing for offerings.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated with consent of instructor. Maximum 9 hours.

508 Introduction to Faculty Research (1) Orientation of new graduate students to current research of departmental graduate faculty. Required of all first-year students.
Grading Restriction: Satisfactory/No Credit grading only.
Comment(s): Admission to program in ecology and evolutionary biology required.

509 Foundations: Readings in Ecology (1-2) Readings and discussion of classic papers in field.
Repeatability: Not repeatable. May be taken once for 1-2 hours.

511 Foundations: Readings in Evolution (1-2) Readings and discussion of classic papers in field.
Repeatability: Not repeatable. May be taken once for 1-2 hours.

512 Foundations: Readings in Conservation Biology (2) Readings and discussion of classic papers in field.

514 Foundations: Readings in Mathematical and Computational Ecology (2) Readings and discussion of classic papers in field.

515 Foundations: Readings in Environmental Toxicology (1-2) Readings and discussion of classic papers in field.
Repeatability: Not repeatable. May be taken once for 1-2 hours.

530 Advanced Taxonomy of Flowering Plants (3) Evolution and classification of families of angiosperms, local flora. Contact Hour Distribution: 2 hours lecture and 1 lab. (DE) Prerequisite(s): 330 or equivalent.

540 Insect Taxonomy I: Major Orders (3) Survey of classification of major orders of insects, with practical experience in identification of insects at family level.
Contact Hour Distribution: 4 hours combined lecture/lab.
Registration Permission: Consent of instructor.

543 Aquatic Insects (3) Taxonomy and biology of aquatic insects; immature forms.
Contact Hour Distribution: 2 hours and 1 lab.
Registration Permission: Consent of instructor.
545 Advanced Animal Behavior (3) Second-level course in ethology, stressing evolution, genetics, physiology, ecology, and human behavior. 
(See same Psychology 545.)
(DE) Prerequisite(s): 450 or equivalent.

546 Ethological Psychology (3) (See Psychology 546.)

547 Conceptual Foundations of Evolution and Behavior (3) (See Psychology 547.)

556 Ice-Age Environments and Global Climate Change (3) Glacial-interglacial climatic cycles and dynamic responses of landscapes within glacial, periglacial, and non-glacial environments across North America over past 2.5 million years.

557 Quaternary Ecology (3) Perturbation, process, and pattern within Quaternary ecosystems; climatic change and vegetational response during last 2.5 million years.
Registration Permission: Consent of instructor.

560 Biometry (3) Statistical applications in biological research.
Recommended Background: Statistics course or consent of instructor.

575 Ecological Genetics (3) Genetics of natural populations, using both single-locus and quantitative genetic approaches.
Recommended Background: Statistics course.

577 Landscape Ecology (3) Ecological structure, function, and change through time of landscape mosaics: quantitative measures of landscape heterogeneity; responses of organisms to changes in landscape heterogeneity.
(DE) Prerequisite(s): Biology 250 or consent of instructor.

581 Mathematical Ecology I (3) (See Mathematics 581.)

582 Mathematical Ecology II (3) (See Mathematics 582.)

583 Zoogeography (3) Processes determining geographic distribution of animals and distribution and composition of animal communities.
Recommended Background: Ecology course or consent of instructor.

585 Mathematical Evolutionary Theory (3) (See Mathematics 583.)

591 Foreign Study (1-15)
Repeatability: May be repeated. Maximum 15 hours.

592 Off-Campus Study (1-15)
Repeatability: May be repeated. Maximum 15 hours.

593 Independent Study (1-15)
Repeatability: May be repeated. Maximum 15 hours.

595 Advanced Evolutionary Ecology (3) Advanced concepts in evolutionary and ecological genetics. Biogeography, climate, population genetics, evolution and natural selection, population growth and regulation, competition, niche, experimental ecology, predation, phylogenetics in ecology, biodiversity, and conservation.
Credit Restriction: Students cannot receive credit for both 595 and 495.
Recommended Background: General biology course, general ecology course, coursework (1 or more courses) in organismal biology (ecology, evolution) at the upper-undergraduate level or consent of instructor.

600 Doctoral Research and Dissertation (3-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

602 Advanced Topics in Ecological Process and Structure (1-3) Exposure and in-depth training in contemporary topics and approaches important to advanced research in ecological process and structure. Consult departmental listing for offerings.
Repeatability: May be repeated with consent of department. Maximum 9 hours.

603 Advanced Topics in Evolutionary Biology (1-3) Exposure and in-depth training in contemporary topics and approaches important to advanced research in evolutionary biology. Consult departmental listing for offerings.
Repeatability: May be repeated with consent of department. Maximum 9 hours.

606 Advanced Topics in Conservation Biology (1-3) Exposure and in-depth training in contemporary topics and approaches important to advanced research in conservation biology. Consult departmental listing for offerings.
Repeatability: May be repeated with consent of department. Maximum 9 hours.

609 Advanced Topics in Comparative Animal Behavior (1-3) Exposure and in-depth training in contemporary topics and approaches important to advanced research in animal behavior. Consult departmental listing for offerings.
Repeatability: May be repeated with consent of department. Maximum 9 hours.

610 Advanced Topics in Mathematical, Theoretical and Computational Ecology (1-3) Exposure and in-depth training in contemporary topics and approaches important to advanced research in mathematical, theoretical, and computational ecology. Consult departmental listing for offerings.
Repeatability: May be repeated with consent of department. Maximum 9 hours.

611 Advanced Topics in Organismal Biology (1-3) Exposure and in-depth training in contemporary topics and approaches important to advanced research in organismal biology. Consult departmental listing for offerings.
Repeatability: May be repeated with consent of department. Maximum 9 hours.

612 Advanced Topics in Environmental Toxicology (1-3) Exposure and in-depth training in contemporary topics and approaches important to advanced research in environmental toxicology. Consult departmental listing for offerings. 
(See Biochemistry and Cellular and Molecular Biology 612.)
Repeatability: May be repeated with consent of department. Maximum 9 hours.

622 Seminar in the History of Botany (2) History of botanical exploration and advances from early civilizations to modern periods.
Repeatability: May be repeated. Maximum 4 hours.

681 Advanced Mathematical Ecology I (3) (See Mathematics 681.)

682 Advanced Mathematical Ecology II (3) (See Mathematics 682.)

Economics (283)

400 Special Topics II (3) Variable topics for advanced students.
(DE) Prerequisite(s): 311 or 312 and 313.
Registration Permission: Consent of instructor.

413 Macroeconomics: Business Cycles and Growth (3) Analysis of macroeconomic short-run fluctuations and long-term growth. Coverage will also include the role of monetary and fiscal policy on aggregate output, employment, and interest rates.
(DE) Prerequisite(s): 313.

421 International Economics (3) Balance of payments, exchange rate determination, monetary and fiscal policies, monetary arrangements, comparative advantage, tariff and nontariff trade distortions, protection arguments, and regional integration, with analyses based upon intermediate-level economic theory.
(DE) Prerequisite(s): 311 or 312.

435 Industrial Organization (3) Monopoly and competition in United States economy; interrelationship of market structure, business behavior, and economic performance.
(DE) Prerequisite(s): 311 or 312.

436 Economics of Health and Health Care (3) Medical care and health status; demand for medical care and insurance; physician and hospital supplies; government provision of services and insurance; regulation of health care markets.
(DE) Prerequisite(s): 311 or 312.

441 Labor Economics (3) Extension of economic principles to labor markets, public policy questions, demand and supply, theory of wage differentials, unemployment, unions in the private sector, investment in individuals, education and training, and mobility.
(DE) Prerequisite(s): 311 or 312.

463 Environmental Economics (3) Economic foundations for public decision making about environmental resources, utilizing tools from intermediate microeconomic theory. Emphasis on the welfare economic approach for the provision of public goods, with specific emphasis on market failure, externalities, benefit-cost analysis, and methods for valuing environmental resources and human health.
(DE) Prerequisite(s): 311 or 312.

472 Public Finance: Taxation and Fiscal Federalism (3) Analysis of federal, state, and local government revenue systems, to include individual and corporate income, sales, and property taxes and other tax and non-tax revenue sources. Consideration of current policy issues and relations among various levels of government.
(DE) Prerequisite(s): 311 or 312.

482 Introduction to Mathematical Economics (3) Application of basic mathematical tools (e.g., calculus, matrix algebra, etc.) to major topics of economic theory.
(DE) Prerequisite(s): 311 or 312.

500 Thesis (1-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.
502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Credit Restriction: May not be used toward degree requirements.

511 Microeconomic Theory (3) Theory of consumer choice and demand, theory of revealed preference, attributes of goods and implicit prices, market demand, labor supply, individual behavior under uncertainty, theory of firm, theory of production and cost, market structures, derived demand and factor pricing, introduction to welfare economics, market failure and theory of second best, pure exchange.

512 Microeconomic Theory (3) Theory of consumer choice and demand, theory of revealed preference, attributes of goods and implicit prices, market demand, labor supply, individual behavior under uncertainty, theory of firm, theory of production and cost, market structures, derived demand and factor pricing, introduction to welfare economics, market failure and theory of second best, pure exchange.

513 Macroeconomic Theory (3) Dynamic general equilibrium models, endogenous growth theory, credibility of monetary policy, budget deficits and fiscal policy, government consumption, investment, asset pricing, overlapping generations models, real business cycle, search theory, and open-economy macro models.

514 Macroeconomic Theory (3) Dynamic general equilibrium models, endogenous growth theory, credibility of monetary policy, budget deficits and fiscal policy, consumption, investment, asset pricing, overlapping generations models, real business cycle, search theory, and open-economy macro models.

577 Environmental Economics and Policy Management (3) Interdisciplinary perspective on goals of sustainable economic development and environmental quality. Development of decision-making tools and conflict resolution.


581 Mathematical Methods in Economics (3) Mathematical analysis in economic theory. Applications of selected mathematical techniques to economic topics: theories of choice, firm, consumer behavior, general equilibrium, games, distribution, growth, stability, and input-output. (DE) Prerequisite(s): 311 and a calculus course.

582 Elements of Econometrics I (3) Elementary econometric concepts and techniques. Least squares and maximum likelihood estimation, specification and econometric problems, statistical inference, generalized least squares, simultaneous equation models, applications of concepts to economic problems. Recommended Background: Introductory statistics course.

583 Elements of Econometrics II (3) Elementary econometric concepts and techniques. Least squares and maximum likelihood estimation, specification and econometric problems, statistical inference, generalized least squares, simultaneous equation models, applications of concepts to economic problems. Recommended Background: Introductory statistics course.

600 Doctoral Research and Dissertation (3-15) Grading Restriction: P/NP only. Repeatability: May be repeated.

621 International Economics (3) Comparative advantage, trade migration, commodity composition of trade, protectionist devices, protectionist arguments, trade liberalization, U.S. trade policy, exchange rate determination, balance of payments adjustment, multinational corporations, and international capital flows. (DE) Prerequisite(s): 512 and 514.

622 International Finance (3) Analysis of macroeconomic adjustment in open economies, with attention to foreign exchange markets, balance of payments, international policy coordination, integration of world capital markets, liberalization of non-market economies and the international monetary system. (DE) Prerequisite(s): 512 and 514.

631 Industrial Organization I (3) Standard models of imperfect competition, oligopoly, and asymmetric information. Topics include pricing with market power and strategic decision making. Registration Permission: Consent of instructor.

632 Industrial Organization II (3) Economics of regulation and antitrust. Topics include public utility regulation, consumer product regulation, occupational safety regulation, environmental regulation and antitrust legislation. Registration Permission: Consent of instructor.

651 Monetary Theory (3) Study of money, credit, and liquidity as related to real output determination, interest rates, employment, and prices. (DE) Prerequisite(s): 513.

652 Topics in Monetary Theory (3) Advanced monetary models, issues in monetary policy, open economy monetary theory and policy. Student participation. (DE) Prerequisite(s): 513.

656 Regional and Urban Location and Development Theory (3) Theory of industrial and agricultural location and human migration. Economic basis for land-use patterns, central places, and urban form. Spatial inequalities and urban problems. National policies for regional and urban assistance.


672 Public Finance: Taxation and Intergovernmental Relations (3) Theory of taxation; tax incidence and tax efficiency; policy analysis of U.S. tax structure at federal, state, and local levels. Theory of fiscal federalism and intergovernmental relations.

677 Environmental and Natural Resource Economics (3) Alternative paradigms for allocating and valuing environmental resources. Exploitation of issues related to market failure and differences between renewable and nonrenewable resources.

678 Economics of Environmental Policy (3) Topics in environmental policy analysis. Consideration of alternative policy instruments, defining policy objectives and role of risk in decision-making process.

682 Advanced Topics in Cross-Section Econometrics (3) Models with limited dependent variables, panel data analysis, nonparametric estimation, selection models and dummy models. (DE) Prerequisite(s): 582 and 583.

683 Time Series Econometrics (3) Univariate and multivariate time series modeling of economic data-AR, MA, ARMA, VAR; models of non-stationary time series-unit roots, cointegration and error correction models; time series models of heteroskedasticity-ARCH, ARCH-M, GARCH; exogeneity and causality. (DE) Prerequisite(s): 582 and 583.

690 Workshop (3) Advanced topics in economics. Student participation. Repeatability: May be repeated. Maximum 9 hours. Registration Permission: Consent of instructor.

693 Independent Study (1-3) Directed research on topic of mutual interest to faculty and student. Variable title for transcript purposes. Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of instructor.

Education (289)

540 Topics in Improvement of Instruction (1-3) Special conferences, workshops, and in-service programs. Grading: Satisfactory/No Credit or letter grade. Repeatability: May be repeated. Maximum 6 hours.

574 Analysis of Teaching for Professional Development (2) Strategies to document and analyze effectiveness of teaching and of professional development. Study and application of various approaches. (DE) Corequisite(s): 575.

575 Professional Internship in Teaching (1-8) Intensive teaching and teaching-related experiences in professional settings in public schools. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 12 hours. Comment(s): Admission to teacher education program required. Enrollment limited to post-baccalaureate students in professional year program.

576 Practicum in Classroom Teaching (1-8) Teaching and teaching-related experiences in elementary and secondary school settings. Specific hours and school level assignment determined by licensure or certification requirements. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 12 hours. Credit Restriction: May not be used for probationary licensure year. May not be used toward degree requirements.
Education of the Deaf and Hard of Hearing (285)

415 Language Development of Deaf/Hard of Hearing I (3) Language problems of hearing impaired contrasted with scope and sequence of normal language development. Formal linguistic systems used to described language development problems.


419 Speech Development of Deaf/Hard of Hearing (4) Theories of speech development, approaches in training perception and production of speech, and aural habilitation. Practicum experiences.

424 Nature of Hearing Impairments (3) Anatomy and physiology of hearing; nature and causes of hearing loss; methods and instrumentation for assessment of hearing level; interpretation of audiologic services to medical and other rehabilitative disciplines.

425 Introduction to the Psychology and Education of the Deaf/Hard of Hearing (3) Primarily for those planning to teach the hearing impaired. Research related to psychology, social adjustment, communication methodology, language development and education of hearing impaired. Survey of literature. Visits to programs.

504 Clinical Experience in Teaching and Supervision of Exceptional Children (3-9) Placement in educational settings. (Same as Special Education 504.)

509 Vocational Guidance and Career Planning With Hearing Impaired (3) Utilization of psychological, educational, social and vocational, diagnostic materials and resources appropriate for hearing impaired persons to provide guidance in career decisions and individualized rehabilitation plan.

523 Practicum with Deaf/Hard of Hearing (3) Receptive and expressive language capabilities of hearing impaired student. Designing, teaching, and post-testing unit of instruction for remediation of specific language errors.


529 Teaching Reading to Deaf/Hard of Hearing (3) Specific methods necessary to teach the prelingually hearing impaired student. Practice in preparation of developmentally appropriate reading materials. Methods which assist in integrating hearing impaired students in regular reading curricula and materials.

579 Special Topics (1-3)

513 Administrative and Organizational Theory (3) Introduction to the administrative and organizational foundations of management and leadership of educational programs and institutions. (Same as Higher Education Administration 513.)

515 Human Relations and Communication in Administration (3) Development and use of effective interpersonal communication skills and channels, inter-group relations, supportive work climates, personnel motivation, conflict management skills, and role of values, attitudes, and expectations in administration.

516 Research Methods (3) Descriptive, experimental, and quasi-experimental designs to help students without quantitative backgrounds to read and understand technical professional literature. Introduction to inferential statistics, needs assessments, and evaluation procedures. (Same as Higher Education Administration 516.)

523 Administration of Special Services (3) Legal, programmatic, and ethical responsibilities of educational administrators in design and implementation of special service programs within school settings. Special learner characteristics, program categories, service delivery models, and legal/ethical frameworks. Inclusion and full service delivery.

529 Politics and Public Relations in Education (3) School/community relations in political context of modern, complex society. Administrator and supervisory competencies: political, social, ethnic, cultural, and racial environments in which schools operate.

533 Program Evaluation in Education (3) (See Educational Psychology 533.)

534 Program Evaluation in Education (3) (See Curriculum, Educational Research, and Evaluation 534.)

535 Administrative Applications of Micro Computers (3) DOS, word processing, data base management, spreadsheets, and computer communications. Review and development of specific administrative applications: scheduling, attendance, student record systems, and accounting.

544 School Finance and Business Management (3) For prospective building level administrators. Financial and logical management tasks and procedures in individual school setting.

548 Supervision and Personnel Administration (3) Basic supervisory and personnel concepts and related competencies at the micro-organizational level; interviewing, personnel planning, collecting and maintaining employee information, supervision of personnel, performance appraisal and staff development.

553 Strategic Planning (3) Processes for improving decision-making function through use of both quantitative and qualitative planning techniques.

554 Policy Issues in Educational Law, K-12 (3) Logical arrangement of case and statutory materials for public school administrators and teachers; problems concerning law and public education.

560 Grant Writing and Project Management (3) Processes of finding funding for research efforts, writing grant proposals, negotiating with funding sources, implementing and maintaining funded programs, and closing out projects at end of funding support.

577 Educational Statistics (3) (See Educational Psychology 577.)

580 Internship in Educational Administration (3) Field experience in appropriate educational setting working directly with administrator. At end of planned program of study. Placement by department assignment. Repeatability: May be repeated. Maximum 6 hours.

583 Educational Leadership-Principalship (3) Knowledge, skills and relationships for principals to be effective educational leaders.

592 Field Problems in Educational Administration and Supervision (3) Repeatability: May be repeated. Maximum 6 hours.

596 Seminar in School Leadership, K-12 (3) On-site study of quality school processes throughout region. Repeatability: May be repeated. Maximum 6 hours.

605 Advanced Seminar in Administrative Theory (3) (See Higher Education Administration 605.)

606 Leadership Forum (1-3) Development of research, evaluation, policy analysis skills and critical analysis and evaluation of philosophical principles undergirding American education. Continuous on-campus enrollment for 2 years. (Same as Higher Education Administration 606.)

608 Development of and Current Issues in Educational Administration (3) Introduction to the area of educational administration. Focusing on the development of educational administration, school leadership preparation programs as well as current reforms, issues and indictments.

610 Internship in Educational Administration (3) Opportunity for doctoral students and advanced graduate students to gain experience in performance of critical tasks of educational administration under supervision of practitioner and university representative. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated at discretion of student's committee. Maximum 12 hours.
### COURSES OF INSTRUCTION

**614 Statistics for Educational Administrators (3)** An introductory statistics course that focuses on the application of statistical procedures to problems in educational administration. Included are: scales of measurement, hypothesis testing, and descriptive and inferential statistical techniques. Computer applications are explored. *(Same as Higher Education Administration 614.)*

**615 Research Design (3)** The foundations of designing, conducting, and evaluating quantitative, qualitative, and mixed-methods research and the philosophical assumptions underlying these approaches. Topics covered include: identifying a research problem, reviewing the literature, specifying a purpose, writing research questions and hypotheses, and collecting and analyzing data. *(Same as Higher Education Administration 615.)*

**616 Research Methods (3)** The techniques of multiple regression, analysis of covariance, and multivariate analysis as applied to problems in educational administration. Computer applications are explored. *(Same as Higher Education Administration 616.)* *(DE) Prerequisite(s): 614.*

**617 Case Study Methods in Educational Research (3)** Methods, techniques, and strategies consistent with case study approaches to inquiry in educational and related settings. *(Same as Higher Education Administration 617.)* *(DE) Prerequisite(s): 615.*

**629 Seminar in Policy Issues in Education (3)** Local, state, and federal education policy: theory analysis, development and implementation. Why education policy is changing rapidly, ways to follow and influence education policy, and conceptual frameworks to use for future understanding. *(Same as Higher Education Administration 629.)*

**646 Personnel Administration (3)** Personnel administration functions for professional and supporting staff in educational organizations. Recruitment, selection, placement, personnel policies, employee wage and salary administration, fringe benefits, collective negotiations, human relations, staff development, and staff evaluation.

**656 Legal Issues in Education (3)** School law; constitutional foundations as they relate to public education at state and local levels.

**658 Conflict Management (3)** *(See Higher Education Administration 658.)*

**670 Values and Ethics in Educational Leadership (3)** *(See Higher Education Administration 670.)*

**680 Administration of Complex Organizations (3)** Concepts and theoretical formulations to understand, analyze, evaluate, and change complex educational programs and organizations. *(Same as Higher Education Administration 680.)*

### Educational Interpreting (287)

**431 American Sign Language III (3)** Sequence (431-432) stresses fluency of expressive and reception sign communication skills. Using language in context is emphasized. Grammatical structures of ASL and cultural implications of the deaf community.

*(DE) Prerequisite(s): 431 and 432 must be taken in sequence.*

**432 American Sign Language IV (3)** Sequence (431-432) stresses fluency of expressive and reception sign communication skills. Using language in context is emphasized. Grammatical structures of ASL and cultural implications of the deaf community.

*(DE) Prerequisite(s): 431 or consent of instructor.*

**435 Linguistics of American Sign Language (3)** Introduction to grammatical and linguistic structures of ASL. Language variations, discourse, bilingualism and language contact also covered in this course. Conducted in ASL.

Grading: Satisfactory/No Credit or letter grade. *(DE) Prerequisite(s): 431 or consent of instructor.*

### Educational Psychology (310)

**431 Personality and Mental Health (3)** *(See Counselor Education 431.)*

**460 Self-Management in the Helping Professions (3)** Applications of self-management strategies to career, social, emotional, and health domains for both helping professionals and their clientele.

Grading: Satisfactory/No Credit or letter grade. *(Recommended Background: Introductory course in psychology or consent of instructor.)*

**500 Thesis (1-15)**

Grading Restriction: P/INP only. Repeatability: May be repeated.

**502 Registration for Use of Facilities (1-15)** Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated.

Credit Restriction: May not be used toward degree requirements.

**503 Problems in Lieu of Thesis (2-3)**

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated. Maximum 9 hours.

**504 Special Topics (1-3)** Instructor-initiated course offered at convenience of unit on topics of current interest.

Grading: Satisfactory/No Credit or letter grade.

Repeatability: May be repeated. Maximum 15 hours.

**505 Quasi-Experimental and Single-Subject Design Research (3)** History, theory and research design techniques used to examine cause and effect relationships during applied psychoeducational research.

Focus on controlling threats to internal validity through research design.

**506 Modes of Inquiry (3)** Exploration of the nature of scholarly inquiry with emphasis on different approaches to research in education and ways to help students make decisions about how they plan to engage in the community of scholars.

**507 Survey of Educational Psychology (3)** Historical developments and current issues; analysis of concepts, principles, techniques and models as they are used to facilitate teaching and learning and the creation of effective educational environments.

**509 Internship in Adult Education (3)** Practical field experiences in selected settings under supervision of practitioner and departmental representative.

Repeatability: May be repeated. Maximum 6 hours.

Registration Permission: Consent of instructor.

**510 Psychological Theories of Human Development Applied to Education (3)** Theory and research on emotional, social, and intellectual development over life span with applications to educational and therapeutic settings.

**513 Reflective Practice in Education and Psychology (3)** Concepts, theories and processes of reflective practice applied to educational settings.

**514 Individual Study in Adult Education (3)** Approval form must be completed in office of unit head.

Repeatability: May be repeated. Maximum 6 hours.

Registration Permission: Consent of supervising instructor.

**515 Educational Applications of Behavioral Theories of Learning (3)** Behavioral theories and research, conditioning, observational learning, and ethological learning as systems apply to student motivation, discipline and learning.

**516 Educational Applications of Cognitive Learning Theories (3)** Cognitive theory and research, social learning, attribution and information processing as applied to education.

**517 Direct Assessment and Interventions for Academic Skills Deficits (3)** Theory, techniques and procedures shown to prevent and remedy academic skills deficits: curriculum-based assessment and direct intervention procedures.

**518 Educational Specialist Research and Thesis (3)**

Grading Restriction: P/INP only.

Repeatability: May be repeated.

**520 Survey of Adult Education (3)** Historical development, philosophies of adult education agencies, associations, programs, issues, and literature illustrating process of adult education and diversity of continuing education.

Registration Permission: Consent of instructor.

**521 Program Development and Operation in Adult Education (3)** Theories and methods from research to practice in planning and operating adult education programs.

Registration Permission: Consent of instructor.

**522 Adult Development (3)** Theory and research in adult development and change over lifespan and its implications for adult learning in formal and informal contexts.

**523 Post-Secondary Education for Adults (3)** History, evolution, philosophy, structure and functions of post-secondary, sub-university institutions, their programs and clientele.

Registration Permission: Consent of instructor.

**524 Continuing Professional Education (3)** Theories and concepts supporting design and management of educational programs for adults in professions.
525 Adult Learning (3) Key characteristics of adult learners, current theory and research on adult learning, and implications for teaching and learning concepts.

526 Informal Methods of Assessment (3) Development and use of rating scales, check-lists, observation, test scores and case reports in assessment and counseling of children and adults.

(DE) Prerequisite(s): Counselor Education 525.

527 Controversies in Adult Education (3) Controversies confronting the field of adult education; development of critical analysis skills by looking at controversies from different perspectives.

528 Psychology and Aging (3) Theory and research of aging and gerontology related issues; psychological and related physiological changes that occur in later life stages of human development. Implications for treatment programs and policy.

529 Facilitating Adult Learning (3) Theory, research, and practice related to working with adults in teaching-learning situations.

530 Methods of Action Research (3) Models of action research and applications in professional practice.

533 Program Evaluation in Education (3) Issues and practices in planning and conducting program and curriculum evaluation in a variety of settings. Fundamentals of design, measurement, philosophy, ethics, and underlying values; proper role and use of evaluation in educational organizations. (Same as Educational Administration 533; Higher Education Administration 533.)

Registration Permission: Consent of instructor.

550 Statistics and Research Design: Conceptual (3) Consumer-oriented, conceptual treatment of statistics, research design, and quantitative basis of testing.

569 Internship in Educational Psychology (3) Supervised employment in unit approved educational psychology internship sites. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 12 hours.

572 Cognitive Education: Models and Approaches (3) Models and approaches in field of cognitive education: research and theoretical support for various program components, critical variables of organizational learning that affect success of implementation.

573 Meeting Needs of Nontraditional and Underachieving Learners (3) Exploration of students’ needs at any age and level of functioning who are not progressing up to their fullest potential. Causes of academic and motivational problems, and approaches to overcome them. Learning to learn, cultural alienation, and personal world view and interaction with effective teaching and learning.

574 Facilitating Group Change (3) Practical issues of group change. Analyses of group and individual experiences in all types of educational settings in relation to systems theory and collaborative learning theory. Needs of individuals and groups involved in change and roles of inside and outside change agents.

577 Educational Statistics (3) Applications of descriptive and inferential statistics to educational and instructional problems. Use of Internet sites and computer programs to analyze data. (Same as Educational Administra- tion 577.)

Recommended Background: 1 year of college mathematics and an elementary course in statistics or consent of instructor.

581 Student Assessment (3) Processes for assessing and reporting student progress; interpretation and use of available assessment data. Methods of assessment other than tests and measurements: portfolios, performance tasks, exhibitions.

582 Educational Research Fundamentals (3) Fundamentals of research methodology applicable to curriculum, instruction, and other areas of educational inquiry. Critical reading of research and development of skills needed for proposal development.

583 Survey Research (3) Introduction to survey (descriptive) research. Survey design and application focused on educational problems. Critical reading of research, methodological development in descriptive and survey areas.

585 Seminar in Gerontology (1) (See Health 585.)

593 Independent Study (1-3)

Grading: Satisfactory/No Credit or letter grade.

Repeatability: May be repeated. Maximum 15 hours.

600 Doctoral Research and Dissertation (3-15)

Grading Restriction: P/NP only.

Repeatability: May be repeated.

601 Professional Seminar (1) An introduction to doctoral study in educational psychology and counseling that explores research requirements, the meaning of scholarship in academic, resources, survival strategies for students, and related topics. (Same as Counselor Education 601.)

Grading Restriction: Satisfactory/No Credit grading only.

Credit Restriction: May not be used to meet the Educational Psychology 600 or Counselor Education 600 requirement.

Comment(s): Admission to a doctoral program in the Department of Educational Psychology and Counseling is required.

602 Directed Research (1-3) Instructor- or student-initiated group investigation of empirical and theoretical problems in educational and counseling psychology.

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated. Maximum 12 hours.

603 Special Topics (1-3) Instructor-initiated courses offered at convenience of unit on topics of interest.

Grading: Satisfactory/No Credit or letter grade.

Repeatability: May be repeated. Maximum 12 hours.

609 Advanced Seminar in Curriculum and Learning (3) Team-taught interdisciplinary seminar: trends, themes, and issues in curriculum and learning. Reading and discussions based on significant research and scholarly publications.

620 Seminar in Adult Education (3) Issues in adult education, theories and concepts, philosophical positions, research trends and methodologies.

(DE) Prerequisite(s): 520 or equivalent.

Registration Permission: Consent of instructor.

622 Advanced Seminar in Adult Development and Learning (3) Adult development and adult learning theory and research.

(DE) Prerequisite(s): 522 and 525.

Registration Permission: Consent of instructor.

630 Doctoral Seminar in Collaborative Learning (3) Issues, theories, concepts and research in collaborative learning.

Grading: Satisfactory/No Credit or letter grade.

Repeatability: May be repeated. Maximum 12 hours.

Comment(s): Requires admission to collaborative learning specialization.

635 Ethical, Legal, and Professional Issues in Psychology (3) (See Psychology 635.)

640 Seminar in Applied Educational Psychology (2) Issues, theories, concepts and research in applied educational psychology.

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated. Maximum 12 hours.

651 Seminar in Assessment and Evaluation (3) Trends and issues in student/client assessment, personnel evaluation, and program evaluation; and examination of current state, regional, and national assessment and evaluation projects.

Registration Permission: Consent of instructor.

652 Application of Evaluation and Assessment: Principles and Procedures (3) Systems designs, instruments, procedures, reporting formats used in personnel and program evaluation and student assessment; analysis, synthesis, and interpretation of data sets.

(DE) Prerequisite(s): 630.

653 Designing and Implementing Personnel Evaluation Systems (3) Models and methods of assessing performance of P-12 educators and other professionals. Critique of systems currently in use and design of evaluation systems.

654 Designing Project Evaluations: Theory and Application (3) Evaluation trends and issues. Theoretical frameworks to design evaluation studies for various educational programs.

655 Research in Psychoeducational Studies (1) Data analyses, collection, and interpretation.

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated. Maximum 9 hours.

662 Applied Research Design (3) Planning of empirical investigations, collection of data, and drawing of inferences from evidence gathered.

Recommended Background: 2-course sequence in statistics.

663 Scale Construction (3) Development, pilot testing, and revision of attitude inventories, rating scales, and other paper-and-pencil techniques for assessing beliefs, personality characteristics, and opinion.

(DE) Prerequisite(s): Counselor Education 525 and a 2-course sequence in statistical analysis.

668 Practicum in Instructional Planning (3) Development and management of course or program of instruction in educational psychology.

(DE) Prerequisite(s): 665 or consent of instructor.
669 Internship in Educational Psychology (1-6) Supervised employment in unit approved educational psychology internship sites. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 12 hours.

670 Internship in Evaluation (1-3) Experiences in educational evaluation applied to instructional improvement. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 9 hours. Recommended Background: Program prerequisites. Registration Permission: Consent of instructor.

671 Mediated Learning Theory (3) Feuerstein's theory of mediated learning experience and its connections to work of Piaget, Vygotsky and others. Implications for transformational learning and building of learning communities for learners of all ages. Comment(s): Requires admission to doctoral program or consent of instructor.

673 Collaborative Learning (3) Theories of collaborative learning and research related to facilitating collaborative learning in professional practice settings. (DE) Prerequisite(s): 513 and 617 or consent of instructor.

677 Advanced Educational Statistics (3) Applications of parametric and nonparametric statistical inference to educational and instructional problems. Use of computer programs and Internet sites in analyzing data. (DE) Prerequisite(s): 577. Registration Permission: Consent of instructor.

693 Independent Study (1-3) Grading: Satisfactory/No Credit or letter grade. Repeatability: May be repeated. Maximum 15 hours.

Electrical and Computer Engineering (319)

400 Senior Design (5) A major design project that focuses the student's attention on professional practice, accumulated background of curricular components, and recent developments in the field. This major design emphasis is directed to topics within the field of electrical and computer engineering. Includes Level 3 design projects which require laboratory work. (DE) Prerequisite(s): 316, 335, 342, and 355.

415 Automatic Control Systems (3) Automatic control systems for physical systems with linear models. The methods presented include steady-state error analysis, stability, root locus, Nyquist theory, and Bode plots. (DE) Prerequisite(s): 316.

416 Computer Control Systems (3) Computer controlled systems using state variables and z-transform model representations with sampling theory and its effect of digital control design. Design of digital controllers in both the state space and frequency domains. Includes Level 1 design projects. (DE) Prerequisite(s): 316.

421 Electric Energy Systems (3) Structure and operation of electrical energy grid, load flow, economic loading, planning, control, and reliability. Balanced and unbalanced faults, system protection, and system stability. Includes Level 1 design projects. (DE) Prerequisite(s): 316.


431 Operational Amplifier Circuits (3) Linear and non-linear active circuits using commercial operational amplifiers. Includes operational, instrumentation, isolation, bridge, rms and logarithmic converters, multipliers and function generators, rectifiers, references, active filters, modulation and demodulation, sinusoidal generators. Noise fundamentals and calculations in op-amp circuits. Design for specified pole-zero functions. Emphasis on applications including transducer interfacing. Includes Level 1 design projects which require laboratory work. (DE) Prerequisite(s): 316, 332, and 342.

432 Electronic Amplifiers (3) Feedback amplifier principles; wideband linear amplifier design; low-noise preamplifier design; audio power amplifier design. Introduction to radio-frequency amplifier design; oscillator principles. Includes laboratory experiments and design projects. Includes Level 2 design projects which require laboratory work. (DE) Prerequisite(s): 431.

441 Digital Communication (3) Quantization and pulse code modulation. Binary and M-ary signaling, spectra of line codes, link budget analysis, binary communication in the presence of noise, matched filtering and equalization, bandpass digital transmission, introduction to multiple access techniques. Includes Level 1 design projects. (DE) Prerequisite(s): 342.

442 Communication System Design (3) Application of communication theory to system design. Hardware and software design and simulation. Modern communication topics. Includes Level 1 design projects. (DE) Prerequisite(s): 441.

443 Antennas and Propagation (3) Introduction to antenna theory including fundamental antenna concepts and parameters (directivity, gain, patterns, etc.) and signal propagation. Theory and design of linear and loop antennas, arrays, and other simple structures. Includes Level 1 design projects. (DE) Prerequisite(s): 316, 341, and 342.

446 Electromagnetic Compatibility (3) Principles and practices to avoid interference among and within electrical devices. Parameters and coupling for dipole, biconical, and log-periodic antennas. High frequency effects in circuit elements. Radiated and conducted emissions and susceptibility. Crosstalk, shielding, electrostatic discharge, and EMC regulations. Includes Level 1 design projects which require laboratory work. (DE) Prerequisite(s): 316, 341, and 342.

451 Computer Systems Architecture (3) Architecture and design of microcomputer systems with microprocessors or microcontrollers. Instruction set architectures, software interfaces, processor structures, memory hierarchy, and interfacing. Includes Level 1 design projects which require laboratory work. (DE) Prerequisite(s): 355.

453 Introduction to Computer Networks (3) Principles of computer networking and software design of network protocol with an emphasis on the internet and TCP/IP protocol suite. Includes Level 1 design projects. (DE) Prerequisite(s): 206.

471 Introduction to Pattern Recognition (3) Introduction to statistical decision theory, adaptive classifiers, and supervised and unsupervised learning. Students will explore the application of these techniques in areas of current interest such as face recognition, speech processing, remote sensing, data mining and bioinformatics. Includes Level 1 design projects. (DE) Prerequisite(s): 316. Comment(s): Non-majors must obtain consent of instructor.

472 Introduction to Digital Image Processing (3) Basic methods for digitizing, storing, processing, and displaying images. Computational procedures for image enhancement, restoration, coding, and segmentation. Includes Level 1 design projects. (DE) Prerequisite(s): 316. Comment(s): Non-majors must obtain consent of instructor.

481 Power Electronics (3) Principles and characteristics of power semiconductor devices, single-phase and polyphase phase-controlled converters, converter control, ac voltage controller. Includes Level 1 design projects and laboratory work. (DE) Prerequisite(s): 316, 325, and 336.

482 Power Electronic Circuits (3) Voltage-fed inverters, PWM principles, control of inverters, dc-dc converters, dc machine drives, resonance converters, step motor drives, brushless dc machine principles. Includes Level 1 design projects. (DE) Prerequisite(s): 481.

491 Special Topics (3) Relating to basic design and current practice. Includes Level 1 or Level 2 design projects which may require laboratory work. Recommended Background: Completion of all junior electrical and computer engineering courses or consent of instructor.

495 Senior Seminar (1) Current topics in electrical engineering. Grading: Satisfactory/No Credit or letter grade. Recommended Background: Completion of all junior electrical and computer engineering courses or consent of instructor.

500 Thesis (1-15) Grading Restriction: P/NP only. Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of graduate committee.

501 Project in Lieu of Thesis (3) Capstone course taken under supervision of student’s major professor and master’s committee. Individual project involving literature survey, development of some software or hardware, testing, writing a report paper or journal paper, or other suitable project. Repeatability: May be repeated. Maximum 6 hours.
502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.  
Grading Restriction: Satisfactory/No Credit grading only.  
Repeatability: May be repeated.  
Credit Restriction: May not be used toward degree requirements.


504 Random Process Theory for Engineers (3) Probability and random variables as approached by set theory. Statistical averages and transformations of random variables. Random processes, stationarity, correlation functions and temporal analysis, power spectrum and spectral analysis as applied to response of systems to random signals.

505 Digital Signal Processing I (3) Discrete-time signals and systems, sampling, fast Fourier transform (FFT) and fast convolution, design of FIR filters and IIR filters.

506 Digital Signal Processing II (3) Filter properties in the Z and Fourier transform domains, structures for digital filters, sampling and reconstruction, hardware implementation of digital filters.

507 Application of Linear Algebra in Engineering Systems (3) (See Chemical Engineering 507.)

509 Multidisciplinary Project (1) (See Industrial Engineering 509.)

511 Linear Systems Theory (3) State space models of linear dynamical systems, linear algebra, state transition map, matrix exponential, controllability, observability, realization theory, and stability theory.  
(DE) Corequisite(s): 507.

512 Multivariable Linear Control System Design (3) Design of controllers, for multivariable systems, which satisfy constraints on robustness to plant uncertainties, disturbance rejection, command following.  
(DE) Prerequisite(s): 511.

517 Reinforcement Learning in Artificial Intelligence (3) Principles and methods for reinforcement learning and sequential stochastic control; Markov decision problems; dynamic programming; temporal difference learning; design considerations for hardware and software.  
Registration Permission: Consent of instructor.

521 Power Systems Analysis I (3) Matrix-vector representations of power networks, sequence modeling of power system components, unbalanced shunt and series faults. Formulating and solving problems in matrix-vector form with application to large scale power systems.  
(DE) Prerequisite(s): 421 or equivalent.

522 Power Systems Analysis II (3) Operation and control of interconnected power systems, transient and dynamic stability. Formulating and solving problems in matrix-vector form with application to large-scale power systems.  
(DE) Prerequisite(s): 521.

523 Power Electronics and Drives (3) Forced commutated inverters, advanced PWM techniques, current-fed inverters, drive system modeling, vector and scalar control of induction machines, parameter variations, control principles of synchronous machines.

525 Alternative Energy Sources (3) Energy outlook, interconnection issues of distributed energy resources, efficiency of power production, electric energy conversion and storage. Photovoltaics, fuel cells, wind turbines, microturbines.

531 Advanced Analog Electronics I (3) Physical operation of modern electronic devices; semiconductor devices: diodes, bipolar transistors, JFETs, and MOS-FETs. Small-signal equivalent circuits and noise models of active devices. Project laboratory.  
(DE) Prerequisite(s): 431 and 432 or consent of instructor.

(DE) Prerequisite(s): 531.

533 Advanced MOS Concepts and VLSI Design (3) Physics of MOS capacitors and transistors, derivation of V-I relation expressing subthreshold, threshold, and saturation region behavior; short-channel effects in scaled-down transistors; scaling laws; VLSI fabrication technologies; silicon-on-insulator technology; design and layout of digital integrated circuits. Includes laboratory assignments emphasizing computer aids in VLSI design; schematic capture, circuit simulation, and layout of custom integrated circuits.  
Registration Permission: Consent of instructor.

541 Electromagnetic Fields (3) Maxwell’s equations, general relativity, wave reflection and transmission, generalized media, guided waves, radiation from current elements.  
(DE) Prerequisite(s): Mathematics 404.

542 Communication Systems Simulation (3) Simulation is used as a design and performance evaluation tool for communication systems. Simulation models for stochastic signals and system components including decoders, modulators, non-linear power amplifiers, bit and carrier synchronizers, equalizers and receivers are discussed along with the error effects resulting from the use of these models. Techniques for modeling time-varying and nonlinear systems are included. Monte Carlo techniques, semi-analytic techniques and variance reduction methods are covered.

(DE) Prerequisite(s): 504.

(DE) Prerequisite(s): 543.

545 Introductory Microwave Networks and Components (3) Scattering and transfer representation for multiports; unilateral and bilateral microwave and millimeter wave devices. Component and system parameter measurement by modern network analyzers. Electronic oscillators and amplifiers, frequency sweep oscillators, transit time devices, parametric devices, mixers, switches.


552 Digital System Design II (3) State identification and structure realization of sequential machines. Digital system architecture design: microprogramming and interrupt control.  
(DE) Prerequisite(s): 551.

553 Computer Networks (3) Principles of computer networks with a focus on the Internet and TCP/IP protocol suite. In-depth study of several core issues and design options involved. Employs a top-down approach in the discussion from the application layer down to the physical layer. An emphasis is given on protocol design and performance analysis. Other topics include ad-hoc networking, network security and network simulation. Assignments that require hands-on networking and programming skills will be issued in order to solve concrete problems.

557 Computer Architecture and Design (3) An exploration of the central issues in computer architecture: instruction set design, addressing and register set design, control unit design, microprogramming, memory hierarchies (cache and main memories, mass storage, virtual memory), pipelining, bus organization, RISC (Reduced Instruction Set Computers), and CISC (Complex Instruction Set Computers), implementation issues, technology trends, architecture modeling and simulation.

561 Plasma Diagnostics I (3) Principles of active, passive, perturbing and nonperturbing diagnostic methods used in low temperature plasmas, and high temperature plasmas of interest in fusion research. Laboratory safety, data reduction and presentation, microprocessor based data handling and analysis, and reduction of time series data.  
(DE) Prerequisite(s): 461 and 463 or consent of instructor.

562 Plasma Diagnostics II (3) Laboratory instruction in operation of plasma diagnostic instruments in plasma science laboratory, experience with high voltage, vacuum, RF, and digital data handling techniques.  
(DE) Prerequisite(s): 561.
565 Industrial Plasma Engineering I (3) Low temperature plasma physics relevant to industrial applications: kinetic theory, particle dynamics in electric and magnetic fields, gaseous discharges, and electron, ion, and plasma sources. Comment(s): Requires graduate standing or consent of instructor.

566 Industrial Plasma Engineering II (3) Continuation of 565 to industrial applications: ion implantation in solids, plasma deposition and etching, space propulsion systems, plasma chemistry, plasma lighting devices, insulating dielectrics and breakdown, materials processing with plasma arcs, and related topics. (DE) Prerequisite(s): 565 or consent of instructor.

571 Pattern Recognition (3) Decision-theoretic and structural approaches to pattern recognition. Deterministic and statistical decision rules, feature extraction and representation, syntactic and semantic methods. (DE) Prerequisite(s): 565 or consent of instructor.

572 Digital Image Processing (3) Spatial and transform processing of images. Neighborhood operators, image enhancement, restoration, and coding. Segmentation techniques. Image representation and description. (DE) Prerequisite(s): 472 or consent of instructor.

573 3D Methods in Robot Sensing, Vision and Visualization (3) Tools used in image synthesis and analysis; 3D recovery by nonlinear estimation. Projective geometry, analytic photogrammetry, range sensing, lighting models, differential geometry, and 3D rendering.

574 Advanced Computer Vision (3) Principles and methods for analysis of time and/or space varying imagery. Imaging physics and color theory, shape-form-X, feature correspondence and tracking, stereo Vision, structure from motion, optical flow, motion-based segmentation, and selected topics from current literature. (DE) Prerequisite(s): 573 or consent of instructor.

594 Culminating Integrated Project Report (3) (See Mechanical Engineering 594.)

598 Graduate Seminar (1) Topics of interest discussed in weekly seminar. Grading: Satisfactory/No Credit or letter grade. Repeatability: May be repeated. Maximum 6 hours.

599 Special Topics (1-3) Repeatability: May be repeated. Maximum 9 hours.

600 Doctoral Research and Dissertation (3-15) Grading Restriction: P/NP only. Repeatability: May be repeated.

613 Nonlinear Systems Theory (3) Introduction to nonlinear systems theory with applications to control systems. Specific emphasis is given to Lyapunov Theory, Adaptive Control, Feedback Linearization and Sliding Mode Control. (DE) Prerequisite(s): 511 or equivalent.

615 Control of Electric Machines (3) Models in the form of nonlinear differential equations are developed for the induction, synchronous, brushless DC and switched reluctance motors. High performance methods of control based on state space techniques are developed including field-oriented and input-output linearization control.

617 Special Topics in Systems Theory I (3) Topics of current interest to students and faculty: large-scale systems, model-order reduction, algebraic- and geometric-system theories, and advanced-design methods. Repeatability: May be repeated. Maximum 6 hours. (DE) Prerequisite(s): 511. Registration Permission: Consent of instructor.

618 Special Topics in Systems Theory II (3) Topics of current interest to students and faculty: large-scale systems, model-order reduction, algebraic- and geometric-system theories, and advanced-design methods. Repeatability: May be repeated. Maximum 6 hours. (DE) Prerequisite(s): 617. Registration Permission: Consent of instructor.

623 Advanced Power Electronics and Drives (3) Phase-controlled cycloconverters, cycloconverter-fed ac drives, resonant converters, vector and scalar control of synchronous machines, static Kramer drives, static Scherbius drives, VSCF generation, modern control theory in ac drives.

625 Utility Applications of Power Electronics (3) Electric power quality, harmonics, voltage sag, reactive power compensation, transient stability. Structure and control of power converters, multilevel converters, active power filters, static series and shunt compensators, FACTS, HVDC. (DE) Prerequisite(s): 521 and 523 or consent of instructor.

626 Solid State Power Semiconductors (3) Semiconductor physics and circuit models. Power diodes, power MOSFETs, thyristors, GTO thyristors, IGBTs, emerging devices and circuits. Wide band gap power semiconductors. Solar cell device physics. (DE) Prerequisite(s): 523 or consent of instructor.

629 Traction Drives (3) Operating principles of traction drives for electric and hybrid electric vehicles. Low speed constant torque control mode and high speed constant power control mode. Ideal performance of the doubly fed, separately excited dc machine and the wound rotor synchronous machine. High CPSR drives based on singly-fed machines including the induction, permanent magnet synchronous, brushless dc and switched reluctance motors. Other contemporary topics in traction drive applications. (DE) Prerequisite(s): 523 or consent of instructor.

631 Advanced Topics in Electronic Instrumentation I (3) Based on particular interests of students. Fundamental physical processes in instrumentation transducers: thermoelectric, magnetoelectric, electromagnetic and quantum-mechanical devices. (DE) Prerequisite(s): 531 and 532. Registration Permission: Consent of instructor.

632 Advanced Topics in Electronic Instrumentation II (3) Physical operation of modern discrete, monolithic, and hybrid electronic structures and their application in signal processors. Resolution, sensitivity, response time, and noise considerations in signal processors used in modern electronic instrumentation. (DE) Prerequisite(s): 631.

642 Wireless Communications (3) Fundamental theory and design of wireless communications systems; mobile radio propagation; modulation techniques; coding, diversity and equalization. Wireless systems and standards. (DE) Prerequisite(s): Satisfactory completion of 441 and 504.

643 Detection and Estimation Theory (3) Detection theory; coding theory; system identification. Signals with unknown parameters; optimal filter synthesis; adaptive systems; sequential detection; suboptimal detection. (DE) Prerequisite(s): 504 or consent of instructor.

644 Coding and Information Theory (3) Structure of algebraic and probabilistic codes; linear codes, convolutional codes, error-correcting codes, decoding methods. Identification schemes: deterministic, stochastic, and hierarchical methods. (DE) Prerequisite(s): 643.

651 Computer-Aided Design of VLSI Systems I (3) Fabrication of microelectronic devices; computer architecture design; algorithmic state machines; partitioning; structured design methodology. (DE) Prerequisite(s): 551 and 552 or consent of instructor.

652 Computer-Aided Design of VLSI Systems II (3) Computer-aided design tools; design and implementation of fully custom very large scale integrated (VLSI) circuits; design for testability; testing of fabricated chips. (DE) Prerequisite(s): 651.

653 Advanced Computer Networks (3) Topics of current interest to students and faculty: high-speed Internet switch/router architectures, routing algorithms and protocols, network performance analysis and packet scheduling algorithms. Coursework will include theoretical as well as practical (simulation-based) assignments. (DE) Prerequisite(s): 553. Registration Permission: Consent of instructor.

657 Advanced Computer Architecture and Design (3) Advanced computer architecture issues including topics such as superscalar architectures, parallel algorithms, principles of parallelism detection and vectorizing compilers, interconnection networks, SIMD/MIMD machines, processor synchronization, shared and distributed memory, data coherence, multiprocessors, multicomputers, dataflow machines, special purpose processors. (DE) Prerequisite(s): 557.

658 Computer and Telecommunications Systems Performance Evaluation (3) Introduction to the basic tools of computer and communications systems analysis and evaluation. Deterministic and stochastic modeling concepts are presented. Queueing theory and discrete event (DES) simulation methods are studied with application to a variety of examples drawn from the computer and communications performance evaluation literature. A standard DES language is used in modeling and simulation studies. Topics of current interest such as computer input/output models, mass memory, bus models, and communications network models are discussed. A modeling project is typically required. (DE) Prerequisite(s): 504.
659 Digital Systems Verification (3) Three critical issues for robust digital system designs are system errors, manufacturing faults, and failures during operation. This course covers digital system verification, testing, and reliability for both timing and logic, in order to prepare students to deal with these in real designs. Verification will cover formal verification for logic and timing, and contrast with simulation. Methods for generating test vectors, scan testing, and built-in self-test will be covered. MTBF will be calculated for several small systems with emphasis on models and their limitations. (DE) Prerequisite(s): 551 and 557.

663 Advanced Plasma Physics I (3) Basic concepts of high temperature plasma physics. Magnetohydrodynamics and kinetic descriptions of plasma, plasma transport, plasma waves, equilibrium, and stability. (DE) Prerequisite(s): 541, 542 and 461, 462 or 563, 564, or consent of instructor. Comment(s): 663 and 664 must be taken in sequence.

664 Advanced Plasma Physics II (3) Plasma heating and radiation phenomena. Advanced topics of current interest. (DE) Prerequisite(s): 663.

671 Image Processing and Robotics I (3) Three-dimensional scene modeling and recognition, multi-sensor systems. (DE) Prerequisite(s): 572 or 573 or consent of instructor.

672 Image Processing and Robotics II (3) Stereovision, shape theory. (DE) Prerequisite(s): 671.

673 Image Processing and Robotics III (3) Time-varying imagery, path planning and navigation. (DE) Prerequisite(s): 672.

691 Advanced Graduate Seminar (1) Research in department. Grading: Satisfactory/No Credit or letter grade. Repeatability: May be repeated. Maximum 6 hours.

692 Special Topics (1-3) Advanced topics of current interest to PhD students in electrical engineering. Repeatability: May be repeated. Maximum 9 hours.

Elementary Education (322)

445 Early Childhood Education: Program Development and Teaching in Kindergarten (3) Curriculum planning, classroom organization and management practices for teaching young children. Relationship of kindergarten to total elementary school.

504 Studies and Theory in Language Development (3) Studies and theory of language development in children. Recommended Background: An elementary school language arts course or consent of instructor.

505 Elementary and Middle School Teaching Methods II (6) Applied methods of teaching reading, language arts, science, social studies and mathematics: accommodation strategies for students with diverse needs. (DE) Corequisite(s): 575. Recommended Background: Course in elementary and middle school teaching methods.

515 Seminar (1-3) Curriculum, instructional technology, elementary education, secondary education, or social foundations as related to goals of students' programs.


527 Elementary School Curriculum (3) Examination, evaluation and application of curriculum designs in elementary school. Trends and issues which affect elementary education.

528 Teaching Language Arts Elementary and Middle School (3) Recent trends and current materials and methods in teaching elementary language arts (except reading).

550 Assessment and Correction of Language Arts Difficulties (3) Procedures and materials for diagnosing and correcting language arts difficulties; analysis of children's work.

566 Curriculum for Early Childhood Education (K-3) (3) Theoretical foundations and current research in content and skill areas of curriculum for Kindergarten-Grade 3; application to local school setting. Repeatability: May be repeated. Maximum 9 hours. Registration Permission: Consent of instructor.

567 Application of Theory in Early Childhood Education (K-3) (3) Principles and practices from selected theoretical orientations. Repeatability: May be repeated. Maximum 6 hours.

584 Seminar in Early Childhood Education (3) Analysis of research and theory in early childhood education; educative process of young children. Repeatability: May be repeated. Maximum 6 hours.

606 Research in Elementary Education (3) Analysis of research in elementary education with application to classroom teaching. Recommended Background: Research course.

650 Advanced Studies in Early Childhood Education (3) Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 6 hours. Recommended Background: 2 graduate courses in early childhood education. Registration Permission: Consent of instructor.

651 Advanced Studies in Elementary School Language Arts (3) Selected issues in elementary school language arts. Recommended Background: Graduate course in elementary school language arts or consent of instructor.

Engineering Management (328)

501 Capstone Project (3-6) Application-oriented project to show competence in major academic area. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 6 hours.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Credit Restriction: May not be used toward degree requirements.

532 Productivity and Quality Engineering (3) Productivity and quality measures defined and used to analyze current competitive position of important sectors of American industry with respect to national and international competition. Study of management theories and systems which promote or inhibit productivity or quality improvements.

533 Theory and Practice of Engineering Management (3) Principles of engineering management, including: business and organization design, culture, leadership, marketing and competition in global economy, motivation and performance management, empowerment, organizational behavior, and diversity. Systems thinking, learning organizations, and systems dynamics modeling. Principle application to work settings and case studies.


535 Management of Technology (3) Creativity and innovation; incorporation of advanced technology equipment; application of systems thinking; new methods in business and manufacturing organizations; justifying technology; assimilating and managing change; changing management roles; and impacts of new technologies. (DE) Prerequisite(s): 538 and Industrial Engineering 518.

536 Project Management (3) Development and management of engineering technology projects. Proposal project preparation; resource and cost estimating; and project planning, organizing, and controlling: network diagrams and other techniques. Role of project manager: team building, conflict resolution, and contract negotiations. Discussion of typical problems and alternative solutions. Case studies and student projects. (DE) Prerequisite(s): 537 or consent of instructor.

537 Analytical Methods for Engineering Managers (3) Survey of management analysis and control systems through industrial engineering techniques. Qualitative and quantitative systems and methods analysis, work measurement, incentive systems, wage and salary development, production and inventory control, facility layout, linear programming, and applied operations research techniques. Credit Restriction(s): No credit for student with undergraduate degrees in industrial engineering.
538 New Venture Formation (3) Factors other than mechanical or chemical which enter into successful establishment of manufacturing or service enterprise. Organizational and financial planning and evaluation. Cost and location studies and market analysis to determine commercial feasibility of new ventures. (DE) Prerequisite(s): 539.

539 Strategic Management in Technical Organizations (3) Strategic planning processes and strategic management in practice; corporate vision and mission; product, market, organizational, and financial strategies; external factors; commercialization of new technologies; and competition and beyond. (DE) Prerequisite(s): 533 and Industrial Engineering 518 or consent of instructor.


543 Legal and Ethical Aspects of Engineering Management (3) Legal aspects imposed by government and ethical considerations in engineering practice. Selected readings, lecture, discussion, and student presentations. Current topics from government and industry.

Engineering Science (335)

500 Thesis (1-15) Grading Restriction: P/NP only. Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Credit Restriction: May not be used toward degree requirements.


529 Fatigue of Engineering Materials (3) Fatigue life prediction, crack initiation, crack propagation. Variable amplitude loading, multi-axial loading, environmental fatigue, creep fatigue, metallurgical and microstructural variables, fractography, non-metals. Registration Permission: Consent of instructor.

533 Dynamics (3) (See Mechanical Engineering 533.)

534 Mechanical Vibrations (3) (See Mechanical Engineering 534.)

539 Continuum Mechanics (3) Cartesian tensors, transformation laws, basic continuum mechanics concepts; stress, strain, deformation, constitutive equations. Conservation laws for mass, momentum, energy. Applications in solid and fluid mechanics. (Same as Aerospace Engineering 539; Biomedical Engineering 539; Mechanical Engineering 539.)

541 Fluid Mechanics I (3) (See Mechanical Engineering 541.)

542 Fluid Mechanics II (3) (See Mechanical Engineering 542.)

551 Finite Elements for Engineering Applications (3) Modern computational theory applied to conservation principles across the engineering sciences. Weak forms, extremization, boundary conditions, discrete implementation via finite element, finite difference, finite volume methods. Asymptotic error estimates, accuracy, convergence, stability. Linear problem applications in 1, 2 and 3 dimensions. Experiments via non-smooth data, unsteady, spectral analysis techniques, coupled equation systems. Computational projects in heat transfer, structural mechanics, mechanical vibrations, fluid mechanics, heat/mass transport. (Same as Aerospace Engineering 551; Biomedical Engineering 551; Mechanical Engineering 551.)


553 Computational Solid Mechanics (3) Finite element techniques in structural mechanics and linear elasticity. Energy method and weak form formulations; isoparametric elements, numerical quadrature. Equation solving methods, matrix and iteration techniques. Applications in beams, plates and shells; use of representative commercial finite element software. (Same as Aerospace Engineering 553; Mechanical Engineering 553.)

559 Advanced Mechanics of Materials I (3) (See Mechanical Engineering 559.)


566 Optical Engineering I (4) Wave optics; scalar diffraction theory; introduction to Fourier optics; ray or geometric optics; lens, mirror, gratings; paraxial design methods; introduction to aberrations.

568 Optical Engineering II (4) Statistical optics; spontaneous and induced emission: black and gray body radiation; incoherent, partial and totally coherent radiation; mutual coherence function; detectors, radiometry. (DE) Prerequisite(s): 566.

571 Biomechanics of Hard and Soft Tissue (3) Introduction to terminology, physiology, and analytical methods for mechanics of living tissue. Continuum mechanics analysis of hard and soft tissue problems. Biological fluids. Flow properties of blood, rheology of blood in microvessels; bioviscoelasticity of fluids and solids, mechanical properties of blood vessels; skeletal, heart and smooth muscle; bone and cartilage. Research paper. (Same as Biomedical Engineering 571.)

572 Biomedical Fluid Mechanics (3) Application of fluid mechanics theory to fluid flows in living systems. Solutions to differential equations of motion for blood flow in arteries, veins and the microcirculation. Measurement of flow properties of blood and other biological fluids. Analysis of pathological flows, blood flow through arterial stenoses. Study of flow through artificial heart valves and in extracorporeal devices. (Same as Biomedical Engineering 572.)

577 Neural Networks in Engineering (3) (See Nuclear Engineering 577.)

578 Fuzzy Systems in Engineering (3) (See Nuclear Engineering 578.)


585 Green Engineering (3) (See Chemical Engineering 581.)

595 Seminar (1) All phases of engineering science, reports on current research at UTK and UTSA. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 20 hours.
600 Doctoral Research and Dissertation (3-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.


652 Advanced Computational Fluid Dynamics Practice (3) Applications of modern CFD theory and code practice for Euler and Navier-Stokes conservation systems. Computer projects in incompressible/compressible flow, viscous, turbulent, reacting and/or inviscid/potential subsonic to hypersonic flows. (Same as Aerospace Engineering 662; Mechanical Engineering 652.) (DE) Prerequisite(s): 645 and 651.

657 Computational Mechanics Seminar (1) Current developments in computational fluid/thermal/structural mechanics. Repeatability: May be repeated. Maximum 20 hours. Comment(s): For departmental thesis students only.

659 Advanced Mechanics of Materials II (3) (See Mechanical Engineering 659.)

671 Advanced Topics in Applied Artificial Intelligence (3) (See Nuclear Engineering 671.)

681 Advanced Topics in Engineering Mechanics (3) Advanced problems in mechanics, group or individually. Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of instructor.

English (339)
Students enrolling in English graduate courses must first register in the Office of the Director of Graduate Studies in 306 McClung Tower.

401 Medieval Literature (3) Reading and analysis of a selection of literary works from the Old and Middle English period, as well as some continental texts; most will be read in modern English translation, and no previous knowledge of Middle English is required. (Same as Medieval Studies 405.)

402 Chaucer (3) Reading and analysis of the Canterbury Tales and Troilus and Criseyde in Middle English. (Same as Medieval Studies 406.)

403 Introduction to Middle English (3) Survey of the language and literature of England from the 12th through the 15th centuries. Reading of prose works and shorter poetry will be done in Middle English with special attention paid to grammar, style, dialect, and language change. The class will explore the culture of medieval England through critical essays, histories, and supplementary texts in translation.

404 Shakespeare I: Early Plays (3) Shakespeare’s dramatic achievement before 1601. Reading and discussion of selected plays from romantic comedies, including Twelfth Night; English histories, including Henry IV; and early tragedy, including Hamlet.

405 Shakespeare II: Later Plays (3) Shakespeare’s dramatic achievement between 1601 and 1613. Reading and discussion of selected plays from great tragedies, including Othello; problem plays, including Measure for Measure; and dramatic romances, including The Tempest.

406 Renaissance Drama (3) English theatre between 1590 and 1640. Representative plays by Shakespeare’s contemporaries — Marlowe, Webster, and Jonson.

409 Spenser and his Contemporaries (3) Principal achievements in prose and poetry of 16th-century authors — Spenser, Wyatt, Marlowe, More, Sidney, and Bacon.


411 Literature of the Restoration and Early 18th Century: Dryden to Pope (3) Survey of English literature and culture from 1660 to 1745.

412 Literature of Later 18th Century: Johnson to Burns (3) Survey of English literature and culture from 1745 to 1800.

413 Restoration and 18th Century Genres and Modes (3) Study of one major genre or literary mode such as drama, novel, poetry, nonfiction, prose, satire, romance, or epic written between 1660 and 1800. Repeatability: May be repeated. Maximum 6 hours.

414 Romantic Poetry and Prose I (3) Emphasis on Wordsworth, Coleridge, and Blake; with readings from Lamb, De Quincey, and other prose writers.

415 Romantic Poetry and Prose II (3) Emphasis on Keats, Shelley and Byron; with readings from Hazlitt, Peacock, and other prose writers.

416 Early Victorian Literature (3) May include poetry by Tennyson and the Browning; prose by Carlyle, Newman, and Mill.

419 Later Victorian Literature (3) May include poetry by the Pre-Raphaelites, Arnold, Hopkins, and Hardy; prose by Arnold, Ruskin, and Carroll; plays by Gilbert and Wilde.

420 The 19th-Century British Novel (3) Major novelists from Scott to Hardy.

421 Modern British Novel (3) Authors such as Joyce and Woolf through contemporary British fiction writers.

422 Women Writers in Britain (3) Emphasis on the literary consciousness and works of women writers in Britain. Course content will vary. Authors covered may include Marie de France, Margery Kempe, Aemilia Lanyer, Elizabeth Cary, Aphra Behn, Frances Burney, Mary Wollstonecraft, Mary Shelley, George Eliot, Virginia Woolf, and Doris Lessing. (Same as Women’s Studies 422.) Repeatability: May be repeated. Maximum 6 hours.

423 Colonial and Post-Colonial Literature (3) Emphasis on historical and theoretical methodologies for reading colonial and post-colonial literature. Repeatability: May be repeated with instructor’s consent. Maximum 6 hours.

431 Early American Literature (3) From the earliest texts to 1830, including exploration and discovery, Native American, colonial, revolutionary, and early national works.

432 American Romanticism and Transcendentalism (3) Prose and poetry of the American Renaissance from 1830 to the end of the Civil War. Includes writers such as Cooper, Emerson, Fuller, Poe, Thoreau, Hawthorne, Melville, Douglass, Jacobs, Whitman, and Dickinson.

433 American Realism and Naturalism (3) Literature from the time of the Civil War to World War I. Includes writers such as Alcott, Twain, Howells, James, Jewett, Harper, Crane, Norris, and Wharton.

434 Modern American Literature (3) World War I to the present.

435 American Novel before 1900 (3) Traces the development of the American novel from the late 18th to the late 19th centuries. Includes such writers as Rowson, Brown, Cooper, Hawthorne, Melville, Stowe, James, Twain, and Dreiser.

436 Modern American Novel (3) Authors such as Faulkner, Steinbeck, Welty.

441 Southern Literature (3) Southern writing from colonial period into the 20th century, including frontier humorists, local color writers, and the Southern Literary Renaissance.

442 American Humor (3) Development of American humor from the early 19th century into the 20th century; with particular emphasis on Mark Twain. (Same as American Studies 442.)

443 Topics in Black Literature (3) Content varies according to particular genres, authors, or themes from 1845 to present, including Langston Hughes and the Harlem Renaissance, Richard Wright and Gwendolyn Brooks, writing by black women, international black literature in English, and black American autobiography. (Same as Africana Studies 443.)


452 Modern Drama (3) Survey of British, American, and international drama from 1880 to the end of World War II. Includes such playwrights as Ibsen, Chekhov, Shaw, Synge, O’Neill, Glaspell, Treadwell, Hughes, Pirandello, Brecht, and Wilder. (Same as Comparative Literature 452.)
453 Contemporary Drama (3) Survey of British, American, and international drama since World War II. Includes such playwrights as Williams, Miller, Beckett, Dürrenmatt, Stoppard, Churchill, Shepard, Mamet, Shange, Wilson, Friel, Maponya, Highway, and Kushner.

454 20th-Century International Novel (3) Fiction in English translation from such writers as Kafka and Camus through contemporary authors. (Same as Comparative Literature 454.)

455 Persuasive Writing (3) Focuses on writing and analyzing persuasive texts in public, private, and academic contexts. (DE) Prerequisite(s): 360 or consent of instructor.

456 Comparative Fiction/Narrative (3) Formal, literary-historical, and thematic movements in post-WWII British and American fiction and international fiction in translation. Focus on postmodern novels and short stories written after 1945, but readings may include some newly influential narrative forms such as the graphic novel, hypertext and digital fiction and the nonfiction novel.

459 Contemporary Poetry (3) Formal, cultural, and thematic movements in poetry published since 1950. Includes such writers as Lowell, Bishop, Brooks, Ginsberg, Plath, Larkin, Ashbery, Heaney, Baraka, and Walcott.

460 Technical Editing (3) Editing technical material for publication. Principles of style, format, graphics, layout, and production management. (DE) Prerequisite(s): 360 or consent of instructor.

462 Writing for Publication (3) Principles and practices of writing for publication. Dissertations, theses, articles, and reports in science and technology. (DE) Prerequisite(s): 360 or consent of instructor.

463 Advanced Poetry Writing (3) Development of skills acquired in basic poetry-writing course. (DE) Prerequisite(s): 363 or consent of instructor.

464 Advanced Fiction Writing (3) Development of skills acquired in basic fiction-writing course. (DE) Prerequisite(s): 365 or consent of instructor.

466 Writing, Layout, and Production of Technical Documents (3) Principles of design for desktop publishing. Production of various documents to be incorporated into a professional portfolio. (DE) Prerequisite(s): 360 or consent of instructor.

470 Special Topics in Rhetoric (3) Topics vary. Repeatability: May be repeated with consent of department. Maximum 6 hours.

471 Sociolinguistics (3) Language in relation to societies. Theoretical and empirical study of language variation in individuals (style-shifting) and among social, cultural, and national/international groups. (Same as Linguistics 471.)

472 American English (3) Phonological, morphological, and syntactic characteristics of major social and regional varieties of American English, with attention to their origins, functions, and implications for cultural pluralism. (Same as Linguistics 472.)

474 Teaching English as a Second or Foreign Language I (3) Introduces major issues surrounding teaching ESL/EFL, including political implications of teaching ESL/EFL. Introduction to second language acquisition, learner variables in language learning, traditional and innovative approaches to ESL/EFL, basic features of American English grammar necessary for teaching ESL. (Same as Linguistics 474.)

476 Second Language Acquisition (3) How humans learn second languages. Examination of theoretical models and research on such issues as the effect of age on second language acquisition; the effect of age on second language acquisition; learner variables; sociocultural factors; and implications for second language instruction. (Same as Linguistics 476.)

477 Pedagogical Grammar for ESL Teachers (3) Aspects of English syntax and morphology presenting difficulties for non-native learners of English. Sentence structure and complex sentence structures; function and article system; and word tense, aspect, modality, and complementation. (Same as Linguistics 477.)

479 Literary Criticism (3) Historical survey of major works of literary criticism.


481 Studies in Folklore (3) Topics vary. Repeatability: May be repeated if topic differs. Maximum 6 hours.

482 Major Authors (3) Concentrated study of at least one of the most influential writers in British or American literary history (e.g., Donne, Pope, Austen, Tennyson, Whitman, Faulkner, Lawrence, Baldwin, or Morrison). Content varies.

483 Special Topics in Literature (3) Topic varies. Repeatability: May be repeated. Maximum 6 hours.

484 Special Topics in Writing (3) Original writing integrated with reading, usually taught by professional author. Repeatability: May be repeated. Maximum 6 hours.

485 Special Topics in Language (3) (Same as Linguistics 485.) Repeatability: May be repeated with consent of department. Maximum 6 hours.

486 Special Topics in Criticism (3) Special topics in theoretical and practical approaches to British and American literature. Content varies. Repeatability: May be repeated with consent of department. Maximum 6 hours.

489 Special Topics in Film (3) Particular directors, film genres, national cinema movements, or other topics. Content varies. (Same as Cinema Studies 489.) Repeatability: May be repeated with consent of department. Maximum 6 hours.

490 Language and Law (3) Language in the Anglo-American legal tradition. Focus on differences between spoken and written language, lexical and syntactic ambiguity; pragmatics; speech act analysis; and the language rights of linguistic minorities. (Same as Legal Studies 490; Linguistics 490.)

495 Introduction to Rhetoric and Composition (3) Introduction to the historical, theoretical, and empirical modes of inquiry in rhetoric and composition and their implications for the teaching of composition. (DE) Prerequisite(s): 355 or consent of instructor.

496 The Rhetoric of Legal Discourse (3) Nature of legal language and written discourse types (opinions, memoranda, briefs). Introduction to legal research resources and techniques. Issue identification and argumentative techniques. Students will write position papers, memoranda, and briefs. No prior legal knowledge necessary. (Same as Legal Studies 496.) Recommended Background: 355 or consent of instructor.

500 Thesis (1-15) Grading Restriction: P/NP only. Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. CreditRestriction: May not be used toward degree requirements.

505 Teaching Freshman Composition (3) Introduction to teaching Freshman English through study of various techniques and philosophies of composition. Required of all first-year teaching associates.

506 Introduction to Literary Research (3) Critical examination of aims of English studies, profession of English teacher, theory of literature, and methods of research: collection of information, evaluation of material, and transmission of results of scholarship.

507 Applied Criticism: The Rhetoric of Literary Forms (3) Study and application of ways in which major critics have analyzed form in poetry and prose fiction. Repeatability: May be repeated. Maximum 6 hours.

508 History of the English Language I (3) Phonological, morphological, and syntactic development of English language: Old and Middle English.

509 History of the English Language II (3) Phonological, morphological, and syntactic development of the English language with concentration on developments after 1500, especially in American English.

513 Readings in Medieval Literature (3) Reading and analysis of selected masterpieces of Old and Middle English literature and their continental sources in modern English. Repeatability: May be repeated. Maximum 9 hours.

514 Readings in Medieval Literature (3) Reading and analysis of selected masterpieces of Old and Middle English literature and their continental sources in modern English. Repeatability: May be repeated. Maximum 9 hours.
520Readings and Analysis in Selected Areas of 16th- and 17th-Century Prose, Poetry, and Drama (3) Content varies: genre, theme, literary movement, or other coherent emphasis.
Repeatability: May be repeated. Maximum 9 hours.

521 Readings and Analysis in Selected Areas of 16th- and 17th-Century Prose, Poetry, and Drama (3) Content varies: genre, theme, literary movement, or other coherent emphasis.
Repeatability: May be repeated. Maximum 9 hours.

530 Readings in English Literature of the Restoration and 18th Century (3) Topics vary. Genre: poetry, prose, fiction, drama; or period: Restoration, earlier 18th century, later 18th century.
Repeatability: May be repeated. Maximum 9 hours.

531 Readings in English Literature of the Restoration and 18th Century (3) Topics vary. Genre: poetry, prose, fiction, drama; or period: Restoration, earlier 18th century, later 18th century.
Repeatability: May be repeated. Maximum 9 hours.

540 Readings in English Literature of the 19th Century I (3) Content varies: genre, theme, literary movement, or other coherent emphasis.
Repeatability: May be repeated. Maximum 9 hours.

541 Readings in English Literature of the 19th Century II (3) Content varies: genre, theme, literary movement, or other coherent emphasis.
Repeatability: May be repeated. Maximum 9 hours.

550 Readings in American Literature (3) Content varies: genre, theme, literary movement, or other coherent emphasis.
Repeatability: May be repeated. Maximum 9 hours.

551 Readings in American Literature (3) Content varies: genre, theme, literary movement, or other coherent emphasis.
Repeatability: May be repeated. Maximum 9 hours.

552 Readings in Black American Literature (3) Content varies: genre, theme, literary movement, or other coherent emphasis.
Repeatability: May be repeated. Maximum 9 hours.

560 Readings in 20th-Century Literature (3) Content varies: genre, theme, literary movement, or other coherent emphasis.
Repeatability: May be repeated. Maximum 9 hours.

561 Readings in 20th-Century Literature (3) Content varies: genre, theme, literary movement, or other coherent emphasis.
Repeatability: May be repeated. Maximum 9 hours.

575 Issues in Second/Foreign Language Rhetoric and Composition (3) Examination of cross-linguistic and cross-cultural issues in the development of academic writing proficiency in a second/foreign language.
(Same as Linguistics 575.)

576 Introduction to Contemporary Criticism (3) Introductory survey of 20th-century literary criticism from New Criticism to present.

580 Fiction Writing (3) Advanced fiction projects under supervision of instructor and time for independent study.
Repeatability: May be repeated. Maximum 6 hours.
Recommended Background: Extensive background in reading and writing fiction.

581 Colloquium in Poetry Writing (3) Major poetic project or continuation of project begun in 463. Individual consultation with instructor; supplements class analysis; readings in contemporary poetry and theory.
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): 463 or consent of instructor.

582 Special Topics in Writing (1-3) Topics vary.
Repeatability: May be repeated. Maximum 6 hours.
Comment(s): Enrollment by consent of director of graduate studies.

583 Special Topics in Literature (3) Topics vary: genres, modes, and other literary subjects not in standard period divisions.
Repeatability: May be repeated. Maximum 6 hours.

584 Topics in Feminist Studies (3) Topics vary.
Repeatability: May be repeated. Maximum 9 hours.

585 Issues in Invention, Style, and Audience (3) Theoretical perspectives on contemporary research in rhetoric and composition.

586 History of Rhetoric I (3) Survey of rhetoric from Sophists to Ramus.

587 History of Rhetoric II (3) Survey of rhetoric from Bacon to present.

588 Readings in Applied Rhetoric (3) Content varies: Writing across curriculum, writing centers, technical communication, text linguistics.
Repeatability: May be repeated. Maximum 6 hours.

589 Special Topics in Language (3) Topics vary.
Repeatability: May be repeated. Maximum 6 hours.

590 Topics in Critical Theory (3) Topics vary.
Repeatability: May be repeated. Maximum 9 hours.

591 Foreign Study (1-15)
Repeatability: Not repeatable. May be taken once for 1-15 hours.

592 Off-Campus Study (1-15)
Repeatability: Not repeatable. May be taken once for 1-15 hours.

593 Independent Study (1-15)
Repeatability: May be repeated once.
Comments: May be taken once in the MA program and once in the PhD program.

594 Film History, Form, and Analysis (3) Issues in film studies: history of narrative film; concept of film form; critical approaches to film study (genre, auteur, formalist, and others); and critical analysis of individual films.

600 Doctoral Research and Dissertation (3-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

610 Studies in Old English Language and Literature (3) Old English grammar with readings in prose and poetry.

611 Studies in Beowulf (3) Translation and critical study of Beowulf.
(De) Prerequisite(s): 610 or consent of instructor.

620 Studies in Medieval English Literature (3) Seminar in literature and literary genres of Medieval English literature, read in Old and Middle English. Subject matter varies from year to year.
Repeatability: May be repeated. Maximum 9 hours.

621 Studies in Chaucer (3) Seminar in text, interpretation, and criticism of Chaucer's writings.
Repeatability: May be repeated. Maximum 6 hours.
Recommended Background: Previous course in Chaucer.

630 Studies in Renaissance Literature (3) Seminars: Spenser, Milton, 17th-century prose and poetry, Shakespeare, 16th-century prose and poetry, non-Shakespearian drama.
Repeatability: May be repeated. Maximum 9 hours.

Repeatability: May be repeated. Maximum 9 hours.

640 Studies in Restoration and 18th-Century Literature (3) Topics vary. Swift, satire, restoration literature, Johnson and Boswell, Addison and Steele, restoration drama, Dryden.
Repeatability: May be repeated. Maximum 9 hours.

650 Studies in English Romanticism (3) Seminar content varies: particular literary figure or figures, genres, theme, or other coherent focus.
Repeatability: May be repeated. Maximum 9 hours.

651 Studies in Victorian Literature (3) Seminar content varies: particular literary figure or figures, genres, theme, or other coherent focus.
Repeatability: May be repeated. Maximum 9 hours.

652 Studies in Victorian Literature (3) Seminar content varies: particular literary figure or figures, genres, theme, or other coherent focus.
Repeatability: May be repeated. Maximum 9 hours.

660 Studies in American Literature (3) Southern literature before 1830, frontier, regionalism, women's literature, Irving, Cooper, Poe, Emerson, Thoreau, Hawthorne, Melville, Whitman, Dickinson, James, and Twain.
Repeatability: May be repeated. Maximum 9 hours.

661 Studies in American Literature (3) Southern literature before 1830, frontier, regionalism, women's literature, Irving, Cooper, Poe, Emerson, Thoreau, Hawthorne, Melville, Whitman, Dickinson, James, and Twain.
Repeatability: May be repeated. Maximum 9 hours.

662 Studies in American Literature (3) Southern literature before 1830, frontier, regionalism, women's literature, Irving, Cooper, Poe, Emerson, Thoreau, Hawthorne, Melville, Whitman, Dickinson, James, and Twain.
Repeatability: May be repeated. Maximum 9 hours.

670 Studies in 20th-Century Literature (3) Seminar content varies: particular literary figure or figures, genres, theme, or other coherent focus.
Repeatability: May be repeated. Maximum 9 hours.

671 Studies in 20th-Century Literature (3) Seminar content varies: particular literary figure or figures, genres, theme, or other coherent focus.
Repeatability: May be repeated. Maximum 9 hours.

672 Studies in 20th-Century Literature (3) Seminar content varies: particular literary figure or figures, genres, theme, or other coherent focus.
Repeatability: May be repeated. Maximum 9 hours.
680 Topics in English Language (3)
Repeatability: May be repeated with consent of director of graduate studies.
Maximum 9 hours.

682 Studies in Rhetoric and Composition (3) Content varies. Advanced work in theory and/or history of rhetoric and composition. Issues in invention, textuality, literacy, historiography, style and ethics.
Repeatability: May be repeated. Maximum 9 hours.

686 Studies in Creative Writing (3) Content varies. Connection between theory and practice in writing.
Repeatability: May be repeated. Maximum 9 hours.

688 Studies in Literary Criticism (3) Content varies. Advanced work in theory and history of literary criticism.
Repeatability: May be repeated. Maximum 9 hours.

690 Special Topics (3) Content varies. History of ideas, humor, biography, autobiography, extra-literary disciplines.
Repeatability: May be repeated. Maximum 9 hours.

694 Studies in Film (3) Content varies. Advanced work in film history and analyses.
Repeatability: May be repeated. Maximum 6 hours.

English Education (340)

459 Teaching English in the Secondary School (3) Techniques of teaching composition, language, and literature.
Comment(s): Admission to teacher education required.

460 Teaching Reading and Literature in the Secondary School (3) Teaching basic reading skills and literature.

507 Teaching Poetry Grades 7-12 (3) Research and theory in application to teaching of poetry. Design of strategies and materials for teaching and writing and reading of poetry. Review of texts and materials.

508 Teaching Composition in the Secondary School (3) Teaching narration, description, exposition, and argumentation; writing process and marking of student papers.

509 Teaching Fiction in the Secondary School (3) Teaching of novels and short stories.

543 Teaching Language Arts in the Middle Grades (3) Activities in this class are intended to promote the professional growth of pre-service and in-service language arts teachers through study, design, and implementation of language arts curriculum and instructional strategies. In particular, methods of teaching contemporary language arts content in grades 4-8 will be explored.

590 Seminar in Teaching English in Secondary Schools (3) Content varies. Theoretical and practical approaches to teaching English in secondary school.
Repeatability: May be repeated. Maximum 9 hours.

592 Linguistics and the Teaching of English (3) Grammar, usage, semantics, dialectology, history of language, and lexicography.

597 Teaching Drama Grades 7-13 (3) Strategies and materials for teaching creative dramatics, enacting and writing of plays, reading of scripts.

601 Studies in English Education (3) Issues and research in teaching of English.

Entomology and Plant Pathology (341)

410 Diseases and Insects of Ornamental Plants (3) Symptoms, identification, and management of diseases and insect pests that affect plants in greenhouse, nursery, and landscape environments.
(DE) Prerequisite(s): 313 or 321 or consent of instructor.

451 Plant Tissue Culture (3) Methods for the culture of cells, tissues, and organs including media preparation and maintenance of cultures. (Same as Plant Sciences 451.)
Contact Hour Distribution: Lecture and lab.
(DE) Prerequisite(s): 110 and 120 or Biology 130 and 140 and Chemistry 120 and 130.
Recommended Background: 310, 321 and 412; Microbiology 310 or 319; Plant Sciences 330.

500 Thesis (1-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.
Registration Restriction(s): Master of Science – entomology and plant pathology major.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

505 Mycology (3) Survey of the fungal kingdom and traditional allies in the context of phyla and classes. Systematics, biology, reproduction, structure-function, physiology, and ecology illustrated with fresh and preserved material and cultural techniques in laboratories.
Contact Hour Distribution: 2 hours and 1 lab.
Credit Restriction: Students cannot receive credit for both 405 and 505.
(DE) Prerequisite(s): Biology 111 and 112 or Biology 130 and 140.

512 Soilborne Plant Pathogens (3) Causal agents; host-parasite-soil environment interactions; epidemiology; detection and identification of soilborne plant pathogens; biological, cultural, and chemical control.
Credit Restriction: Students who receive credit for 612, may not enroll in 512.
(DE) Prerequisite(s): 313 or consent of instructor.
Comment(s): Master’s students only.

513 Fungal Epidemiology and Disease Control (2) Quantitative epidemiology and propagation of fungal plant pathogens; disease assessment strategies and modes of action of fungicides. (Same as Plant Sciences 513.)
Registration Restriction(s): Not open to PhD students.

514 Bacterial Plant Diseases (2) Morphology, taxonomy, ecology, physiology, and genetics of bacterial plant pathogens; infection and disease development, pathogenesis and resistance; diagnosis, detection, effect of environment, and management of bacterial plant diseases; beneficial plant-bacterial interactions.
Contact Hour Distribution: 3 hours and 1 lab for 7 weeks.
(DE) Prerequisite(s): 313 or consent of instructor.

515 Physiology of Plant Disease (3) Biochemical and physiological events involved in host-pathogen interactions. Mechanisms of disease resistance.
Credit Restriction(s): Students taking 515 cannot receive credit for 615.
Recommended Background: Introductory plant physiology and pathology or consent of instructor.
Comment(s): Master’s students only.

520 Plant Parasitic Nematodes (2) Morphology, physiology, taxonomy, ecology, and management of plant parasitic nematodes, host-parasite relationships.
Contact Hour Distribution: 2 hours and 2 labs weekly for 7 weeks.
Recommended Background: 8 hours of biology.

521 Plant Virology (2) Symptomatology, epidemiology, and management of virus infection; structure, morphology, replication, transmission, purification, characterization, and classification of plant viruses; serology; plant pathogenic viroids, mycoplasmas and spiroplasmas.
Contact Hour Distribution: 2 hours and 1 lab.
Prerequisite(s): 313 or consent of instructor.

523 Field Crop and Vegetable Insects (2) Identification, biology and management of insects affecting commercial vegetable and home garden crops.
Contact Hour Distribution: 1 hour and 1 lab.
(DE) Prerequisite(s): 321 or basic entomology course.

525 Medical and Veterinary Entomology (3) Morphology, taxonomy, biology and control of arthropod parasites and vectors of pathogens of humans and animals. Ecology and behavior of vectors in relation to pathogen transmission and control.
Contact Hour Distribution: 2 hours and 1 lab.
(DE) Prerequisite(s): 321 or 325 or consent of instructor.

530 Integrated Pest Management (3) Principles and application of biological, cultural, genetic, behavioral, and chemical methods of control to maintain pest populations below economic threshold levels. (Same as Plant Sciences 530.)
(DE) Prerequisite(s): 321 or consent of instructor.

531 Special Problems in Entomology (1-3) Comprehensive individual study of current problems.
Repeatability: May be repeated. Maximum 6 hours.

532 Special Problems in Plant Pathology (1-4) Comprehensive individual study of current problems.
Repeatability: May be repeated. Maximum 6 hours.

533 Concentrated Study in Entomology (1-3) Selected subjects in entomology for advanced students, concentrated in time and subject matter.
Repeatability: May be repeated. Maximum 6 hours.

(DE) Prerequisite(s): 321 or basic entomology course.
541 Seminar (1-2) Review in oral or poster form of literature and current research in entomology or plant pathology, or report on student's thesis research; critique and analysis of presentation effectiveness. Presentations on current topics by outside speakers.

Repeatability: May be repeated. Maximum 6 hours.

Comment(s): Master's students only.

544 Protein Gel Electrophoresis (1) Practical experience with isolating native and denatured proteins from plants and fungi, determining protein concentrations, PAGE of proteins including total proteins and assays for specific enzyme (isozyme) analyses. (Same as Plant Sciences 544.)

Contact Hour Distribution: 1 hour and 4 labs weekly for 5 weeks.

Recommended Background: 8 hours of biology or botany and 8 hours of chemistry.

545 Plant Microtechnique (1) Practical light and scanning electron microscopy methods for investigating aspects of plant development, histochemistry and pathological structures in ornamental forest and crop species. (Same as Plant Sciences 545.)

Contact Hour Distribution: 1 hour and 4 labs weekly for 5 weeks.

Recommended Background: 8 hours of biology or botany and 8 hours of chemistry.

548 Taxonomy of Adult Insects (3) Classification, phylogeny, and distribution of insects and related arthropods. Lectures on theory and practice of insect systematics and major features of insect evolution. Laboratory practice on methods of collection, preservation, and study of insects, with emphasis on order and family identification of adults. Substantial insect collection (above requirements for 448), one or more field trips, and a taxonomically oriented project required.

Credit Restriction: Students cannot receive credit for both 548 and 448.

Registration Permission: Consent of instructor.

550 Molecular Epidemiology (3) An overview of molecular tools for exploring variation as well as gene function with an emphasis on tools for emerging and traditional model organisms that have whole genome sequences available. The course will include lectures, assigned reading and discussion, and laboratory demonstrations. (Same as Microbiology 550.)

Registration Restriction(s): Minimum student level – senior.

Registration Permission: Consent of instructor.

555 Apterygote Insects (2) Comprehensive study of the five primitively wingless groups of hexapods, including evolution, biology, behavior, and taxonomy; methods of preservation, photomicrography, and videography; collection and field trips required.

600 Doctoral Research and Dissertation (3-15)

Grading Restriction: P/NP only.

Repeatability: May be repeated.

Registration Restriction(s): Doctor of Philosophy – plant, soils, and insects major.

602 Advanced Topics in Entomology (1-3) Morphology, systematics, physiology, ecology and genetics of arthropods, apiculture, medical and veterinary entomology, insect biodiversity, and insect pathology.

Repeatability: May be repeated. Maximum 12 hours.

604 Advanced Topics in Plant Pathology (1-3) Biological control, disease diagnosis and management, epidemiology, fungal plant pathogens, integrated pest management, molecular plant-microbe interactions, nematology, plant physiopathology, plant pathogenic bacteria, soil- and seedborne pathogens, and virology.

Repeatability: May be repeated. Maximum 12 hours.

608 Advanced Topics in Integrated Pest Management (1-3) Selected issues and topics of current significance to integrated pest management: transgenic in agriculture, issues in biological control, pesticide resistance management, ethics in pest management, environmental manipulations, epidemiology of plant diseases, biological control of plant pests, induced plant resistance, plant-microbe interactions, and new pesticide chemistries.

Repeatability: May be repeated. Maximum 12 hours.

(PE) Prerequisite(s): 530 or consent of instructor.

612 Soilborne Plant Pathogens (3) Causal agents; host-parasite-soil environment interactions; epidemiology; detection and identification of soilborne plant pathogens; biological, cultural, and chemical control.

Credit Restriction(s): Students who have received credit for 512 may not enroll in 612.

(PE) Prerequisite(s): 313 or consent of instructor.

Comment(s): PhD students only.

613 Fungal Epidemiology and Disease Control (2) Quantitative epidemiology and propagule dispersal of fungal plant pathogens; disease assessment strategies and modes of action of fungicides.

Contact Hour Distribution: 2 hours and 2 labs weekly for 7 weeks.

Registration Restriction(s): Minimum student level – doctoral.

615 Physiology of Plant Disease (3) Biochemical and physiological events involved in host-pathogen interactions. Mechanisms of disease resistance.

Credit Restriction: Students who have taken 515 cannot receive credit for 615.

Recommended Background: Introductory plant physiology and plant pathology or consent of instructor.

Comment(s): PhD students only.

628 History of Phytopathology (1) Study of how plant diseases have impacted human history and of the people who pioneered the science of plant pathology.

Contact Hour Distribution: 3 hours for five weeks.

640 Seminar (1) Review of literature and current research in entomology and plant pathology.

Repeatability: May be repeated. Maximum 2 hours.

Comment(s): PhD students only.

643 DNA Analysis (2) Practical experience in isolating genomic DNA from prokaryotic and eukaryotic organisms, amplification of DNA using arbitrary nucleotide primers. DNA profiling techniques (DAF, ASAP, ITS ribosomal DNA and 16S bacterial gene) isolation and purification of amplified products. Data collection and analysis of relationships between organisms. (Same as Plant Sciences 643.)

Contact Hour Distribution: 1 hour and 4 labs weekly for 7 weeks.

Recommended Background: 12 hours biological science and 8 hours chemistry.

Registration Permission: Consent of instructor.

Environmental and Soil Sciences (345)

434 Environmental Soil Chemistry (3) Composition and chemical properties of soils and processes that govern fate and behavior of chemicals in soil environment. Topics include – clay mineralogy; soil organic matter; mineral weathering and stability; aqueous speciation; surface chemistry; ion exchange, adsorption, and molecular retention; oxidation-reduction; and soil acidity, alkalinity, and salinity.

Recommended Background: Organic chemistry.

442 Soil Genesis and Classification (3) Soil genesis and formation; observing and describing morphology of agricultural and forest soils; chemical and physical properties, classification. Includes 3 weekend field trips.

Contact Hour Distribution: 2 hours and 1 lab.

Recommended Background: General soils.

444 Environmental Soil Physics (3) Basic understanding of soil physical properties and processes; influence of soil physical properties on water and chemical movement in soil; practical experience in the measurement and analysis of soil physical properties, water flow, and chemical movement in soil.

Recommended Background: General soils and physics.


Recommended Background: Computer proficiency.

500 Thesis (1-15)

Grading Restriction: P/NP only.

Repeatability: May be repeated.

Registration Restriction(s): Master of Science – environmental and soil sciences major.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated.

Credit Restriction: May not be used toward degree requirements.

503 Seminar (1) Presentations and discussions of current scientific material. (Same as Biosystems Engineering 503; Biosystems Engineering Technology 503.)

Repeatability: May be repeated. Maximum 3 hours.

511 Soil-Plant Relationships (3) Principles of mineral nutrition of higher plants: plant physiological characteristics that influence uptake of water and nutrients; functions of nutrient elements in plants; soil factors influencing nutrient availability to plants; important relationships at soil-plant root interface; and responses to adverse soil environmental conditions.

Contact Hour Distribution: 3 hours and 1 rec.

Recommended Background: Plant physiology.
512 Pedology (3) Physical and chemical weathering processes, factors of soil formation, soil forming processes. 
Contact Hour Distribution: 2 hours and 1 lab. 
Recommended Background: Soil genesis and classification.

513 Advanced Soil Chemistry (3) Chemical properties and processes that operate in soil environment: thermodynamics of soil solutions, soil formation, soil solutions, soil complex formation, mineral solubility, electrochemical equilibria, geochemical modeling, ion exchange equilibria, surface functionality and reactivity, adsorption phenomena, and surface complexation modeling. 
Recommended Background: Soil chemistry.

514 Advanced Soil Physics (3) Principles of water, gas, heat, and solute movement in soil/water systems; application of appropriate models for the description of these processes; methods for characterizing hydraulic and chemical transport properties of soils; applications of the science of soil physics to solution of contemporary problems in water conservation, prevention of surface/ground water contamination, and management of plant water status. 
Recommended Background: Soil physics.

516 Soil Biology and Biochemistry (3) Soil organisms and their activities in soils; soil ecology, biogeochemical cycling of important elements, organic matter dynamics, and applications of agricultural and environmental biology and biochemistry. 
Contact Hour Distribution: 2 hours and one 3-hour lab. 
Recommended Background: General soils.

530 Urban Hydrology and Stormwater Engineering (3) Planning, design, modeling, design, and maintenance of urban stormwater systems. Theory and application of hydraulic and hydrologic principles to design of stormwater management systems; design of inlet structures, conveyance systems, detention/retention basins and appurtenances, and selected best management practices (BMP's); evaluation of land-use changes of runoff quantity and quality; review, selection and application of contemporary computer models. 
(DE) Prerequisite(s): Civil Engineering 395 or 416.

535 Applied Ground Water Hydrology (3) Applied hydrology of multi-layered aquifer systems. Modeling of complex ground water systems that will include: the development and implementation of conceptual, analytical and numerical models. Numerical approaches to the solution of PDE's that describe flow through porous media: boundary conditions, stability, existence and uniqueness. 
((Same as) Geology 535.) 
(DE) Prerequisite(s): 485 or Geology 485 or consent of instructor.

543 Instrumentation and Measurement (3) (See Biosystems Engineering 543.)

552 Floodplain and Urban Flood Management (3) Review of national, regional, and local flood problems; state of the art flood damage reduction alternatives: structural and non-structural; institutional responses: policies, programs, organizations, regulations, and legal aspects; floodplain hydrology and hydraulics, HEC-1, HEC-2; floodway encroachment, flood hazard zone and damage potential determinations; case studies. 
(DE) Prerequisite(s): 390 or consent of instructor for non-majors.

555 Solid Waste Management (3) Magnitude and characteristics of solid waste problems; collection systems; design of disposal systems: landfill, incineration, and composting, design of resource recovery systems; current and future regulations. 
Comment(s): Requires graduate standing or consent of instructor.

570 Air Quality Management/Pollution Control (3) Introductory course on concepts of air pollution, analysis of relationships among sources, meteorology, effects; stack sampling; emission control systems. 
Registration Permission: Consent of instructor.

571 Design of Air Pollution Control Systems (3) Design and evaluation of systems used to control emission of gaseous and particle air pollutants. Comprehensive design of specific devices and systems. 
(DE) Prerequisite(s): 570.

572 Air Quality Dispersion Modeling (3) Diffusion in atmosphere; application of atmospheric dispersion models and evaluation of meteorological and air quality data. 
(DE) Prerequisite(s): 570.

573 Sampling of Air Pollutants (3) Standard sampling methods for particulate and gaseous air pollutant emissions from industrial processes; ambient air monitoring instrumentation/techniques. 
(DE) Prerequisite(s): 570.
575 Applied Microbiology and Bioengineering (3) (See Chemical Engineering 575.)
581 Green Engineering (3) (See Chemical Engineering 581.)
590 Special Problems in Environmental Engineering (3) Enrollment limited to environmental engineering students in non-thesis program. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 6 hours. Comment(s): Enrollment limited to students with graduate standing.
595 Special Topics (1-4) Problems and topics related to current developments in field. Repeatability: May be repeated. Maximum 9 hours.
651 Industrial Waste Unit Operations and Processes (3) Theoretical design and laboratory modeling of industrial waste treatment processes and operations. Contact Hour Distribution: 2 hours and 1 lab. (DE) Prerequisite(s): 551 and 553. (DE) Prerequisite or (DE) Corequisite(s): 552.
653 Pollutant Fate Modeling and Risk Assessment (3) Application of scientific principles concerning movement and fate of chemicals at interfaces of air, water, and earthen solids in environment. Methods of assessing risk posed by presence of those chemicals. (DE) Prerequisite(s): 551.
691 Special Topics in Environmental Engineering (3) Selected advanced problems of current interest. Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of instructor.

Exercise Science (347)
480 Physiology of Exercise (3) Lecture and laboratory class dealing with functions of the body in muscular work. Topics include physiological aspects of fatigue, training, and adaptation to environment. (Same as Biochemistry and Cellular and Molecular Biology 480.) Contact Hour Distribution: 2 lectures and 1 lab. (DE) Prerequisite(s): Biochemistry and Cellular and Molecular Biology 230 or 440.
500 Thesis (1-15) Grading Restriction: P/np only. Repeatability: May be repeated.
501 Special Project (3) Culminating experience for non-thesis major. Grading Restriction: Satisfactory/No Credit grading only.
502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Credit Restriction: May not be used toward degree requirements.
508 Research in Exercise Science (3) Research for writing of thesis and institutional review board proposals; presentation of research through free communications and poster presentations; calculation and interpretation of statistics related to common research designs used in research; and use of computer software.
509 Graduate Seminar in Public Health (1) (See Public Health 509.)
513 Biomechanics of Orthopedic Rehabilitation (3) Effect of physical activity on musculoskeletal tissue: flexibility development and measurement, surgical implications, and rehabilitation related research.
516 Therapeutic Exercise (3) Current research in therapeutic exercise: role of nervous system, soft tissue healing, proprioception, muscle activation patterns, and strength.
521 Physical Activity Epidemiology Methods (3) Epidemiological foundation for research in physical activity related to individual and population-based health. Emphasis on analytic methods, surveys, and research designs. Focus on issues within special populations (e.g., elderly, children). Recommended Background: Course in statistics or consent of instructor.
531 Biomechanics (3) Biomechanical principles and applications to analyses of human movements. Quantitative analysis of human movements. Recommended Background: General physics course.
533 Exercise Physiology (3) Physiology of human performance: acute and chronic effects of exercise on metabolic, cardiac, pulmonary, and skeletal systems. Contact Hour Distribution: 2 hours and 1 lab. Recommended Background: Human physiology or general physiology course and a general chemistry course.
541 Special Topics (1-3) Advanced study in selected areas of exercise science. Repeatability: May be repeated. Maximum 6 hours.
545 Advanced Physiology of Exercise (3) Systematic study of skeletal muscle and metabolism related to acute exercise and physical training: lectures, discussions of major scientific reviews, and appropriate laboratory experiments. (DE) Prerequisite(s): 480 or 533.
569 Clinical Exercise Physiology (3) Cardiac structure and function, interpretation of 12-lead electrocardiograms, exercise considerations for cardiac and pulmonary patient. (DE) Prerequisite(s): 480 or 533 and 567.
570 Cardiac Rehabilitation Practicum (1-3) Supervised experience in hospital-based exercise programs for participants with cardiac and/or pulmonary disorders. Use of telemetry monitoring, leading safe exercise regimens counseling participants on safe exercise guidelines. Presenting educational class on topic applicable to participants. Repeatability: May be repeated. Maximum 6 hours. (DE) Prerequisite(s): 533 and 567 or consent of instructor. (DE) Corequisite(s): 569.
585 Seminar in Gerontology (1) (See Health 585.)
593 Independent Study (1-3) Grading: Satisfactory/No Credit or letter grade. Repeatability: May be repeated. Maximum 6 hours.
600 Doctoral Research and Dissertation (3-15) Grading Restriction: P/NP only. Repeatability: May be repeated.
601 Research Seminar (1) Research topics in different aspects of exercise science, sport psychology, and sport sociology. (Same as Sport Studies 601.) Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 6 hours.
622 Directed Independent Research (3-6) Grading Restriction: Satisfactory/No Credit or letter grade. Repeatability: May be repeated. Maximum 6 hours. Comment(s): For doctoral students. Others must obtain consent of instructor.
633 Advanced Methods and Instrumentation in Biomechanics (3) Focus on methods and instrumentation commonly used in biomechanics. Provides practical experience and theoretical foundations for selected topics in two/three-dimensional kinematics, anthropometric models and parameters, force measurements and force platform, pressure distribution measurements, two-dimensional/three-dimensional kinetics, muscle electrical activity and electromyography, and other related methods. Recommended Background: Basic biomechanics course or consent of instructor.
635 Physical Activity and Positive Health (3) Review of clinical, epidemiological, and experimental evidence concerning relationship and effects of exercise on health-related components of fitness. (Same as Public Health 635.) (DE) Prerequisite(s): Elementary statistics course, 480 or 533 and 567 or consent of instructor.
661 Seminar in Exercise and Applied Physiology (1-3) Selected topics in exercise and environmental physiology. Repeatability: May be repeated. Maximum 6 hours. (DE) Prerequisite(s): 480 or 533.
664 Research Participation in Exercise Science (1-6) Participation in research with faculty member whose interests coincide with those of student. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 6 hours.
681 Practicum (1-3) Intern experience in areas of major interest. Repeatability: May be repeated. Maximum 6 hours.
693 Independent Study (1-3) Grading: Satisfactory/No Credit or letter grade. Repeatability: May be repeated. Maximum 6 hours.
Finance (349)
502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.
511 Strategic Management for Creation of Financial Value (3) Strategic issues in corporate finance, investments, and capital markets: how firms can employ financial strategies to create value. Use of derivatives, risk management, real options, fixed income securities, venture capital, initial public offerings and financial restructuring.
(DE) Prerequisite(s): Business Administration 511, 512, and 513 or consent of instructor.
512 Problems in Financial Management (3) Readings and cases that apply finance theory to real-world investment, financing, and asset management problems.
(DE) Prerequisite(s): 511 and Business Administration 511, 512, 513, and 514 or consent of instructor.
525 Investment Analysis and Portfolio Management (3) Investment process, portfolio applications. Asset allocation decision in global setting; organization and functioning of financial markets; equity and bond valuation; asset valuation models; equity and bond portfolio management; options, forwards and futures contracts; evaluation of portfolio performance; and review of alternative economies and emerging markets.
(DE) Prerequisite(s): 511 and Business Administration 511, 512, 513, and 514 or consent of instructor.
(DE) Prerequisite(s): 511 and Business Administration 511, 512, 513, and 514 or consent of instructor.
581 Real Estate Investment and Finance (3) Financial and market analysis used to make real estate investment decisions. Effects of various financing options on rate of return on income-producing properties. Effect of various financing options on consumer's decisions to purchase. Relationship between primary and secondary mortgage markets and impact of those markets on cost and availability of funds for real estate lending. Effects of government intervention (taxation, subsidization, and regulation) in both real estate and mortgage markets.
(DE) Prerequisite(s): 511 and Business Administration 511, 512, 513, and 514 or consent of instructor.
593 Independent Study (3) Directed research and study.
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): Business Administration 511, 512, 513, and 514 or consent of instructor.
599 Special Topics in Finance (1-3) Topics vary.
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.
600 Doctoral Research and Dissertation (3-15)
Grading Restriction: P/INP only.
Repeatability: May be repeated.
641 Seminar in Finance (1-3) Capital markets, utility theory, asset pricing, theory of the firm, capital structure, dividend policy.
Grading: Satisfactory/No Credit or letter grade.
Registration Permission: Consent of instructor.
651 Seminar in Corporate Finance (1-3) Recent theoretical and empirical developments in micro-finance literature. Topics vary.
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): 641.
Registration Permission: Consent of instructor.
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): 641.
Registration Permission: Consent of instructor.
653 Seminar in Financial Institutions (1-3) Theoretical and empirical studies of financial institutions. Topics: modeling banking firm, efficiencies in banking, bank lending arrangements and asymmetric information, international competitiveness, and deposit insurance.
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): 641.
Registration Permission: Consent of instructor.
654 Special Topics (1-3) Recent developments in finance.
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): 641.
Registration Permission: Consent of instructor.
693 Independent Study (1-6) Directed research on subject of mutual interest to student and staff member.
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

Food Science and Technology (390)
410 Food Chemistry (3) Reactions of water, proteins, lipids, carbohydrates, minerals, enzymes, vitamins, and additives in foods.
Contact Hour Distribution: 3 hours lecture.
(DE) Prerequisite(s): Chemistry 110, Biochemistry and Cellular and Molecular Biology 310.
415 Food Analysis (4) Principles, methods and techniques for qualitative and quantitative analyses of composition and physical, chemical, and biological properties of food and food ingredients.
Contact Hour Distribution: 3 hours and one 2-hour lab.
(DE) Prerequisite(s): Chemistry 110 or 350.
419 Food Chemistry Lab (1) Interaction of water, proteins, lipids, carbohydrates, minerals, enzymes, vitamins, and additives in foods and methods of evaluation of chemical properties of foods.
Contact Hour Distribution: One 2-hour lab.
(RE) Corequisite(s): 410.
420 Food Microbiology (2) Physical, chemical and environmental factors moderating growth and survival of foodborne microorganisms; pathogenic and spoilage microorganisms affecting quality of foods and their control.
(DE) Prerequisite(s): Microbiology 210.
(DE) Corequisite(s): 429.
429 Food Microbiology Lab (3) Methods for examination, enumeration, cultivation and identification of foodborne microorganisms.
(DE) Prerequisite(s): Microbiology 210.
(DE) Corequisite(s): 420.
430 Sensory Evaluation of Food (3) Principles and methods of sensory evaluation of foods.
Contact Hour Distribution: 2 hours and 1 lab.
Recommended Background: Basic statistics course.
445 Application of Food Chemistry and Processing Principles (4) Interactions and functions of dairy, egg, cereal and other plant based ingredients during the production and storage of processed food products.
Contact Hour Distribution: 3 hours lecture and 1 lab.
(DE) Prerequisite(s): 340 and 410 or consent of instructor.
461 Fresh Meats (3) Basic principles in the conversion of muscle to meat and the factors that contribute to the utilization and marketing of quality fresh meat products.
462 Manufactured Meat Technology (2) Basic principles of manufacturing valued added meat products.
Contact Hour Distribution: 1 hour lecture and 1 hour lab.
490 Food Laws and Regulations (3) A comprehensive examination of the laws and regulations designed to preserve safety, wholesomeness, and nutritional quality of the United States food supply with an in-depth analysis and discussion of precedent case studies and their impacts on laws and regulations.
(DE) Prerequisite(s): 140.
Registration Permission: Consent of instructor for non-majors.
495 Quality Assurance and Sanitation Practices (3) Design and evaluation of a food processing operation to produce a safe and acceptable quality food product.
(DE) Prerequisite(s): 320 and 340 or consent of instructor.
500 Thesis (1-15)
Grading Restriction: P/INP only.
Repeatability: May be repeated.

501 Seminar (1) Individual reports and discussion on topics from current literature.
   Grading Restriction: Satisfactory/No Credit grading only.
   Repeatability: May be repeated. Maximum 3 hours.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
   Grading Restriction: Satisfactory/No Credit grading only.
   Repeatability: May be repeated.
   Credit Restriction: May not be used toward degree requirements.

503 Problems in Lieu of Thesis (2-3)
   Grading Restriction: Satisfactory/No Credit grading only.
   Repeatability: May be repeated. Maximum 9 hours.

515 Food Carbohydrates, Proteins and Lipids (4) Advanced study of chemical and physical attributes of carbohydrate, protein, and lipid components of foods; effects of components on production of safe and consistent quality food products; and changes during processing and/or distribution of food products.
   Contact Hour Distribution: 3 hours and 1 lab.
   (DE) Prerequisite(s): 410.

521 Advanced Food Microbiology (3) Extrinsic and intrinsic factors associated with foods and food processing that relate to growth, survival, inhibition, detection, and recovery of foodborne pathogens and spoilage organisms; traditional and current approaches to microbiological food safety and quality.
   (DE) Prerequisite(s): 420 and 429.

540 Food Product Development (3) Art, science and technology of developing and marketing new food products.
   Contact Hour Distribution: 2 hours and 1 lab.
   (DE) Prerequisite(s): 340.

541 Food Engineering (3) Transport processes in food engineering: unit operations; thermal and non-thermal processing of foods; food separations; processing and physicochemical properties of foods; calculations, design practices, and equipment used in food processing operations.
   Contact Hour Distribution: 2 hours and one 2-hour lab.
   Credit Restriction: Students cannot receive credit for both 441 and 541.
   Recommended Background: Basic calculus and physics.

590 Special Topics in Food Technology and Science (1-3) Critical reviews of current research and production concerns of food industry.
   Repeatability: May be repeated. Maximum 9 hours.

593 Directed Studies (1-3) Research on non-thesis topics chosen by student and major professor. Supervised experience in food industry or governmental laboratories.
   Repeatability: May be repeated. Maximum 6 hours.

600 Doctoral Research and Dissertation (3-15)
   Grading Restriction: P/NP only.
   Repeatability: May be repeated.

601 Seminar (1) Reports and directed discussion on research topics from current literature.
   Grading Restriction: Satisfactory/No Credit grading only.
   Repeatability: May be repeated. Maximum 3 hours.

615 Food Biopolymers (3) Study of biopolymers obtained from food and used in food and other industries. Chemical, physical, and mechanical characterizations, chemical and physical modifications, and applications as functional ingredients, carriers, and packaging materials.
   Contact Hour Distribution: 3 hours lecture.
   Recommended Background: Organic chemistry and food chemistry.

620 Food Toxicology (3) Basic and applied concepts in food toxicology; toxicological aspects of processed foods. Mode of action, prevention and control of food toxicants in food supply.
   (DE) Prerequisite(s): 410 and 521 or consent of instructor.

Foreign Language/ESL Education (394)

   Recommended Background: Completion or near completion of foreign language hours for certification.
   Comment(s): Enrollment requires admission to teacher education.

555 Foreign Language in the Elementary Schools Practicum (3) Experiences designing, implementing and assessing second language instruction in elementary school setting.
   (DE) Prerequisite(s): 587 or consent of instructor.

556 English as a Second Language Practicum (3) Experiences designing, implementing and assessing English instruction to non-native English speakers. Course is required for ESL certification.
   (DE) Prerequisite(s): 578 or consent of instructor.

566 ESL Assessment and Evaluation (3) Highlights the implementation of authentic assessment, specifically, portfolio assessment for ESL students in K-12 settings. It focuses on designing appropriate tools for various assessment purposes. Specific types and different forms of assessment are examined based on their effectiveness and meaningfulness.

578 Teaching English as a Second Language (3) Examines ESL pedagogy, practices, and instructional strategies that accommodate students in all levels of ESL/EFL settings. Required for Tennessee (PreK-12) license.
   (DE) Prerequisite(s): 588 or consent of instructor.

588 Content-Based ESL Methods (3) Focused on designing and implementing content-based English as a Second Language instruction to enhance English language learners academic achievement. Offered for ESL education students.
   Registration Permission: Consent of instructor.

678 Advanced Studies in English as a Second Language (3) Research, curricula, assessment, trends and issues in English as a second language.
   (DE) Prerequisite(s): 578 or consent of instructor.

Forestry (396)

   Comment(s): Senior standing or consent of instructor required.

423 Wildland Recreation Planning and Management (3) Planning processes, master and site planning, site design projects. Management strategies, methods of visitor and recreation site management. Case studies. Weekend field trips may be required.
   Contact Hour Distribution: 2 hours and 1 lab.

500 Thesis (1-15)
   Grading Restriction: P/NP only.
   Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
   Grading Restriction: Satisfactory/No Credit grading only.
   Repeatability: May be repeated.
   Credit Restriction: May not be used toward degree requirements.

511 Problem Analysis in Forest Resources (3) Problem identification, analysis and solution in forest resources management. Identify, analyze and prepare written report. Topic and report must have approval of graduate committee.
   Comment(s): Available only to forestry majors in the non-thesis option.

512 Seminar (1) Current developments in forestry. Required of all graduate students in residence in the fall.
   Grading Restriction: Satisfactory/No Credit grading only.
   Repeatability: May be repeated. Maximum 2 hours.

514 Tree Physiology (3) Tree structure, growth and development, and function, and how these are related to the environment and to cultural practices. Influence of environmental variables on plant growth and distribution; effects of forest management practices on growth and function.
   Credit Restriction: Students cannot receive credit for both 514 and 414.
   (DE) Prerequisite(s): Biology 111 and 112 or Biology 101 and 102.

515 Forest Conservation Workshop (1-3) Relation of forest biology, ecology and management to conservation issues; integration of current conservation issues into classroom work and student projects; environmental education strategies.
   Repeatability: May be repeated. Maximum 3 hours.
   Comment(s): Not available to students in forestry or wildlife and fisheries science.

520 Advanced Forest Ecology (3) Physiological ecology and adaptations of trees; relationships between overstory structure, microclimate, and understory response; regeneration ecology; competition and effects of natural and human disturbance regimes at multiple scales; forest succession and stand dynamics.
   Comment(s): Requires graduate standing in forestry or biological science or consent of instructor.
521 Composite Materials from Renewable Resources (3) Manufacturing processes, science and engineering of composite materials derived from renewable resources. Overview of renewable resources and utilization; structure and properties of natural fibers, thermosets, thermoplastics, and bioplastics; fundamentals of adhesion; engineered wood composites; natural fiber reinforced composites; and mechanical property and durability testing.

(DE) Prerequisite(s): Biology 220
Recommended Background: Basic understanding of polymer chemistry, engineering, physics, a silvicultural methods course or consent of instructor.

530 Advanced Forest Resource Management (3) Analysis of forest management problems in public and private organizations. Classical forest regulation; linear and goal programming, as applied to resource management problems; advanced forest investment analysis; decision-making methods for primary forest management activities; and methodologies for incorporating non-timber values in forest management operations.

Recommended Background: Senior-level forest management course or consent of instructor.

550 Recreation Planning for Forests and Associated Lands (3) Planning process for recreation development on forests and associated lands; analysis and critique of specific contemporary alternatives. Includes overnight field trips.

Recommended Background: Senior-level course in forest recreation or consent of instructor.

580 Advanced Silviculture (3) Silvical characteristics, silvicultural practices and systems applied to commercially important hardwoods and softwoods. In-depth analyses of silvicultural principles involved and tools used, prescribed fire, pesticides, in regeneration and management; computer modeling of stand dynamics, structure, growth/yield.

Contact Hour Distribution: 2 hours and 1 lab.
Recommended Background: Silviculture course.

585 Advanced Forest Biometry (3) Application of sampling techniques to forest inventory; fixed and variable plot sampling; list sampling; Poisson sampling; regression estimators; multistage and multihaphe sampling. Growth and yield predictors for even-aged and uneven-aged forests.

Recommended Background: Forest inventory and sampling coursework.

590 Advanced Topics in Forestry (1-3) Recent advances and concepts; research techniques and analyses of current problems.

Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

593 Independent Study in Forestry (1-4) Repeatability: May be repeated. Maximum 6 hours.

630 Forest Growth and Development (3) Forest stand dynamics, analysis of changes in species composition and forest stand structure (physical and temporal) during forest succession, response of stands to disturbances (anthropogenic and natural), modeling techniques to make predictions of future stand development.

Contact Hour Distribution: 2 hours and 1 lab.
Recommended Background: Undergraduate course in silviculture.

Forestry, Wildlife and Fisheries (398)

416 Planning and Management of Forest, Wildlife and Fisheries Resources (3) Integrated forest and wildland resource management through developing land management plans and analyzing case studies including conflict resolution.

Contact Hour Distribution: 1 hour and 2 labs.
Comment(s): To enroll, students must be at least a senior.

520 Natural Resource Issues at International Level (3) Identification and analyses of issues regarding forestry, wildlife, fisheries and wildland park resources beyond U.S. borders. Political, economic, social, and biophysical elements impacting natural resources in different parts of the world: Northern Europe, Latin America, Asia, Africa, and South America. In-depth case study and class presentation required by student teams. 

Credit Restriction: Students cannot earn credit for Forestry, Wildlife and Fisheries 420 and 520.

535 Environmental Impacts to Natural Ecosystems (3) Current environmental problems impacting natural ecosystems: climatic change, acidic deposition, air pollution, species declines, and introductions of exotic species. Management methodologies to mitigate environmental problems. Overnight field trips required.

Recommended Background: Undergraduate course in natural resource management.

540 Seminar on Integrated Resources Management in Biosphere Reserves (2) MAB program, UNESCO-sanctioned global conservation initiative. Analysis of integrated resources management practices that demonstrate concept of sustainable development. Environmental policy and application of science to management practice. Applicable to majors in forestry and in wildlife and fisheries science.

570 Natural Resource Sustainability: Social, Political and Institutional Dimensions (3) Use and management of natural resources in a world of constant change, interdependent systems (environmental, social, economic and political), and inevitable conflicts, utilizing technical as well as social/political advances. Historical and current approaches to natural resource governance, associated and inherent conflicts, changes in institutions and new paradigms of collaboration, adaptive management, social learning and social capacity building.

Credit Restriction(s): Students who received credit for Forestry 570 may not receive credit for Forestry, Wildlife and Fisheries 570. Comment(s): Graduate standing required.

590 Advanced Topics in Forestry, Wildlife and Fisheries (1-3) Recent advances and concepts, research techniques, and analysis of current problems.
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

600 Doctoral Research and Dissertation (3-15) Grading Restriction: P/NP only. Repeatability: May be repeated.


Registration Permission: Consent of instructor.

610 Seminar in Natural Resources (2) Selected issues in natural resources and natural resource management at regional, national, or international level. Development of interdisciplinary approach to addressing problems: evaluating current state of knowledge, developing alternative actions to address problems, and identifying criteria for evaluation of alternatives.

612 Seminar in Forestry, Wildlife and Fisheries (1) Current issues and developments in forestry, wildlife and fisheries. Required of all doctoral students in residence during the fall.
Repeatability: May be repeated. Maximum 3 hours.

French (405)

410 Medieval French Literature (3) Major representative works of Medieval French literature. Texts in modern French. (Same as Medieval Studies 410.)
(DE) Prerequisite(s): 300-level literature course.

411 French Literature of the 16th Century (3) Highlights of 16th-century French literature. Excerpts from Rabelais and Montaigne. Readings of poems from the writers from Lyon and members of the Pèlade. 
(DE) Prerequisite(s): 300-level literature course.

(DE) Prerequisite(s): 300-level literature course.

413 French Literature of the 18th Century (3) Major works of the Enlightenment.
(DE) Prerequisite(s): 300-level literature course.

(DE) Prerequisite(s): 300-level literature course.

(DE) Prerequisite(s): 300-level literature course.

420 French Cinema (3) The French cinema from its earliest days through New Wave directors. May be applied toward the French major. (Same as Cinema Studies 420.)
(DE) Prerequisite(s): 300-level literature course.

421 Phonetics (3) Foundation in the science of phonetics. Practical exercises and individual performance.
Credit Restriction(s): Graduate credit is not available to students majoring in a Romance language. 
(DE) Prerequisite(s): 333 or 334 or 345 or permission of department.

422 Advanced Grammar (3) Improving one's written French by studying basic and more refined structures of the French language. Writing creative free-style compositions.
(DE) Prerequisite(s): 333 or 334 or 345.

423 Advanced Conversation (1) Informal conversation with native speaker on contemporary topics. Stresses in-class contact rather than outside preparation.
Contact Hour Distribution: Meets 2 hours a week.
(DE) Prerequisite(s): 333 or 334 or 345.
424 Advanced Conversation (1) Informal conversation with native speaker on contemporary topics. Stresses in-class contact rather than outside preparation.

Contact Hour Distribution: Meets 2 hours a week.

(DE) Prerequisite(s): 333 or 334 or 345.

425 Introduction to Descriptive Linguistics (3) Initiation into the theory and practice of techniques of linguistic analysis in the subfields of phonetics, phonology, morphology, syntax, semantics, pragmatics and historical linguistics; discussion of their relevance to the learning and teaching of foreign languages and to the study of literary texts. (Same as German 425; Linguistics 425; Russian 425, and Spanish 425.)

Recommended Background: Linguistics 200.

426 Methods of Historical Linguistics (3) (See German 426.)

429 Romance Linguistics (3) Development of Classical Latin through Vulgar Latin into major Romance languages. (Same as Linguistics 429; Spanish 429.)

430 Theatrical French (4) Comprehensive introduction to dramatic texts, performance, and theatrical production in French. Students collaborate in the creative staging of a French play and they actively participate in its public performance. May be applied toward the major as a literature course.

(DE) Prerequisite(s): French 351 or French 352.

431 Highlights of French Civilization (3) Survey of French civilization from the Gauls to World War II. Historical events, daily life, all forms of arts.

(DE) Prerequisite(s): 300-level literature course.

432 Contemporary French Culture (3) Current French cultural issues placed in historical perspective with comparative emphasis. In English; with readings in French for majors. May be applied toward the French major.

500 Thesis (1-15)

Grading Restriction: P/NP grading only.

Repeatable: May be repeated.

501 Techniques in Literary Analysis (3) Close stylistic analysis of texts representative of different eras and of different genres. Development and improvement of student's written French. Required for MA students.

502 Registration for Use of Facilities (1-15)

Require for student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.

Grading Restriction: Satisfactory/No Credit grading only.

Repeatable: May be repeated.

Credit Restriction: May not be used toward degree requirements.

510 The French Language (3) French as spoken and written from Medieval period to present.

512 Teaching a Foreign Language (3) Practical application of methods for teaching and evaluating basic language skills and foreign language skills, and cultural aspects through seminars, demonstrations, peer teaching, and observation of foreign language classes. Required of all MA and PhD students holding Graduate Teaching Assistantships, except those whose previous training or experience warrants their being excused by the department.

515 Technology Enhanced Language Learning (3) Introduction to TELL. Overview of existing software, programs, and professional literature on topic. Hands-on development of instructional Web site for teaching language, culture, or literature.

519 Bibliography and Methods of Research (3) Critical research tools and scholarly contributions in French literature and language. Practical exercises on compiling of scholarly data using computer-based and non-computer sources.

520 French and Francophone Film (3) French and Francophone culture through film.

530 French and Francophone Theater (3) Changing approaches to French and Francophone Theater.

540 French Literature and Culture I (3) Literary and cultural heritage of French Middle Ages.

550 French Literature and Culture II (3) Literary and cultural heritage of 16th- and 17th-century France.

560 French Literature and Culture III (3) Literary and cultural heritage of 18th- and 19th-century France.

570 French and Francophone Literature and Culture I (3) Literary and cultural heritage of France and other Francophone countries in the first part of 20th century.

573 French and Francophone Literature and Culture II (3) Literary and cultural heritage of France and other Francophone countries from the late 20th-century to present.

580 Critical Moments in French and Francophone Studies, or Linguistics (3) Contribution of France and Francophone world to evolution of literature, society, and ideas.

Repeatable: May be repeated. Maximum 12 hours.

584 Modern Theory and Criticism (3) Survey of 20th-century critical theory, including psychoanalysis, Marxism, structuralism, and more.

591 Foreign Study (1-15)

Repeatable: May be repeated. Maximum 15 hours.

592 Off-Campus Study (1-15)

Repeatable: May be repeated. Maximum 15 hours.

593 Independent Study (1-15)

Grading: Satisfactory/No Credit or letter grade.

Repeatable: May be repeated. Maximum 15 hours.

594 French Directed Readings (3)

595 French Directed Readings (3)

600 Doctoral Research and Dissertation (3-15)

Repeatable: May be repeated. Maximum 15 hours.

610 Doctoral Seminar in French and Francophone Studies, or Linguistics (3) Content varies.

Repeatable: May be repeated with consent of department. Maximum 12 hours.

**Geography (415)**

410 Global Positioning Systems and Geographic Data (3) Theory, field, and laboratory use of Global Positioning Systems for capturing digital geographic data. Management of geographic data, including coordinate systems, datum issues, scanning digitizing, map standards, and uncertainty in Geographic Information Systems.

Contact Hour Distribution: 2 hours and one 2-hour lab.

411 Introduction to Geographic Information Science (3) Concepts and methods of spatial analysis and their application using geographic information systems software and techniques. Emphasizes both theoretical and applied aspects.

Contact Hour Distribution: 2 hours lecture and 2 hours lab.

(DE) Prerequisite(s): 310 or consent of instructor.

412 Advanced Cartography Techniques (3) Cartographic design and data display techniques for reference and thematic maps. Basic principles and methods of map reproduction.

Contact Hour Distribution: 2 hours and 2 labs.

(DE) Prerequisite(s): 310 or consent of instructor.

413 Remote Sensing: Types and Applications (4) Principles and uses of remote sensing imagery, digital data, and spectral data, with particular emphasis on geographic interpretation and mapping techniques.

Contact Hour Distribution: 3 hours lecture and 2 hours lab.

(DE) Prerequisite(s): 132.

414 Spatial Databases and Data Management (3) Types, sources, acquisition, and documentation of spatial data. Spatial database management methods and strategies for data sharing.

Contact Hour Distribution: 2 hours lecture and 2 hours lab.

(DE) Prerequisite(s): 411 or consent of instructor.

415 Quantitative Methods in Geography (4) Geographic application of statistical techniques, point pattern analysis, spatial analyses, and correlation and regression techniques.

Contact Hour Distribution: 3 hours lecture and 2 hours lab per week.

(DE) Prerequisite(s): Mathematics 115 or Statistics 201.

421 Geography of Folk Societies (3) Geographical study of folk culture, emphasizing traditional material culture and rural settlement, with examples drawn from eastern North America and selected foreign areas.

423 Geography of American Popular Culture (3) Geographical study of regional variation in popular cultures, especially focused on youth cultures in the United States. (Same as American Studies 423.)

432 Dendrochronology (4) Principles, techniques, and interpretation in tree-ring science. Applications in geography, climate, ecology, forestry, archaeology, and earth sciences.

Contact Hour Distribution: 3 hours and 2 hours lab per week.

(DE) Prerequisite(s): 132.

433 The Land-Surface System (3) Characteristics of surface form, water, vegetation, and surface materials, and their regional interrelationships. People as evaluators and agents of change.

(DE) Prerequisite(s): 132.
434 Climatology (3) General circulation system leading to world pattern of climates. Climatic change and modification. Interrelationships of climate and human activity.

(DE) Prerequisite(s): 131 or consent of instructor.

435 Biogeography (3) Study of the changing distribution patterns of plants and animals on a variety of spatial and temporal scales. The effects of plate tectonics, Pleistocene climatic change, and human activity on world biota. Recommended Background: Introductory physical geography or coursework in botany or ecology.

436 Water Resources (3) Global water resources and hydrologic processes: water availability, flooding, and water quality issues examined from physical and economic geographical perspectives.

(DE) Prerequisite(s): 132.

439 Plant Geography of North America (3) Characteristics and distribution of major plant communities of Canada, the U.S., Mexico, and Central America. Relationships to climate, soil, fire, and human disturbance. Long-term history and future prospects. Recommended Background: Introductory physical geography or coursework in botany or ecology.

441 Urban Geography of the United States (3) Concepts and theories concerning development and significance of systems of cities and internal morphology of cities in the United States.

442 Urban Social Geography (3) Geographical study of urban culture. Social production of neighborhoods; social and behavioral aspects of territoriality, residential mobility, segregation, and the rise of post-industrial and global cities.

443 Rural Geography of the United States (3) Geographical appraisal of rural areas of the United States, including small towns and urban fringes. Problems and potentials of rural America.

449 Geography of Transportation (3) Examination of transportation systems, emphasizing their effects on trade patterns, land use, location problems, and development.

450 Process Geomorphology (3) (See Geology 450.)

454 Terrain Analysis (3) Analysis of landscape history from digital elevation datasets and traditional topographic maps. Basement materials and structures. Erosional and depositional evidence, including fluvial, glacial, aeolian, and shoreline features, of past climatic and biological regimes. Recommended Background: 132 or Geology 101 and 102 or Geology 107 and 108.

466 Teaching and Learning Geography (3) Preparation of prospective teachers in content, skills, strategies, and understandings needed for effective teaching and assessment of geography in the K-12 schools. Course organization and content based largely on that of National Geography Standards.

495 Special Topics in Geography (1-4) Topics vary. Grading: Satisfactory/No Credit or letter grade. Repeatability: May be repeated with consent of instructor. Maximum 8 hours. Registration Permission: Consent of instructor.

500 Thesis (1-15)

Grading Restriction: P/NP only. Repeatability: May be repeated.

501 Colloquium in Geography (1) Discussion of departmental research, current research literature, and general topics. May be applied toward graduate degree. Registration required of resident graduate students whenever offered. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 10 hours. Credit Restriction: A maximum of 4 hours may be applied toward the MS. A maximum of 4 hours may be applied toward the PhD.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Credit Restriction: May not be used toward degree requirements.

504 Introduction to Geographical Research (1) Research interests and methods of departmental faculty. Research frontiers in geography. Required of new graduate students. Grading Restriction: Satisfactory/No Credit grading only.

505 Directed Research (2-6) Research on problems as defined by individual students.

Grading: Satisfactory/No Credit or letter grade. Repeatability: May be repeated with consent of instructor. Maximum 9 hours. Registration Permission: Written consent of instructor and department.

506 Directed Readings (2-6) Readings on topics of interest as defined by individual students.

Grading: Satisfactory/No Credit or letter grade. Repeatability: May be repeated with consent of instructor. Maximum 9 hours. Registration Permission: Written consent of instructor and department.

507 Research in Human Geography (3) Introduction to human geography's questions, methods, and norms.

509 Topics in Geography (2-3) Topics vary. Grading: Satisfactory/No Credit or letter grade. Repeatability: May be repeated with consent of instructor. Maximum 6 hours. Registration Permission: Consent of instructor.

510 Geographic Software Design (3) Algorithms for spatial analysis, software design, and program implementation in stand alone and distributed computing environments. Registration Permission: Consent of instructor.

513 Topics in Remote Sensing (3) Applied research using imagery for interpretation and mapping of geographic data. Repeatability: May be repeated with consent of instructor. Maximum 6 hours. (DE) Prerequisite(s): 413 or consent of instructor.

515 Topics in Quantitative Geography (3) Multivariate analysis applied to problems in geography; research problems utilizing appropriate computer programs; usefulness to geographic research of techniques developed by other disciplines. Repeatability: May be repeated with consent of instructor. Maximum 6 hours. (DE) Prerequisite(s): 415 or consent of instructor.

517 Geographic Information Management and Processing (3) Concepts and methods in management of geographic information. Database design, manipulation, sampling and analysis. Registration Permission: Consent of instructor.

518 GIS Project Management (3) Interactions between management, technical, and application aspects of Geographic Information Systems project through simulated environment of real-world GIS sites. (DE) Prerequisite(s): 411 or consent of instructor.

519 Graduate Practicum in Cartography/Remote Sensing/GIS (2-6)

Repeatability: May be repeated with consent of instructor. Maximum 6 hours. Registration Permission: Written consent of department before registration.

521 Topics in Cultural Geography (3) Examination of trends, problems, and methods in cultural geography. Repeatability: May be repeated with consent of instructor. Maximum 6 hours. (DE) Prerequisite(s): 421 or consent of instructor.

532 Topics in Global Change (3) Emerging trends, anticipated problems and methods in global change research and response. Repeatability: May be repeated with consent of instructor. Maximum 6 hours. (DE) Prerequisite(s): 434 or consent of instructor.

533 Topics in Physical Geography (3) Trends, problems, and methods in geomorphology or other areas of physical geography. Repeatability: May be repeated with consent of instructor. Maximum 6 hours. Registration Permission: Consent of instructor.

534 Topics in Climatology (3) Trends, problems and methods in area of climatology. Repeatability: May be repeated with consent of instructor. Maximum 6 hours. (DE) Prerequisite(s): 434 or consent of instructor.

535 Topics in Biogeography (3) Examination of trends, problems, and methods in biogeography. Repeatability: May be repeated with consent of instructor. Maximum 6 hours. (DE) Prerequisite(s): 435 or consent of instructor.

536 Topics in Watershed Dynamics (3) Trends, problems and methods in study of watershed processes. Repeatability: May be repeated with consent of instructor. Maximum 6 hours. Registration Permission: Consent of instructor.

541 Topics in Urban Geography (3) Analysis of research on urban systems, internal morphology, urban problems and urban spatial behavior. Repeatability: May be repeated with consent of instructor. Maximum 6 hours. (DE) Prerequisite(s): 441 or consent of instructor.

545 Topics in Population Geography (3) Human population dynamics and migration, spatial variation in population composition and housing. Demographic analysis techniques.

549 Topics in the Geography of Transportation (3) Examination of trends, problems, and methods in transportation geography and transportation networks. Repeatability: May be repeated with consent of instructor. Maximum 6 hours. (DE) Prerequisite(s): 449 or consent of instructor.
591 Foreign Study (1-15)
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Written consent of department prior to registration.

592 Off-Campus Study (1-15)
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Written consent of department prior to registration.

593 Independent Study (1-15)
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Written consent of department prior to registration.

599 Geographic Concept and Method (3)
Topics vary.
Repeatability: May be repeated.

600 Doctoral Research and Dissertation (3-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

609 Seminar in Geography (2-3)
Topics vary.
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

611 Seminar in Geographic Information Science (3)
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): 517 and 518 or consent of instructor.

631 Seminar in Natural Hazards (3)
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

632 Seminar in Dendrochronology (3)
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): 432 or consent of instructor.

633 Seminar in Physical Geography (3)
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): 533 or consent of instructor.

634 Seminar in Climatology (3)
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): 534 and 532 or consent of instructor.

635 Seminar in Biogeography (3)
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): 535 or consent of instructor.

641 Seminar in Urban Geography (3)
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): 541 or consent of instructor.

643 Seminar in Rural Geography (3)
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): 443 or consent of instructor.

649 Seminar in Geography of Transportation (3)
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): 549 or consent of instructor.

663 Seminar in Geography of the American South (3)
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

Geology (424)

401 Quantitative Methods in Geology (3)
Applications of calculus and differential equations to problems in the earth sciences. Examples of the diffusion equation in hydrogeology; the wave equation in geophysics; mechanical modeling and boundary conditions in structural geology and tectonics.
Contact Hour Distribution: 3 hours lecture.
Recommended Background: Introductory geology and calculus or consent of instructor.

410 Mineral Science (3)
Crystal chemistry of the rock-forming minerals. Interaction of electromagnetic radiation and crystalline solids. Optical properties of minerals, visible and infrared spectroscopy, and X-ray diffraction. Laboratory exercises emphasize thin section and X-ray diffractometer methods of mineralogy.
Contact Hour Distribution: 2 lectures and one 2-hour lab.
Recommended Background: Mineralogy or consent of instructor.

440 Field Geology (5)
Summer field course for advanced undergraduate geology majors and first-year graduate students in geology. Taught off-campus and requires the full time of the student. The course provides a synthesis of the major aspects of the geological sciences in societal context. Field techniques demonstrated, practiced, and applied to solution of geologic problems.
Recommended Background: At least 16 hours of mineralogy, petrology, paleontology, sedimentology and stratigraphy, or structural geology and geophysics.
Registration Permission: Consent of instructor.

450 Process Geomorphology (3)
Integrative approach to the development of the surface of Earth based upon case histories, maps, remote sensing imagery. (Same as Geography 450.)
Contact Hour Distribution: 2 hours and one 2-hour lab.
Recommended Background: Introductory geology or consent of instructor.

455 Basic Environmental Geology (3)
Applications of the geological sciences toward a comprehension of the effects of geological processes on humans and effects of human activities on the Earth's environments.
Contact Hour Distribution: 2 hours and one 3-hour lab or field period.
Recommended Background: Introductory geology or consent of instructor.

460 Principles of Geochemistry (4)
Applications of chemical principles to geologic systems with emphasis on problem-solving techniques. Topics include phase diagrams, partitioning of trace elements, thermodynamic principles for evaluating stabilities of mineral assemblages, aqueous solutions, and applications of radiogenic and stable isotopes to geologic systems.
Contact Hour Distribution: 3 hours and one 2-hour tutorial.
Recommended Background: General chemistry, calculus, mineralogy and petrology or consent of instructor.

470 Applied Geophysics (3)
Basic principles of data collection, processing, and analysis for several common geophysical techniques will be presented through lectures, computer assignments (labs), and field work. Passive (earthquake) and active (reflection and refraction) seismology, potential fields (gravity and magnetism), heat flow, electromagnetics (including ground penetrating radar), and electrical techniques will be covered.
Contact Hour Distribution: One 3-hour meeting per week consisting of lecture, computer lab, or field work. One optional day or weekend field trip will be scheduled.
Recommended Background: Calculus, physics, petrology, sedimentology and stratigraphy and structural geology or consent of instructor.

473 Principles of Near-Surface Geophysics (3)
Basics of several standard near-surface geophysics techniques (for example, seismic reflection, seismic refraction, surface wave and GPR, electrical resistivity, magnetism, and EM), using state-of-the-art field equipment to develop the skills necessary to process and interpret data. Includes a significant field component.
Recommended Background: Introductory calculus.

485 Principles of Hydrogeology (3)
Physical principles of flow, flow equations, geologic controls, aquifer analysis, major well design/testing, introduction to transport processes. (Same as Civil Engineering 485.)
Recommended Background: Introductory calculus, physics, and geology.

500 Thesis (1-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

501 Fractal Models in Earth Sciences (3)
An introduction to the theory and methods of fractal analysis as applicable to earth sciences. Topics include deterministic and statistical fractals, self-affine fractals, multifractals, percolation, renormalization group theory, cellular automata, and methods of estimating fractal parameters (e.g., dimension and lacunarity). Applications to be discussed include: characterization of coastlines, drainage basins, and fracture networks; terrain simulation; modeling porous media and hydraulic properties; rock fragmentation; spatial variability of mineral deposits; and temporal variability of earthquakes and floods.
Recommended Background: 6-8 hours of coursework in earth sciences, calculus, or consent of instructor.

502 Registration for Use of Facilities (1-15)
Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

505 Structure of the Southern and Central Appalachians (2)
Structural development of Southern and Central Appalachians from extensional Late Proterozoic to early Paleozoic rift-drift-platform margin through processes related to compressional events producing accretionary elements that formed Appalachians throughout the Paleozoic. Comparisons to similar orogens.
Recommended Background: Structural geology or consent of instructor.
510 Clay Mineralogy (3) Origin, chemistry, structures, and properties of clay minerals; application of mineralogical techniques in clay mineral studies. 
Contact Hour Distribution: 2 hours lecture and one 2-hour lab. 
Recommended Background: Mineralogy and geochemical analysis or consent of instructor.

525 Data Analysis for Geoscientists (3) Overview of sampling schemes, data analysis, and statistical methods as applicable to earth sciences. 
Recommended Background: Introductory geology and introductory calculus.

530 Petrogenesis of Crystalline Rocks (4) Origin and properties of igneous and metamorphic rocks, magmatic and subvolcanic processes and physical conditions. Laboratory involves petrographic study of crystalline rocks in thin section. 
Contact Hour Distribution: 3 hours lecture and one 2-hour lab. 
Recommended Background: Advanced mineralogy or consent of instructor. 

535 Applied Ground Water Hydrology (3) (See Environmental Engineering 535.) 

539 Geologic Applications of Remote Sensing (3) An introduction to the use of visible, infrared, microwave/radio, and nuclear remote sensing techniques in the geologic study of the Earth. Topics covered include mineral spectroscopy, light scattering models, instrumentation for remote sensing, calibration and atmospheric removal, multi- and hyperspectral image cube analysis, and ground-truthing techniques. Emphasis on working directly with remote sensing data to solve geologic problems. 
Contact Hour Distribution: 2 hours lecture and one 2-hour lab. 
Recommended Background: Mineralogy, calculus and physics or consent of instructor.

545 Siliciclastic Petrogenesis (4) Origin and evolution of siliciclastic sediments from a geochemical and petrographic perspective. Emphasis on a quantitative treatment of major elements, trace elements and rare earth elements to extract provenance, weathering, and diagenetic information. 
Contact Hour Distribution: 2 lectures per week, one 2-hour lab. 
Recommended Background: Mineralogy, optical mineralogy and sedimentology and stratigraphy or consent of instructor. 

546 Carbonate Sedimentology and Geochemistry (4) Environments of deposition and diagenesis of carbonate rocks; introduction to carbonate chemistry, carbonate equilibria, and the precipitation of carbonate minerals; abiotic vs. biotic control of carbonate precipitation; secular change in carbonate mineralogy and fabric through geology time. Petrographic observation, synthesis of petrographic and geochemical datasets, critical analysis of scientific literature, and oral/written presentation. 
Contact Hour Distribution: 3 lecture/discussion hours per week and one 2-hour lab. 
Recommended Background: General chemistry, mineralogy and sedimentology and stratigraphy or consent of instructor. 

561 Organic Geochemistry (3) Fundamentals of organic geochemistry; primary production, diagenesis, and preservation of organic matter in the sedimentary rock records; and reconstructions of ancient geologic environments using biomarker compounds. 
Contact Hour Distribution: 3 lecture hours. 
Recommended Background: General chemistry or consent of instructor. 

563 Stable Isotope Geochemistry (3) Theoretical aspects of isotope fractionation and applications to geologic systems. Isotope exchange, variations in natural waters, diagenetic, hydrothermal and metamorphic systems. 
Recommended Background: General chemistry or consent of instructor. 

565 Chemical Petrology (3) Application of thermodynamics to geochemical materials. Thermodynamics of condensed phases, solutions, thermodynamic stability, heterogeneous multicomponent phase equilibria, and conduct of heat through earth. 
Recommended Background: Calculus, general chemistry and physical chemistry or consent of instructor. 

568 Geochemical Analysis (3) Collection and treatment of geochemical data using electron microprobe, x-ray fluorescence, and atomic absorption spectrophotometry techniques. 
Contact Hour Distribution: 2 hours lecture and one 2-hour lab. 
Recommended Background: General chemistry and mineralogy or consent of instructor.

570 Advanced Structural Geology (4) Current topics in structural geology and tectonics of mountain belts; recent literature. 
Contact Hour Distribution: 3 hours lecture and 1 lab or seminar. 
Recommended Background: Structural geology or consent of instructor. 

572 Fracture Analysis (3) Field and subsurface characterization, and mechanical development of natural fractures: role in groundwater flow. (Same as Civil Engineering 572.) 
Recommended Background: Structural geology or consent of instructor. 

575 Tectonics (4) Evolution of Earth’s lithosphere in context of plate tectonics theory. Formation of continents through comparative anatomy of mountain belts, including Appalachians, Alps, Urals, Caledonians, Cordillera, Andes, and Himalayas. 
Contact Hour Distribution: 3 hours lecture and 1 seminar. 
Recommended Background: Structural geology course. 
Registration Permission: Consent of instructor.

576 Reflection Seismology (3) Imaging subsurface features using reflected seismic waves. Energy sources, modes of wave propagation, field procedures, computer data processing, and pitfalls. Applications to tectonic and environmental problems. 
Recommended Background: Geophysics. 
Registration Permission: Consent of instructor.

585 Contaminant Hydrogeology (3) Physical transport processes, isotopes and groundwater age dating, processes influencing inorganic, organic and microbial contaminants, sampling and monitoring methods, remediation of contaminated groundwater, aquifer protection. 
Recommended Background: Calculus, physics, hydrogeology and geochemistry or aquatic chemistry. 
Registration Permission: Consent of instructor.

586 Field and Laboratory Methods in Hydrogeology (3) Research methods. Measurement of hydraulic properties, drilling, sampling and instrumentation, tracer experiments. Formulating hypotheses and research plans. 
Recommended Background: Calculus, physics, and hydrogeology. 
Contact Hour Distribution: 3 lecture hours. 
Registration Permission: Consent of instructor.

590 Special Problems in Geology (1-3) Student- or instructor-initiated course offered at the convenience of the department, with focus on specialized topics in the geological sciences. 
Repeatable: May be repeated. Maximum 12 hours. 
Registration Permission: Consent of instructor.

591 Foreign Study (1-12) 
Repeatable: May be repeated. Maximum 12 hours. 
Credit Restriction: Only 3 hours may be applied to the geology major. 
Registration Permission: Consent of instructor.

592 Off-Campus Study (1-12) 
Repeatable: May be repeated. Maximum 12 hours. 
Credit Restriction: Only 3 hours may be applied to the geology major. 
Registration Permission: Consent of instructor.

593 Independent Study (1-12) Student or instructor initiated independent study. 
Repeatable: May be repeated. Maximum 12 hours. 
Credit Restriction: Only 3 hours may be applied to completion of graduate coursework requirements. 
Registration Permission: Consent of instructor.

595 Selected Topics in Geology (1) Presentation of research by faculty and visiting scientists. 
Grading Restriction: Satisfactory/No Credit grading only. 
Comment(s): Registration required each spring and fall semester for resident full-time graduate students, except when registered for 596.

596 Geology Colloquium (1) Preparation and oral presentation of scientific material. Grade based on content, preparation, presentation, and instructor critique in departmental seminar. 
Comment(s): Registration required once during residence for each graduate student.

600 Doctoral Research and Dissertation (3-15) Grading Restriction: P/NP only. 
Repeatable: May be repeated. 

630 Seminar in Petrology (3) 
Repeatable: May be repeated. Maximum 9 hours. 
Registration Permission: Consent of instructor.

640 Seminar in Sedimentary Geology (3) 
Repeatable: May be repeated. Maximum 9 hours. 
Registration Permission: Consent of instructor.

650 Seminar in Geomorphology and Quaternary Geology (3) 
Repeatable: May be repeated. Maximum 9 hours. 
Registration Permission: Consent of instructor.

660 Seminar in Geochemistry (3) 
Repeatable: May be repeated. Maximum 9 hours. 
Registration Permission: Consent of instructor.

670 Seminar in Structural Geology (3) 
Repeatable: May be repeated. Maximum 9 hours. 
Registration Permission: Consent of instructor.

675 Seminar in Geophysics (3) Advanced treatment of selected topics in geophysics. 
Repeatable: May be repeated. Maximum 9 hours. 
Registration Permission: Consent of instructor.
685 Seminar in Hydrogeology (3)
Registration Permission: Consent of instructor.

695 Seminar in Planetary Sciences (3)
Registration Permission: Consent of instructor.

German (433)

411 Advanced Conversation and Composition (3)
(DE) Prerequisite(s): 311 and 312 or consent of department.

412 Advanced Conversation and Composition (3)
(DE) Prerequisite(s): 311 and 312 or consent of department.

415 German Special Topics (3)
Repeatability: May be repeated. Maximum 6 hours.

416 Metropolis Revisited (3) The 20th-century German or Austrian metropolis in the mirror of history, literature, theory, art, architecture, and music. Taught in English.
(DE) Prerequisite(s): 101 and 102 or simultaneous enrollment in that sequence. Registration Permission: Consent of instructor.

419 German Fairy Tales and Literary Fantasies (3) How and why forms of literary fantasies ranging from apocalyptic dreams to enchanted visions have changed over the centuries. Strong interdisciplinary component, tracing interconnections between philosophy, psychology, religion and literary history, as well as exploring the relationship between literary, musical and artistic representations of specific themes. Recommended Background: 6 hours of 300-level courses, excluding 331 and 332.

420 Selected Topics in German Literature from 1750 to the Present (3) Recommended Background: 6 hours of 300-level courses, excluding 331 and 332 and courses in English translation.

425 Introduction to Descriptive Linguistics (3) (See French 425.)

426 Methods of Historical Linguistics (3) Phonetics, distinctive feature analysis, sound change types, nature of sound change, principles of reconstruction, and fundamental assumptions about language change through time. Non-phonological linguistic change, language families, and Proto-Indo-European, and other proto-languages. (Same as French 426; Linguistics 426; Russian 426; Spanish 426.)
Recommended Background: 6 hours of upper-division foreign language courses, excluding courses in translation or graduate reading courses.

431 Images of Nature and the Body in German Culture (3) Representations of nature from idyllic refuge and object of praise to scientific object and precarious resource. Other themes include sexuality, the body, childhood, and aging. Discussions based on literary and documentary texts and films. Recommended Background: 6 hours of 300-level courses, excluding 331 and 332.

432 German Creative Thinking: Interdisciplinary Dialogues (3) Interdisciplinary connections between German literature and art, music, philosophy, theatrical praxis, psychology, dance, anthropology, history, and the sciences. Comparative analyses of literary and non-fictional texts, films, and other media. Recommended Background: 6 hours of 300-level courses, excluding 331 and 332.

433 Nation, Race, and Ethnicity (3) Examination of cultural constructions of nation, race, and ethnicity and how they have challenged each other and developed in German-speaking countries since the 18th century. Close study and analysis of fiction, non-fiction, and films that address controversial topics such as assimilation, integration, racial/ethnic identity formation, and multiculturalism. Recommended Background: 6 hours of 300-level courses, excluding 331 and 332.

434 Extraordinary Wo(Men)-Outcasts, Rebels, Martyrs and Saints (3) Examination of German texts and visual media that have challenged mainstream thinking throughout the centuries. Strong interdisciplinary component focusing on literary and artistic forms that depict struggles involving religion, politics and gender. Recommended Background: 6 hours of 300-level courses, excluding 331 and 332.

435 Structure of the German Language (3) Contrastive English-German segmental and suprasegmental phonemes, contrastive English-German linguistic structures, selected topics in advanced German grammar and syntactic analysis. (Same as Linguistics 435.) Recommended Background: 6 hours of upper-division German language courses, excluding courses in translation and graduate reading courses.

436 History of the German Language (3) Development of the German language from Indo-European through Proto-Germanic. Old High German, Middle High German to New High German. Internal and external linguistic history of German speech. (Same as Linguistics 436.)
Recommended Background: 6 hours of upper-division German language courses, excluding courses in translation and 331 and 332.

445 Business German (3) German used in fields of business, government, administration, and economics. Recommended Background: 6 hours of upper-division German, excluding courses in translation and 331 and 332.

494 German Community Service Practicum (1) Supervised by the director of the lower-division German program. Students either assist German classes at local schools or perform supervised service with local institutions that promote awareness of German culture among the general public.
Repeatability: May be repeated. Maximum 3 hours. (Maximum 1 hour per semester.)
Recommended Background: 18 hours of upper-division German courses. Registration Permission: Consent of instructor.

500 Thesis (1-15)
Grading Restriction: P/NP only. Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Credit Restriction: May not be used toward degree requirements.

510 German Phonetics and Advanced Grammar (3) Advanced work in phonetics, pronunciation, and selected topics in German grammar. For teachers and prospective teachers.
Registration Permission: Consent of instructor.

512 Teaching a Foreign Language (3) Practical application of methods for teaching and evaluating basic language skills and foreign language skills, and cultural knowledge through seminars, demonstrations, peer teaching, and observation of foreign language classes. Required of all MA and PhD students holding Graduate Teaching Assistantships, except those whose previous training or experience warrants their being excused by the department.

519 Bibliography and Methods of Research (3) Critical research tools and scholarly contributions in German literature and language. Practical exercises on compiling of scholarly data using computer-based and non-computer sources.

541 Medieval German Language and Literature (3) Introduction to Middle High German.

550 Studies in German Literature (3) Content varies. Repeatability: May be repeated. Maximum 6 hours.

552 German Enlightenment, Rococo, and Sturm und Drang (3) Content varies. Repeatability: May be repeated. Maximum 6 hours.

553 German Classicism and Romanticism (3) Content varies. Repeatability: May be repeated. Maximum 6 hours.

554 German Realism and Naturalism (3) Content varies. Repeatability: May be repeated. Maximum 6 hours.

555 Modern German Literature 1890-1945 (3) Content varies. Repeatability: May be repeated. Maximum 6 hours.

556 Modern German Literature 1945-Present (3) Content varies. Repeatability: May be repeated. Maximum 6 hours.

560 German Literary Theory and Criticism (3)

561 Directed Readings in German Language and Literature (3)

562 Directed Readings in German Language and Literature (3)

591 Foreign Study (1-15)
Repeatability: May be repeated. Maximum 15 hours.

592 Off-Campus Study (1-15)
Repeatability: May be repeated. Maximum 15 hours.

593 Independent Study (1-15)
Grading: Satisfactory/No Credit or letter grade. Repeatability: May be repeated. Maximum 15 hours.

600 Doctoral Research and Dissertation (3-15) Grading Restriction: P/NP only. Repeatability: May be repeated.
Global Studies (440)

482 Special Topics in Global Cinema (3) (See Modern Languages and Literatures 482.)

Health (449)

400 Consumer Health (3) Major consumer health care providers and health care services. Selecting, purchasing, evaluating and financing medical and health care services/products. (Same as Public Health 400.)

406 Death, Dying and Bereavement (3) Aspects of dying, death and handling the trauma of loss. Medical, financial, physical, legal, and social implications of death. (Same as Safety 406.)

420 Sex Education As It Relates to Human Sexuality (3) Science of human sexuality. Emphasis on the trends, issues, and content of sex education.

425 Women's Health (3) Factors influencing women's health and women as consumers in nation's health service delivery systems. Study of health problems/concerns of women and techniques for prevention, maintenance and/or correction. (Same as Women's Studies 425.)

430 Suicide and Crisis Intervention (3) Factors which make suicide a serious health problem. Assessment, intervention, and prevention techniques.

435 Substance Use and Abuse (3) Drug and alcohol abuse problems and suspected causes. Pharmacology of drugs and effects on society. Strategies for intervention and education.

465 Aging and Health (3) Aging process in a health perspective as it relates to health promotion and wellness of the aged.

500 Thesis (1-15)
  Grading Restriction: P/NP only.
  Repeatable: May be repeated. Maximum 18 hours.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements.
  Grading Restriction: Satisfactory/No Credit grading only.
  Repeatable: May be repeated. Maximum 3 hours.

520 Sex Education and Human Sexuality (3) Advanced in-depth discussion of educational and health counseling theory, techniques, materials used in school, community, or health care facility.

530 Health Promotion and Health Education Program Development (3) Theories and principles of health promotion program development; methodology, marketing, public relations. Health education as vehicle for health promotion.

540 Evaluation in Health Promotion and Health Education (3) Evaluation principles and methodologies as related to health promotion products, processes and programs. Construction of instruments for use in assessing health education outcomes.

570 Special Topics (1-3) For graduate students, in-service teachers and other health professionals. Health/wellness or health promotion issues.
  Repeatable: May be repeated. Maximum 12 hours.

585 Seminar in Gerontology (1) Scope of gerontology as discipline and as related to other academic and professional disciplines. Speakers both internal and external to the University of Tennessee, Knoxville. (Same as Counselor Education 585; Educational Psychology 585; Exercise Science 585; Nursing 585; Public Health 585; Social Work 585; Sociology 585.)
  Grading Restriction: Satisfactory/No Credit grading only.
  Repeatable: May be repeated. Maximum 3 hours.
  Registration Permission: Consent of instructor.

590 Research Methods in Health (3) Basic research techniques in a variety of health settings. Development of research skills and problem identification for research topic. (Same as Public Health 590; Safety 592.)

593 Directed Independent Studies (1-3) Individual identification and study of health/wellness or health promotion problem/issue. Specific proposal must be presented to instructor before registration.
  Repeatable: May be repeated. Maximum 12 hours.

600 Doctoral Research and Dissertation (3-15)
  Grading Restriction: P/NP only.
  Repeatable: May be repeated.

601 Internship/Research in Safety and Health (3-6) (See Safety 601.)

610 Critical Analysis of Writing and Research (3) Analysis of writing and research in health related areas.

620 Advanced Research Techniques in Health (3) Advanced theory and techniques of research design and methodologies in health discipline.
  (DE) Prerequisite(s): 590 and 610.

650 Health Aspects of Gerontology (3) Knowledge and understanding of biological, psychological and sociological aspects of aging as related to health and wellness of individual. (Same as Public Health 650.)

655 Seminar in Nation's Health (3) Comprehensive study of definition, determinants, resources and health status of nation. (Same as Public Health 655.)

660 International Health (3) Study of quality of health, health promotion and health services in countries worldwide. (Same as Public Health 660.)

Higher Education Administration (461)

455 Seminar in Student Leadership (1) Topics to be assigned. Designed to develop knowledge and skills in leadership roles for resident assistants, student government leaders, student activities, and other student organizations.
  Repeatable: May be repeated. Maximum 3 hours.

500 Thesis (1-15)
  Grading Restriction: P/NP only.
  Repeatable: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements.
  Grading Restriction: Satisfactory/No Credit grading only.
  Repeatable: May be repeated.
  Credit Restriction: May not be used toward degree requirements.

503 Problems in Lieu of Thesis (2-3)
  Grading Restriction: Satisfactory/No Credit grading only.
  Repeatable: May be repeated. Maximum 9 hours.

513 Administrative and Organizational Theory (3) (See Educational Administration 513.)

514 Leadership Themes in Literature (3) Review and analysis of selected literature works – novels, biographies, poetry, plays, essays, personal letters and speeches; history – for lessons that enhance understanding of leadership role, values, and effectiveness.

516 Research Methods (3) (See Educational Administration 516.)

531 Program Evaluation in Education (3) (See Educational Psychology 533.)

534 Program Evaluation in Education (3) (See Curriculum, Educational Research, and Evaluation 534.)

536 Policy Issues in Higher Education Quality Assurance (3) Exploration of historic and contemporary approaches to definition and demonstration of quality in education and examination of contemporary policy issues related to quality assurance.

537 Student Assessment in Higher Education (3) Outcome assessment in American higher education: origins of assessment policies, rationales for assessment policy and practice, constructs and outcomes typically assessed, methods for conducting assessment, and uses of assessment data. Philosophies, priorities, and values, recent assessment efforts in higher education.

542 The College Student and the Court (3) Legal precedent affecting student personnel services in public higher education. Student discipline, housing, dress, organizations, activities fees, tuition and related federal regulations.

543 American Higher Education in Transition (3) History, philosophy, purposes, functions, organizations and programs in American higher education.

570 Student Affairs Administration in Higher Education: Theory and Practice (3) Historical, philosophical and organizational perspective. Functional areas comprising field and major issues.
572 Student Development Theory and Practice in Higher Education (3) Theoretical framework of college student personnel services and practical application of theory in student services environment. Applicable administrative theory, human development theory and evaluation assessment techniques.

574 The College Student (3) Critical examination of the characteristics and concerns of current college students in relation to the direction and provision of student services and student personnel administration.

593 Independent Study (1-3) 
Repeatability: May be repeated. Maximum 9 hours. 
Registration Permission: Consent of instructor.

595 Special Topics (1-3) 
Repeatability: May be repeated. Maximum 12 hours.

599 Internship in College Student Personnel (1-6) 
Grading Restriction: Satisfactory/No Credit grading only. 
Repeatability: May be repeated. Maximum 6 hours. 
Registration Permission: Consent of instructor.

600 Doctoral Research and Dissertation (3-15) 
Repeatability: May be repeated.

604 Seminar in Educational Administration and Policy Studies (1-4) Directed readings and research in educational administration. 
Grading Restriction: Satisfactory/No Credit grading only. 
Repeatability: May be repeated. Maximum 6 hours.

605 Advanced Seminar in Administrative Theory (3) Interdisciplinary seminar. Readings selected by faculty for research and scholarly value from early to current classic theoretical studies and current periodical literatures in administrative and organizational theory. (Same as Educational Administration 605.)

606 Leadership Forum (1-3) (See Educational Administration 606.)

614 Statistics for Educational Administrators (3) (See Educational Administration 614.)

615 Research Design (3) (See Educational Administration 615.)

616 Research Methods (3) (See Educational Administration 616.)

617 Case Study Methods in Educational Research (3) (See as Educational Administration 617.)

619 Administration and Governance of Higher Education (3) Trends, structure and process of collegiate governance. Development of understanding of administrative theory and practice in higher education.

629 Seminar in Policy Issues in Education (3) (See Educational Administration 629.)

640 Policy Issues in College and University Law (3) Legal precedent affecting organizations, administration, and finance of higher education. Academic freedom, faculty termination, religion, tort liability, administrative law, academic due process and affirmative action in employment.

645 Curriculum and Instruction in Higher Education (3) Examination of teaching, learning and curriculum in higher education.

650 Fiscal Policy Issues in Higher Education (3) Revenue sources, appropriation process, budget procedures, cost analysis, and fiscal management in public and independent colleges and universities.

658 Conflict Management (3) Social conflict and its management. Causes of interpersonal, inter-group, and organizational conflict, skills and strategies used to manage conflict, conflict management models associated with different sectors of human activity, and current organizational practices for managing destructive conflict. (Same as Educational Administration 658.)

670 Values and Ethics in Educational Leadership (3) Examination of moral and ethical dimensions of the work of educational leaders. (Same as Educational Administration 670.)

680 Administration of Complex Organizations (3) (See Educational Administration 680.)

693 Independent Study (1-3) 
Repeatability: May be repeated. Maximum 12 hours.

695 Special Topics (1-3) 
Repeatability: May be repeated. Maximum 12 hours.

History (462)

500 Thesis (1-15) 
Grading Restriction: P/NC only. 
Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. 
Grading Restriction: Satisfactory/No Credit grading only. 
Repeatability: May be repeated. 
Credit Restriction: May not be used toward degree requirements.

510 Foundations of Graduate Study in History (3) Assumptions and methods of historians. Required of all candidates for advanced degrees.

511 Teaching World History (3) Methodology, conceptualization, historiography, text book selection and syllabus construction to prepare students to teach courses in world history.

513 Teaching United States History (3) Methodology, conceptualization, historiography, text book selection and syllabus construction to prepare students to teach courses in U.S. history.

515 Introduction to American History to 1840s (3) Survey of major themes, methodologies, and interpretations in early American historiography.

516 Introduction to American History, 1840s – present (3) Survey of major themes, methodologies, and interpretations in modern American historiography.

521 MA Readings (3) Directed readings in preparation for MA examinations. 
Grading Restriction: Satisfactory/No Credit grading only. 
Repeatability: May be repeated. Maximum 15 hours. 
Comment(s): Open only to master’s candidates in history.

531 Topics in Pre-modern Europe (3) Reading seminar: secondary sources on pre-modern European movements and trends. Focus varies. 
Repeatability: May be repeated. Maximum 15 hours.

532 Topics in Modern Europe (3) Reading seminar: secondary sources on movements and trends that are multinational in focus. Focus varies. 
Repeatability: May be repeated. Maximum 15 hours.

533 Topics in European National History (3) Reading seminar: secondary sources on intra-national topics, usually British, Russian, German, or French. Focus varies. 
Repeatability: May be repeated. Maximum 15 hours.

541 Topics in Early American History (3) Reading seminar: secondary sources on early North American history. Focus varies. 
Repeatability: May be repeated. Maximum 15 hours.

542 Topics in 19th-Century United States (3) Reading seminar: secondary sources on 19th-century United States. Focus varies. 
Repeatability: May be repeated. Maximum 15 hours.

543 Topics in 20th-Century United States (3) Reading seminar: secondary sources on 20th-century United States. Focus varies. 
Repeatability: May be repeated. Maximum 15 hours.

544 Topics in U.S. Environmental History (3) Reading seminar: secondary sources on U.S. environmental history. Focus varies. 
Repeatability: May be repeated. Maximum 15 hours.

551 Topics in the History of Foreign Relations (3) Reading seminar: secondary sources on foreign relations. Focus varies. 
Repeatability: May be repeated. Maximum 15 hours.

552 Topics in Military History (3) Reading seminar: secondary sources on military history, military operations, social impact of war, and naval strategy in foreign policy. 
Repeatability: May be repeated. Maximum 15 hours.

555 Topics in United States Social and Economic History (3) Reading seminar: secondary sources on U.S. social and economic history. Focus varies. 
Repeatability: May be repeated. Maximum 15 hours.

556 Topics in European Social and Economic History (3) Reading seminar: secondary sources on social or economic history of European nations. Focus varies. 
Repeatability: May be repeated. Maximum 15 hours.

557 Topics in Cultural and Intellectual History (3) Reading seminar: secondary sources on cultural and intellectual history. Focus varies. 
Repeatability: May be repeated. Maximum 15 hours.

558 Topics in United States Regional and Local History (3) Reading seminar: secondary sources on regions, states and cities of the South. 
Repeatability: May be repeated. Maximum 15 hours.
559 Topics in Jewish History (3) Reading seminar: secondary sources on Jewish history. Focus varies.
   Repeatability: May be repeated. Maximum 15 hours.

561 Topics in Latin American History (3) Reading seminar: secondary sources on Latin America. Focus varies.
   Repeatability: May be repeated. Maximum 15 hours.

562 Topics in Asian History (3) Reading seminar: secondary sources on Asian history. Focus varies.
   Repeatability: May be repeated. Maximum 15 hours.

563 Topics in African History (3) Reading seminar: secondary sources on African history. Focus varies.
   Repeatability: May be repeated. Maximum 15 hours.

580 Topics in History (3) Reading seminar: secondary sources for new topics. Focus varies.
   Repeatability: May be repeated. Maximum 15 hours.

585 Topics in World History (3) Reading seminar in transnational themes involving analysis of two or more world cultures. Focus varies.
   Repeatability: May be repeated. Maximum 9 hours.

591 Foreign Study (1-12)
   Repeatability: May be repeated. Maximum 12 hours.

592 Off-Campus Study (1-12)
   Repeatability: May be repeated. Maximum 12 hours.

593 Independent Study (1-12)
   Repeatability: May be repeated. Maximum 12 hours.

600 Doctoral Research and Dissertation (3-15)
   Grading Restriction: P/NP only.
   Repeatability: May be repeated. Maximum 15 hours.

621 Directed Readings (3) Directed readings to prepare candidate for doctoral comprehensive examination.
   Grading Restriction: Satisfactory/No Credit grading only.
   Repeatability: May be repeated. Maximum 6 hours.

631 Seminar in Pre-Modern European History (3) Research seminar in primary sources. Focus varies.
   Repeatability: May be repeated. Maximum 15 hours.

632 Seminar in Modern European History (3) Research seminar in primary sources culminating in scholarly paper in modern European history. Focus varies.
   Repeatability: May be repeated. Maximum 15 hours.

641 Seminar in 17th- and 18th-Century America (3) Research seminar in primary sources. Focus varies.
   Repeatability: May be repeated. Maximum 15 hours.

   Repeatability: May be repeated. Maximum 15 hours.

   Repeatability: May be repeated. Maximum 15 hours.

651 Seminar in Military and Foreign Relations History (3) Research seminar in primary sources culminating in scholarly paper in military or foreign relations history. Focus varies. Not restricted by national grouping.
   Repeatability: May be repeated. Maximum 15 hours.

658 Seminar in United States Regional and Local History (3) Research seminar in primary sources culminating in scholarly paper in regional and local history. Focus varies.
   Repeatability: May be repeated. Maximum 15 hours.

Hotel, Restaurant, and Tourism (514)

423 Marketing for Hospitality and Tourism (3) Marketing principles and practices specifically applied to the hospitality and tourism industry. Includes the analyses of various hospitality and tourism marketing strategies and the implications of those strategies. Develops the use of marketing tools as an integral part of the hospitality and tourism operation.
   (DE) Prerequisite(s): 210, 211, 224, and Marketing 300 or consent of instructor.

435 Meeting Planning, Special Events, and Convention Management (3) Management techniques used in the execution of meetings, marketing, conventions, and special events. Emphasis on integration of management principles and strategic planning.
   (DE) Prerequisite(s): 210, 211, and 390 or consent of instructor.

500 Thesis (1-15)
   Grading Restriction: P/NP only.
   Repeatability: May be repeated.

501 Professional Project (3-15) Application-oriented, capstone project to show competence in major academic area.
   Grading Restriction: Satisfactory/No Credit grading only.
   Repeatability: May be repeated. Maximum 15 hours.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
   Grading Restriction: Satisfactory/No Credit grading only.
   Repeatability: May be repeated.
   Credit Restriction: May not be used toward degree requirements.

510 Trends and Issues in Service Management (3) Examination of current and emerging trends and issues in the consumer product and services industry. Implications of trends and their managerial and strategic applications in services management.

523 Tourism Analysis (3) Trade theory and regional analysis methodologies applied to tourism and the service industry, including travel balance account, interregional transactions flow, economic impacts, environmental economics, demand theory and forecasting.

524 Tourism Destination Development (3) Relationship of economic theory and planning principles to tourism development. Includes the application of pre-feasibility analysis to tourism projects and the evaluation of various types of tourism and components of tourism.

532 Human Resource Management in Services Industry (3) Analysis of significant organizational processes and practices in management of human resources within consumer product and service industry.

534 Special Topics in Foodservice and Lodging Administration (1-3) Lecture/discussion format. Contemporary developments and trends in industry.
   Repeatability: May be repeated. Maximum 6 hours.
   Registration Permission: Consent of instructor.

535 Directed Study in Foodservice and Lodging Administration (1-3) Problems selected for study by student with guidance of faculty member.
   Repeatability: May be repeated. Maximum 6 hours.
   Registration Permission: Consent of instructor.

537 Seminar in Foodservice and Lodging Administration (1) Grading Restriction: Satisfactory/No Credit grading only.
   Repeatability: May be repeated. Maximum 3 hours.

542 Advanced Hotel Administration (3) Strategic management of hotel organizations. Theoretical and applied literature on formulation and implementation of strategy; external and internal factors relevant for business and corporate level decisions. Consideration of role of marketing in hotel firms. Analysis of industry and case studies.
   (DE) Prerequisite(s): 531 and 532.

547 Field Experience (3-9) Experience in food- or lodging-related industry or agency under supervision of faculty member.
   Grading Restriction: Satisfactory/No Credit grading only.
   Repeatability: May be repeated. Maximum 9 hours.
   Registration Permission: Consent of instructor.

600 Doctoral Research and Dissertation (3-15)
   Grading Restriction: P/NP only.
   Repeatability: May be repeated.

614 Trends and Issues in Hospitality and Tourism (3) Examination of contemporary issues in hospitality and tourism.

615 Literature and Thought in Hospitality and Tourism (3) Evaluation of hospitality and tourism management literature with emphasis upon research literature, development of scholarly thought, and identification of potential areas of further study.

Human Resource Development (529)

500 Thesis (1-15)
   Grading Restriction: P/NP only.
   Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
   Grading Restriction: Satisfactory/No Credit grading only.
   Repeatability: May be repeated.
   Credit Restriction: May not be used toward degree requirements.

503 Problems in Lieu of Thesis (3)
   Grading Restriction: Satisfactory/No Credit grading only.
   Repeatability: May be repeated. Maximum 6 hours.
509 Implementation of Human Resource Development Systems (3)
   The internship provides experiential learning for students who come to
human resource development without practical real world experience.
   The internship is an opportunity to apply classroom knowledge, obtain
additional human resource experience, and reflect on the knowledge and
experience. The corporate experience provides additional human re-
source knowledge and assists the student in research and career ad-
ancement.
   (DE) Prerequisite(s): 510.

510 Foundations of Human Resources (3)
   Students develop a working definition and understanding of the foundations that grid the academic
discipline and profession of Human Resources. Students develop knowl-
edge of the historical, theoretical, and philosophical foundations as well
as the core models of learning, performance, change and management
that promote best practices in the field. Students are introduced to the
disciplines of training and development, human expertise, organizational
development, and management including human resource management
goals and activities.

511 Issues and Trends in Human Resource Development (3)
   Study of current, emerging, and future issues and trends in Human Resource De-
velopment research and practice. Linking research and practice, impor-
tance of theory to inform practice, research needs reflected in practice,
cycle of how researchers and practitioners learn, how they design prac-
tice, and how they evaluate to inform policy.
   (DE) Prerequisite(s): 510.

513 Special Topics in Human Resource Development (1-3)
   Topics vary in research, theory and current issues in human resources.
   Repeatability: May be repeated. Maximum 9 hours.
   Registration Permission: Consent of instructor.

514 Individual Study in Human Resource Development (3)
   Approval form must be filed in the office of the program liaison.
   Repeatability: May be repeated. Maximum 6 hours.
   Registration Permission: Consent of supervising instructor.

517 Career Development (3)
   Examination of processes and practices that facilitate the individual's leadership development, performance im-
provement and career goals in relation to the organization's present and
future human resource needs, including identification of personal respon-
sibilities and organizational opportunities through successful career de-
development systems.

518 Performance Improvement Systems and Technologies (3)
   Provides studies of concepts, strategies, tools, and trends of performance
improvement technologies. Major emphasis will be on the planning, facil-
itating, and implementation of performance technologies that support
human resource functions and facilitate their value to organizations.
   (DE) Prerequisite(s): 510.

519 Human Resource Problems (3)
   Accommodates experiential learning for students who have a background in human resource develop-
ment. In the management context, students identify, analyze design, devel-
op, implement, and evaluate a practical human resource development in-
tervention.
   (DE) Prerequisite(s): 510 and 511.

520 Collaborative Strategies in Human Resource Development (3)
   Examines the strategies for collaboration and teambuilding within organi-
zational systems. The course assists human resource professionals un-
derstand the processes associated with teambuilding including defining
types of teams, rewarding and evaluating team performance, operating
principles and communication within teams. The primary focus of this
course will be creating the high performance team.
   (DE) Prerequisite(s): 563.

556 Organizational Development Strategies (3)
   Overview of the roles, strategies, and challenges of organizational development with a focus on
the dynamics of organizational change and the internal integration of or-
ganizational culture in a global context.
   (DE) Corequisite(s): 510.

557 Design Strategies (3)
   Design methodology for business and industry interventions; development of instructor-based, technology-based,
and self-directed training for training and development and consulting.
   (DE) Corequisite(s): 510.

559 Evaluation Strategies (3)
   Evaluation strategies for professional set-
tings. This course examines the importance of evaluation, how to con-
duct appropriate evaluations, instrumentation and analysis strategies,
how to assess the return-on-investment, and guidelines for creating an
evaluation report.
   (DE) Prerequisite(s): 557.

561 Strategic Human Resource Development (3)
   Overview of how human resource development increases organizational competitive ad-
vantage. Human capital theory, systems theory and systems integration
emerge as theoretical frameworks for linking human resource develop-
ment with business strategy to attain strategic initiatives. Value creation
for human resource development stakeholders, management of human
resource development resources, and continuous improvement of human
resource development processes are emphasized. Students explore the
role of human resource development in organizational visioning, planning,
leadership development, innovating, and economic development.

563 Organizational Communication Strategies (3)
   Students investigate organizational communication theory, purposes, channels, prac-
tices, styles, approaches, skills, and tools. Process improvement strate-
gies span internal, and external communication and target oral, written,
and nonverbal communications that occur in face-to-face, technology-
mediated, and blended organizational communication contexts.

600 Doctoral Research and Dissertation (3-15)
   Grading Restriction: P/NP only.
   Repeatability: May be repeated.

602 Proseminar I in Human Resource Development (3)
   Basic thought, concepts, and issues required for advanced graduate study in human re-
source development. Must be taken during the first year of study in the
program.
   Registration Permission: Consent of instructor for non-program students.

603 Proseminar II in Human Resource Development (3)
   Basic thought, concepts, and issues required for advanced graduate study in human resource development. Must be taken during the first year of
study in the program.
   Registration Permission: Consent of instructor for non-program students.

605 Seminar in Organizational Theory and Environmental Context
   Organizational structure and basic systems influencing individual,
group and organizational behavior with an emphasis on environmental
context impacting worker performance and opportunities for learning trans-
ferral. Ecological approach to organizational effectiveness is addressed.
   (DE) Prerequisite(s): 602 and 603.

606 Research in Human Resource Development (3)
   Theory and application of qualitative approaches to social science and human resource
development research. Emphasis is on ethnographic methods to obtain
in-depth information about behaviors and beliefs of people in natural set-
tings. Use of methods, structured interviews using heuristic elicitation
methodology, participant/observation and case studies.
   (DE) Prerequisite(s): 602 and 603.

607 Seminar in Organizational Communication Processes (3)
   Students study how the elements and complexities of organizational commu-
ication lead to potential miscommunications. This course involves
analysis of contemporary and leading-edge organizational communic-
ation; and the development of communication skills and techniques.
Students address prevention and mini-
mization of destructive system and process complexities; and maximization of
constructive elements; and explore organizational and individual ac-
countability for creating, sustaining, and improving organizational com-
munication systems, processes, and environments.
   (DE) Prerequisite(s): 602 and 603.

608 Seminar in Work/Life Interface Issues (3)
   Interface of work/life topics; how does work and life issues interconnect and influence each other from a psychosocial perspective? The goal of the course will be to help
human resource professionals better understand and address the critical
linkages between work and life to encourage personal and professional
well-being.
   (DE) Prerequisite(s): 602 and 603.

609 Seminar in Technological Frameworks for Human Resource De-
velopment (3)
   Provides instruction and discussions on technology and
human performance issues in today's organizations. Topics include tech-
ology diffusion, performance improvement technologies, and privacy
and ergonomic issues in utilizing technologies to improve human per-
formance in organizations.
   (DE) Prerequisite(s): 602 and 603.

611 Internship in Human Resource Development (3)
   Field experience in relevant organizations.
   Grading Restriction: Satisfactory/No Credit grading only.
   Repeatability: May be repeated. Maximum 6 hours.
   Registration Permission: Consent of instructor.

613 Seminar in Selected Topics (3)
   Topics in human resource develop-
ment.
   Repeatability: May be repeated Maximum 6 hours.
   (DE) Prerequisite(s): 602 and 603.
Industrial and Organizational Psychology (568)
502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and faculty time before degree is complete.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
525 Research in Industrial/Organizational Psychology (1-3)
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 6 hours.
Comment(s): Available only to students admitted to program or by prearrangement with program director.
567 Proseminar in Industrial/Organizational Psychology (3) Basic thought, concepts, and issues required for advanced graduate study in industrial and organizational psychology. Must be taken during first year of study in program.
Registration Permission: Consent of instructor required for non-program students.
568 Proseminar in Industrial/Organizational Psychology (3) Basic thought, concepts, and issues required for advanced graduate study in industrial and organizational psychology. Must be taken during first year of study in program.
Registration Permission: Consent of instructor required for non-program students.
569 Applied Measurement for Industrial/Organizational Psychology (3) Basic techniques for collection and evaluation of individual and organizational data using both classical and modern psychometric techniques. Relevant statistical models: reliability analysis, and exploratory and confirmatory factor analyses.
600 Doctoral Research and Dissertation (3-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.
605 Advanced Research Methods in Psychology (3) Critical analysis of new and evolving techniques for psychological research; new statistical and psychometric methods.
610 Individuals in Organizations Seminar (3) Bridging principles and processes which link individual attributes with more macro organization concerns: culture, climate, and group decision making.
611 Seminar in Organizational Leadership (3) Current theories, concepts, and issues associated with psychology of organizational leadership.
(DE) Prerequisite(s): 567 and 568 or consent of instructor.
612 Seminar in Work Motivation (3) Current theories, concepts, and issues associated with psychology of work motivation.
(DE) Prerequisite(s): 567 and 568 or consent of instructor.
613 Seminar in Performance Appraisal (3) Current issues, problems, and research in performance appraisal and criterion development; applications in compensation.
(DE) Prerequisite(s): 567 and 568 or consent of instructor.
614 Seminar in Employee Selection (3) Current issues, concerns, and methods used in employee selection.
(DE) Prerequisite(s): 567 and 568 or consent of instructor.
615 Seminar in Organizational Training and Development (3) Current issues, problems, and research in training and development.
(DE) Prerequisite(s): 567 and 568 or consent of instructor.
625 Topics in Organizational Psychology (3) Topics vary.
Repeatability: May be repeated. Maximum 9 hours.
626 Topics in Industrial Psychology (3) Topics vary.
Repeatability: May be repeated. Maximum 9 hours.
627 Structural Equation Models in Organizational Research (3) Issues related to analysis of organizational data using structural equation and related techniques.
628 Personality Assessment (3) Review of key domains of social cognition: measurement systems which use individual differences in social-cognitive biases as basis for measuring personality.
635 Ethical and Professional Issues in Industrial/Organizational Psychology (3) Issues involved with ethical practice in research, academic, organizational, and consulting situations.
690 Supervised Practicum, Internship or Field Training in Industrial/Organizational Psychology (1-15) One credit hour per 30 hours of practice.
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 15 hours.

Industrial Engineering (556)
Note: Any 400-level course required for the Bachelor of Science in Industrial Engineering at the University of Tennessee, Knoxville, may not be used for graduate credit in the MS program.
401 Integrated Manufacturing Systems (3) NC and CNC machine tools, robotics and related materials handling systems, hard automation, alternative integrated manufacturing systems, and manufacturing information/control systems.
(DE) Prerequisite(s): 330.
402 Production System Planning and Control (3) Theory and application of forecasting systems including regression and time series models. Independent demand inventory models, including development of safety stock. All modules of Manufacturing Resource Planning (MRP) Systems. Master production scheduling, resource requirements planning, bill of material and inventory file structures, material requirements planning, capacity planning, shop floor and purchase order control. Overview of just-in-time inventory concepts and MRP’s role in manufacturing automation.
(DE) Prerequisite(s): 302.
421 Information Systems Analysis and Design (3) Systems engineer approach to analysis and design of systems of information. Topics – system development life cycle, system analysis methodologies, data analysis techniques, system design, joint application design, and rapid application design. Lab introduces analysis and design software tools.
422 Senior Problems Analysis (3) Current real-world problems will be drawn from local production and service organizations and presented by personnel from these organizations. Senior industrial engineering student teams will solve these real-world problems under the guidance of their instructor using industrial engineering methodology. These problems emphasize problem definitions, analysis, and presentation with considerations for engineering standards and realistic economic, environmental, ethical, safety, social, political, and other pertinent constraints.
427 Introduction to Lean Systems (3) Introduces a framework to implement improvements within an enterprise. This framework will focus on definition of the physical system and the associated information system. The students will be introduced to the basic concepts of facilities design based upon process design and requirements. The design of the physical and information systems will be based on integrating the concepts, terminology, and tools of lean enterprise and Six Sigma. Activities will include case studies, industry based projects, and the preparation of written engineering reports.
(DE) Corequisite(s): 306 and 402.
455 Human-Computer Interaction (3) Introduction to the analysis, design, production, and implementation of systems requiring interaction between humans and computers (HCI). Includes human sensory systems, human memory capacity, computer hardware/software requirements, input/output device design, and error message handling.
Recommended Background: Computer programming course.
483 Introduction to Reliability Engineering (3) (See Nuclear Engineering 483.)
484 Introduction to Maintainability Engineering (3) (See Nuclear Engineering 484.)
500 Thesis (1-15) Grading Restriction: P/NP only.
Repeatability: May be repeated.
501 Design Project (1-3) Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 6 hours.
Comment(s): Enrollment limited to industrial engineering students in non-thesis option.
502 Registration for Use of Facilities (1-15) Required, except for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Credit Restriction: May not be applied toward degree requirements.

503 Industrial Engineering Methods Review (3) Survey of industrial engineering tools and techniques applied to analysis, design, and improvement of manufacturing systems. Students who do not have an undergraduate degree in industrial engineering must enroll in this course. Grading Restriction: Satisfactory/No Credit grading only. Credit Restriction(s): May not be applied toward degree requirements. Comment(s): Admission to dual MS-MBA program required.

504 Product Development Process (1) (See Mechanical Engineering 504.)

506 Product Selection and Evaluation (2) (See Mechanical Engineering 506.)

507 Application of Linear Algebra in Engineering Systems (3) (See Chemical Engineering 507.)

508 Integrated Product, Process and Manufacturing System Design (3) Different manufacturing system configurations. Relationships between product design and processing requirements, design specifications and manufacturing costs. Finalizing design specifications and selection processes. Analysis of manufacturing system costs. Presentation of factors affecting manufacturing system design. Case studies and team projects. (Same as Mechanical Engineering 508.)

509 Multidisciplinary Project (1) Venue for multidisciplinary student teams to coordinate design and manufacturing tasks of product to be developed. Project management (budget and schedule), assignment of tasks for team members, and concurrent design and manufacturing. Design concepts and product feature reviewed by potential customers/investors. (Same as Aerospace Engineering 509; Biomedical Engineering 509; Chemical Engineering 509; Electrical and Computer Engineering 509; Materials Science Engineering 509; Mechanical Engineering 509; Nuclear Engineering 509.)

511 Business Planning and Commercialization (3) Complex issues of product development and business planning required to deliver new product from concept to market. Strategic issues that emerge during product development cycle, beginning with concept to product development to commercialization to eventual product introduction or dismissal. Management practices for successful product development and product management. Registration Permission: Consent of instructor.

513 Facilities Planning and Design (3) Modern materials handling techniques, computer-aided layout techniques, application of operation research models, and use of these to design manufacturing facility. (DE) Prerequisite(s): 403 or consent of instructor.

514 Advanced Information Systems Analysis and Design (3) Systems analysis and systems control concepts applied to systems of information. Role of Industrial engineering in office and factory of future. Management support systems, decision support systems, and integrated support systems.

515 Advanced Production and Inventory Systems (3) Advanced topics in production planning and inventory systems. Material requirements planning; production planning and master scheduling; just-in-time concepts; distribution requirements planning; and other selected topics. (DE) Prerequisite(s): 402 or consent of instructor.

516 Statistical Methods in Industrial Engineering (3) Application of classical statistical techniques to industrial engineering problems. Statistics and statistical thinking in managerial context of organizational improvement, descriptive statistics and distribution theory, relationship between statistical process control techniques and classical statistical tools: parameter estimation and hypothesis testing; goodness-of-fit testing; linear regression and correlation; analysis of variance; single and multiple factor experimental design. (DE) Prerequisite(s): Statistics 251 or equivalent.

517 Reliability Engineering (3) Continuous time random processes with applications to availability of equipment and manufacturing systems. Failure densities and failure data analysis. Maintainability. Reliability-based criteria for product acceptance. (DE) Prerequisite(s): 516.

518 Advanced Engineering Economic Analysis (3) Application of engineering economic analysis in complex decision situations. Inflation and price changes; uncertainty evaluation using non-probabilistic techniques; capital financing and project allocation; evaluations involving equipment replacement, investor-owned utilities, and public works projects; probabilistic risk analysis including decision trees; multi-attribute decision analysis; and other advanced topics. (DE) Prerequisite(s): 405 and Statistics 251.

519 Human Factors Engineering and Ergonomics (3) Application of human factor and ergonomic concepts and principles to design and analysis of manual systems and products. Human as biomechanical system: human information processing, minimization of human error; anthropometry: anatomy and physiology; physical and mental workload; effects of environmental factors: temperature, lighting, weightlessness, and vibration on humans; manual materials handling and back injuries; design of workstations and office ergonomics; design of displays and controls; hand tool design; and cumulative trauma injuries. (DE) Prerequisite(s): 519 or consent of instructor.

520 Human Factors and Product Safety Engineering (3) Role of human factors and safety engineering, legal implications in product design, product liability, system safety, and system failure analysis. Product testing, reliability, and system safety analysis techniques. Case histories of accident investigations, reconstruction, causality, and product liability litigation. (DE) Prerequisite(s): 519 or consent of instructor.

522 Optimization Methods in Industrial Engineering (3) Classical optimization applied to constrained and unconstrained, non-linear, multi-variable functions; search techniques; decision making under uncertainty; game theory; and dynamic programming. (DE) Prerequisite(s): 301 or Engineering Management 537.

524 Advanced Integrated Manufacturing Systems (3) Different types of manufacturing systems. Integrated application of numerical control and automation. Conversion from functional layouts to cellular manufacturing. Process planning for discrete products, measurement and reverse engineering principles and other selected topics. (DE) Prerequisite(s): 401 and 508 or consent of instructor.

525 Systems Modeling and Simulation (3) Modeling of discrete systems using current simulation software and Monte-Carlo simulation. Probability and random number generation, input distributions, output data analysis, model validation and verification, variance reduction techniques, animation of models, and design of simulation experiments. Case studies in variety of domains for simulation modeling. Registration Permission: Consent of instructor.

526 Advanced Applications of Systems Modeling and Simulation (3) Modeling of discrete, continuous, and combined systems using current simulation software. Development of flexible simulation models to enhance accessibility of simulation models for experimentation. Development of distributed simulation models to represent and test production and supply chain systems. (Same as Management Science 526.) (DE) Prerequisite(s): 306 or 525.

527 Lean Production Systems (3) Characteristics and performance of mass and lean production systems. Lean production concepts and principles. Planning, designing and implementing lean production systems: line balancing, set-up time reduction, cost management, maintenance support and other selected topics. Application at enterprise level to achieve strategic competitive goals. (DE) Prerequisite(s): 515 or consent of instructor.

550 Graduate Seminar (1) A seminar to guide and familiarize graduate students of engineering to the process of thesis and/or dissertation research. This includes selection of committee members, research management and guidelines, basics of data analysis and presentation, and guidelines for writing grant and research proposals. Grading Restriction: Satisfactory/No Credit grading only. Comment(s): Admission to graduate program required.

552 Advanced Linear Programming and Extensions (3) Linear programming solution procedures, duality, sensitivity, and parametric analysis; and quadratic, separable, integer, and goal programming. (DE) Prerequisite(s): 301.
554 Advanced Development of Information Systems (3) Presents algorithms commonly needed to implement advanced information systems. Different types of data structures are presented in an attempt to find the model that best suits a given problem. Includes in-depth discussion of Visual Basic modules. Involves the transformation of programs into programming paradigms, and encodes solutions using the Microsoft Visual Basic 6 rapid application development tool. Activities will include case studies and demonstrations to supplement lectures. Practical problems and projects will be assigned.

(DE) Prerequisite(s): 514 or consent of instructor.

555 Advanced Topics in Human-Computer Interactions (3) This course is a combination seminar/hands-on all phases of the product development cycle, examining the impact of human-computer interactions (HCI design course that covers) each. It focuses on a user-centered approach to product design, addressing and applying usability to physical designs and web designs. The course includes lectures, discussions, demonstrations and field trip to a local usability lab.

(DE) Prerequisite: 455 or consent of instructor.

556 Data Mining in Engineering and Manufacturing (3) This course will include the following components: the process of knowledge discovery; popular data mining tools such as classification, regression, and clustering; advanced data mining techniques; application of data mining in manufacturing, engineering design, and security; and research project.

(Same as Chemical Engineering 556.)

(DE) Prerequisite(s): 516 or equivalent.

561 Application of Multivariate Statistics to Process Modeling and Data Analysis (3) (See Chemical Engineering 561.)

591 Special Topics in Industrial Engineering (1-3) Individual or group research projects.

Repeatability: May be repeated if topic differs. Maximum 6 hours.
Registration Permission: Consent of instructor.

592 Special Topics in Industrial Engineering (1-3) Individual or group research projects.

Repeatability: May be repeated if topic differs. Maximum 6 hours.
Registration Permission: Consent of instructor.

593 Special Topics in Industrial Engineering (1-3) Individual or group research projects.

Repeatability: May be repeated if topic differs. Maximum 6 hours.
Registration Permission: Consent of instructor.

594 Culminating Integrated Project Report (3) (See Mechanical Engineering 594.)

600 Doctoral Research and Dissertation (3-15)

Grading Restriction: P/ NP only.
Repeatability: May be repeated.

601 Operations Research Models in Engineering Economy (3) Mathematical programming techniques applied to capital budgeting; advanced topics in multiple attribute decision analysis; Bayesian analysis of sequential decision making; artificial intelligence in complex decision analyses.

(DE) Prerequisite(s): 518 and 523.

602 Nonlinear Optimization (3) (See Management Science 651.)


(DE) Prerequisite(s): 516.

606 Advanced Topics in Human Factors, Safety and Biomechanical Engineering (3) Application of advanced engineering analysis and design methods to man-made system safety, epidemiology of accidents and injuries, and study of injury causal mechanisms. Injury models and theories and development of injury, loss, and risk reduction techniques. Current research issues in manned systems analysis and design. Research into system failures: prevention of injuries.

Registration Permission: Consent of instructor.

691 Advanced Topics in Industrial Engineering (3) Forum to study individually or in groups.

Repeatability: May be repeated if topic differs. Maximum 6 hours.
Comment(s): Requires graduate standing.
Registration Permission: Consent of instructor.

692 Advanced Topics in Industrial Engineering (3) Forum to study individually or in groups.

Repeatability: May be repeated if topic differs. Maximum 6 hours.
Comment(s): Requires graduate standing.
Registration Permission: Consent of instructor.

693 Advanced Topics in Industrial Engineering (3) Forum to study individually or in groups.

Repeatability: May be repeated if topic differs. Maximum 6 hours.
Comment(s): Requires graduate standing.
Registration Permission: Consent of instructor.

Information Management (558)

541 Advanced Database Systems (3) Illustrates and applies advanced database techniques including data modeling, database design, SQL, stored procedures, multi-user databases and web databases. Also covered are data security and control issues related to multi-user databases. In addition to MS Access, this course makes use of the Oracle database to introduce concepts and implement assignments. A database project is a major component of this course.

(DE) Prerequisite(s): 541 or consent of instructor.

542 Application Security and Controls (3) Introduces students to data security, systems controls, and privacy issues regarding Internet applications.

(DE) Prerequisite(s): 541 or consent of instructor.

543 Systems Audit Security and Controls (3) Discusses information systems security, auditing/assurance, planning, and control issues. The course examines security and control issues primarily at the operating system level.

(DE) Prerequisite(s): 541 or consent of instructor.

549 Enterprise Planning, Security and Controls (3) Examines the use of enterprise information systems to achieve strategic and operational advantage, to support managerial decision making, and to achieve operational control.

(DE) Prerequisite(s): 541 or consent of instructor.

Information Sciences (560)

450 Writing About Science and Medicine (3) (See Journalism and Electronic Media 450.)

500 Thesis (1-15)

Grading Restriction: P/ NP only.
Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

510 Information Environment (3) Generation, production, management, dissemination, and use of information. Roles of information in society, information seeking and user behavior, information industry, economics of information products and services, technological and organizational change, information professions, and issues.

520 Information Representation and Organization (3) The structure and organization of intellectual content regardless of format. Emphasis on how content is created, exchanged, and stored so it can be found. Includes standards and best practice for describing and characterizing intellectual content.

521 Cataloging and Classification (3) Basic library-oriented cataloging and classification techniques, tools, and supporting operations. Descriptive cataloging, choice and form of non-subject entries, subject heading work, general classification, authority control, bibliographic utilities, online library catalogs.

523 Abstracting and Indexing (3) Philosophies, standards, and procedures for manual and automatic document indexing, back-of-the-book indexing, vocabulary control, thesaurus construction, and abstracting.

530 Information Access and Retrieval (3) Information access, retrieval, and use. Information seeking, user interfaces, information services and tools. Database structure, search engines, query logic, and evaluation of retrieval system performance.

531 Sources and Services for the Social Sciences (3) Information sources in political science, sociology, psychology, geography, history, anthropology, business, and education.

532 Sources and Services for Science and Engineering (3) Information sources in engineering, physical and life sciences.

533 Sources and Services for the Humanities (3) Information sources in philosophy, religion, fine arts, performing arts, literature and language.

534 Government Information Sources (3) Selection, acquisition, organization, and utilization of government information in variety of formats from legislative, judicial and executive branches of federal, state, local, and international government and intergovernmental agencies.
535 Advanced Information Retrieval (3) Bibliographic, non-bibliographic, full-text databases, e.g., non-bibliographic formula and structure databases, contents-page/full-text databases, patents; document delivery alternatives, evaluation, and testing.

536 The Information Society (3) Competing theoretical positions and definitions regarding the existence and importance of the information society; historical evolution and selected key contributors of information society theories; issues of globalization including critical perspectives of economic, social, political, and cultural aspects.

537 Information Industry (3) Issues and trends concerning information industry: products and services. Standards, enabling technologies, choice of distribution media, entrepreneurial opportunities. Legal, ethical, and quality concerns.

538 Economics of Information (3) Costing and pricing of information; value of information and value added services; cost-benefit analysis and tradeoffs; policy issues related to economic aspects of information exchange and transfer.

539 Information Policy (3) Role of government in creation and exchange of information; review of key national and international policy areas relevant to information creation, production, and distribution; development of information policy for organizations.

540 Research Methods for Information Professionals (3) Research methods in a variety of information environments; primary and secondary research; research project design; research results interpretation; analysis of published research; techniques supporting research process.

550 Management of Information Organizations (3) Supervisory and management concepts, strategies, and techniques applicable to information professionals working in libraries, archives, records management, and other information organizations.

551 School Library Media Centers (3) Planning, implementing, and evaluating school library programs. Curricular involvement, role of technology, site-based management, relationships with district and state services.

552 Academic Libraries (3) Mission, status, and history of academic libraries and academic librarianship in community colleges, colleges and universities; trends in higher education, information technology, and government's impact on public, technical, and administrative services.

553 Specialized Information Agencies and Services (3) Development and present status, scope and objectives. Information resources external to organization.

554 Public Library Management and Services (3) Development, roles, political environment, governance, organization, fiscal management, services, marketing, and performance evaluations.

555 Scientific and Technical Communications (3) Evolution of scientific and technical communication; current trends; role of formal and informal communications; major STI organizations and their roles.

556 Knowledge Management for Information Professionals (3) Covers classic theories of knowledge and theories of first and second-generation knowledge management paradigms. Introduces related disciplines and the knowledge lifecycle, types of knowledge, organizational learning, intellectual capital, communities of practice, knowledge ecologies, knowledge audits, knowledge sharing repurposing of information, uses of information technology, and roles of information professionals in developing knowledge management initiatives.

557 User Instruction (3) Theory, strategy, design, and practice in providing instructional services and technology for end users of information and information systems. Includes practical experience.

558 Library Services for a Diverse Society (3) Examines the issues of diversity and multiculturalism in libraries and librarianship. Considers general issues affecting institutions in addition to libraries. Examines specific social characteristics and the social/cultural groups constructed around these characteristics. Considers the needs of such groups, and library responses to these needs, and how to create a more diverse library profession.

560 Development and Management of Collections (3) Selecting and preserving a variety of items (tangible and intangible) to meet needs of particular users; community analysis; policies and procedures; evaluation; purchasing.

561 Contemporary Book Publishing (3) Creation, design, production, marketing, and distribution; various types of publishers.

563 Graphic Design and Media (3) Principles and practice in visual aspects of communications. Graphic design, typography, production techniques and publication design, as these apply to electronic information delivery systems.

564 Archives and Records Management (3) Objectives and functional elements of records systems, archival programs, management information systems and techniques within various types of organizations. Management of information internal to organizations.


566 Business Intelligence for Information Professionals (3) Principles and practices of gathering and synthesizing business intelligence: including competitive intelligence, environmental scanning, and issues management; information evaluation and synthesis; role of strategic information in modern organizations.

567 Information Network Applications (3) Scholarly and community-based electronic communications. National and international standards, tools, resources; identification, analysis, evaluation, and management of tools and resources; construction of local technologies as developed and applicable.


572 Resources and Services for Young Adults (3) Critical survey of books and related materials for young adults; personal, vocational, and recreational needs and interests. Evaluation, selection, and utilization for school and public libraries.

573 Programming for Children and Young Adults (3) Philosophy and objectives of public and school library services for children and young adults. Reading, listening, and viewing guidance for individuals and groups. Program planning, implementation, and evaluation.

574 Resources and Services for Adults (3) Examines strategies and programming for developing programs in libraries. The course provides public service librarians with the knowledge and skills to create, evaluate, and improve programs with some emphasis on reader’s advisory.

575 Valuing Diversity: International and Intercultural Resources for Youth (3) Examines texts and materials for youth that reflect the contemporary settings and lives of young people from all over the world. This course will review the scholarship of literature and film to determine how to recognize stereotypes; how to understand publishing worlds; and how to recognize universal themes that transcend ethnicity, religion, gender, class, and nationhood.

576 Storytelling in Libraries and Classrooms (3) Examines the history of those who influenced the programming and styles of storytelling. Additionally, the course will offer techniques and sources for selecting, preparing and telling stories to library and classroom audiences.

582 Information Systems Planning and Evaluation (3) Information systems used in libraries and information agencies. Emphasizes planning, evaluation and system implementation. Covers usability engineering, interface design, and human computer interaction.

583 Information Systems Problems and Principles (3) Use of systems theory and analytical tools for understanding and improving information systems. Emphasizes the interaction between technology, processes, and stakeholders. Focuses on problem identification and problem-solving techniques, system design representations, object-oriented system design, system prototyping, and project management.

584 Database Management Systems (3) Defining data needs, data structures, role of operating systems in data management, file organization, database management systems, logical data models, internal data models, database administration and evaluation. Design and implementation of application using database management system.

585 Information Technologies (3) Evolution, trends, capabilities, and limitations of technologies applied to information capture, storage, preservation, access, and distribution.

586 Information Retrieval Systems (3) Historical perspective on information retrieval research; statistical and probabilistic retrieval techniques; cognitive user modeling; expert intermediary systems; associations, relations and hypertext.
587 Mining the Web (3) Covers strategies for mining the Web, Web engines and directories, cognitive accessibility, Web design and development, and usability engineering.

588 Human-Computer Interaction (3) Survey of human-computer interaction and introduction to human and technological factors of importance to design of usable information systems. Basic phenomena of human perception, cognition, memory, and problem solving, and relationship to user-centered design. Methods and techniques for interaction design and evaluation.


590 Problems in Information Sciences (3-6)
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

591 Independent Project or Research (3)
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

594 Graduate Research Participation (3) Advanced research techniques under supervision of staff research director whose area coincides with interests of student.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of advisor and research director.

595 Student Teaching in School Library Information Center (9) Planned professional semester: full day school library work and classroom observation activities.
Grading Restriction: Satisfactory/No Credit grading only.

596 Field-Based Experience in School Library Information Centers (2) Prescribed activities to gain competencies in a school library information center setting. Must be taken twice.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 6 hours.

599 Practicum (3-6) Opportunity to translate theory into practice under guidance of qualified information professionals.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 6 hours.
Recommended Background: Completion of core and advanced coursework relevant to student’s practicum design.
Comment(s): 3.00 GPA required.
Registration Permission: Consent of advisor and approval of practicum coordinator.

601 Advanced Seminar in Information Sciences (3) Theories, research, and traditional practices of information representation, organization, and access and retrieval. Research opportunities and methods. Relationship to and interaction with other disciplines.

680 Information Science Theory (3) Intensive study of theories of information including the definitions of information, information sciences, and information technology. Focus on the intersection of theory: Fundamental information representation, retrieval, and transfer; theories of human behavior, organizational behavior and information; standards and technologies for information processing and distribution, bibliometrics and informetrics; exploration of relationships with theories of other disciplines.

Instructional Technology (569)

521 Computer Applications in Education (3) Use and integration of technology in educational settings to support teaching and learning.
Recommended Background: Basic computer operations or consent of instructor.

566 Administering Instructional Media Programs (3) Leadership roles and responsibilities of professional media administrator in variety of organizational settings.

569 Media and Technology Production Techniques (3) Workshop strategy: basic photography, audio production, multi and single camera TV production, basic digital video editing, and other media/technology techniques important for improving communication in variety of presentation or instructional settings.

570 Instructional Systems Design (3) Application of theory and research of instructional systems design to solve instructional problems in educational settings.

571 Desktop Publishing for Educators (3) Use of computer-based desktop publishing and graphics software and related hardware in designing and producing instructional and informational products.

573 Introduction of Multimedia in Instruction (3) Selected computer-based multimedia production tools and use to produce instructional materials based on specific learner characteristics and objectives.

575 The Internet: Implications for Teaching and Learning (3) Investigation of Internet, its origin and historical development. Hands-on use of Internet for consuming, sharing, and publishing information. Relevant issues regarding legal and ethical issues, evaluation, responsible use, proprietary rights. Participants will need unrestricted access to a personal computer connected to the Internet to complete all course activities.
Registration Permission: Consent of instructor.

576 Advanced Interactive Multimedia for Instruction (3) Design and production of educational and interactive Web sites using advanced software. Development of effective interactive methods for enhancing teaching and learning supported by principles of planning, creating, testing, and evaluating.
(DE Prerequisite(s): 573)

577 Internet-Mediated Collaborative Learning (3) Use of the Internet to conduct collaborative learning activities among diverse, geographically-distributed participants. Participants will need unrestricted access to the Internet to complete all course activities.
(DE Prerequisite(s): 575 or 521)

578 Web Design (3) Design and development of instructional Web sites using basic design principles and visual Web editor software.

669 Instructional Media Research (3) Identification, location, and collection of developmental and experimental research on instructional media. Application of research.

670 Constructivist Perspectives in Instructional Technology (3) Effectively designed technology-based teaching strategies can enhance learning in a wide variety of subjects and learners from K-12 students to adults. This course will examine the theories, principles, and applications of constructivism with emphasis on technology-based constructivist strategies and instructional designs for online and classroom learning.

678 Seminar in Instructional Technology (1) Readings and discussions based on current literature, research, theories and practices in instructional technology.
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.


680 Designing Problem-Based Learning Environments (3) Development and integration of problem-based learning pedagogy into curriculum. Examination of literature to understand theoretical perspective for design of this type of learning environment.

Instructional Technology, Health, and Cultural Studies (572)

500 Thesis (1-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

503 Problems in Lieu of Thesis (2-3)
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 9 hours.

518 Educational Specialist Research and Thesis (3)
Grading Restriction: P/NP only.
Repeatability: May be repeated. Maximum 12 hours.

593 Independent Study (1-3)
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 12 hours.

594 Supervised Readings (1-3)
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 12 hours.

595 Special Topics (1-3)
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated.

600 Doctoral Research and Dissertation (3-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.
601 Foundations of Research, Scholarship and Doctoral Study (3) Introduction to PhD program concentrations in ITES: research requirements, meaning of scholarship in academe and issues/problems in education.

Comment(s): Admission to a PhD program in ITHCS required.

689 Internship (1-3) Experiences in application of principles and practices of curriculum development and instructional improvement.

Grading Restriction: Satisfactory/No Credit or letter grade.

Registration Permission: Consent of instructor.

693 Independent Study (1-3) Grading: Satisfactory/No Credit or letter grade.

Registration Permission: Consent of instructor.

694 Supervised Readings (1-3) Grading: Satisfactory/No Credit or letter grade.

Registration Permission: Consent of instructor.

695 Special Topics (1-3) Grading: Satisfactory/No Credit or letter grade.

Registration Permission: Consent of instructor.

Italian (584)

401 Dante and Medieval Culture (3) Introduction to the significance of this great Italian writer. (Same as Medieval Studies 401.)

(DE) Prerequisite(s): 212 or consent of instructor.

402 Petrarch and Boccaccio (3) (Same as Medieval Studies 402.)

(DE) Prerequisite(s): 212 or consent of instructor.

403 Literature of the Rinascimento (3) From Pulci to Tasso, Quattrocento and Cinquecento.

(DE) Prerequisite(s): 212 or consent of instructor.

409 Directed Readings (3)

410 Italian Theatre (3) Survey of Italian theatre from Renaissance to present.

(DE) Prerequisite(s): 212 or consent of instructor.

411 Aspects of Modern Literature and Culture (3) Representative works of modern literature and culture.

412 Advanced Literary Reading and Conversation (3) Representative works of contemporary literature and culture.

422 Topics in Italian Cinema (3) Examination of Italian cinema from 1930 to the present focusing on feature films, documentaries and, depending on the topic of the course, on literary works in light of political, cultural, and social contexts. Films are shown in Italian with English subtitles. (Same as Cinema Studies 422.)

510 Readings in Italian Literature (3) Topics vary.

Registration Permission: Consent of instructor.

511 Advanced Reading and Conversation (3) Topics vary.

Registration Permission: Consent of instructor.

Japanese (589)

451 Readings in Pre-Modern Japanese Literature (3) (See Asian Languages 451.)

452 Readings in Modern Japanese Literature (3) (See Asian Languages 452.)

Journalism and Electronic Media (592)

412 Opinion Writing (3) Analysis of editorial positions and practices. Writing editorials/columns for newspapers, magazines, corporate publications, and electronic media (radio, television, cable, Internet), with emphasis upon study and use of rhetorical devices and logic.

Registration Permission: Consent of instructor.

414 Magazine and Feature Writing (3) Techniques of writing features and in-depth articles for mass circulation and specialized magazines or newspapers. Organizing and presenting material with attention to problems in areas such as business, science, agriculture, and the humanities.

(DE) Prerequisite(s): 203 or consent of instructor.

415 Magazine Industry Workshop (3) Introduction to the magazine industry including management, design, writing and editing, and interactivity. Analysis of print and electronic format magazines. Planning new products for the marketplace.

(DE) Prerequisite(s): 414 or consent of instructor.

430 Public Affairs Reporting (3) Reporting (including database reporting) and writing about courts, government and public agencies. Event and issue-oriented journalism of politics and public affairs.

(DE) Prerequisite(s): 315.

433 Editing and Layout for Print/Web (3) Editing and layout for newspapers, magazines, and online publishing.

(DE) Prerequisite(s): 203 or consent of instructor.

450 Writing About Science and Medicine (3) Writing workshop to analyze examples of successful science writing and write series of articles for general public based on scientific journals, news conferences, technical meetings and interviews. (Same as Information Sciences 450.)

Registration Permission: Consent of instructor.

451 Environmental Writing (3) Writing for news media (including the Internet) on such environmental issues as sprawl, forests, air pollution, energy, and invasive species. Students hear presentations from and interview experts in environmental science and reporting. Exemplary environmental writing is analyzed.

Registration Permission: Consent of instructor.

460 Electronic News Operations (3) Production of news programs for television, cable and the Internet. Advanced course in electronic news gathering, reporting, digital videography, non-linear editing, and producing. Computerized newsroom and studio are utilized.

(DE) Prerequisite(s): 411.

470 Cable, Broadband, and Interactive Digital Media (3) History and structure of cable television and other broadband delivery systems (DBS, Internet, etc.). Development of digital broadcasting, interactive television and other broadband media systems and digital technologies. Regulation, policy, programming, and management issues arising from new media and digital technologies.

(DE) Prerequisite(s): 275 or consent of instructor.

475 Sports Writing (3) Writing sports stories, features and columns. Sports writing is considered from the standpoint of sports reporters, sports information specialists and others with an interest in writing about sports.

Registration Permission: Consent of instructor.


(DE) Prerequisite(s): 290 or consent of instructor.

491 Foreign Study (1-15)

Comment(s): Approval of hours and topics by advisor required.

492 Off-Campus Study (1-15)

500 Thesis (1-15)

Registration Permission: Consent of instructor.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when the student uses university facilities and/or faculty time before degree is completed.

Grading Restriction: Satisfactory/No Credit grading only.

Registration Permission: Consent of instructor.

503 Workshop in Journalism across the Media I (3) Techniques of writing, reporting, and editing for print and Web. Also includes graphics, layout, and photography. Overview of the history, technology, and economics of newspapers, magazines, and the Internet. Consideration of the First Amendment.

Credit Restriction: May not be used toward degree requirements.

504 Workshop in Journalism across the Media II (3) Techniques of writing, reporting, and editing for electronic media. Also includes video production. Overview of the history, technology, and economics of cable, interactive, and satellite. Consideration of the impact of rules, regulations, and policies of the Federal Communications Commission. Consideration of techniques in print, Web, and electronic media. Creating material for one medium and using it in another.

Credit Restriction: May not be used toward degree requirements.
510 International Journalism (3) Studies the development and impact of international and trans-national media systems on journalism today. Examines the implications for reporters, editors, and publishers in print, broadcasting, cable, satellite, and the Internet as well as the effects on audiences, societies, global cultures, and political economies. Comparative analysis of media, media practices, and flow of information throughout the world.

Comment(s): Requires admission to the program or consent of the instructor.

512 Mass Media Research Methods (3) Applications of communication research techniques for management. Gathering and analysis of data for assessing media audiences and message impacts.

Comment(s): Requires admission to the program or consent of the instructor.

515 Advanced Reporting across the Media (3) Developing good story ideas, researching them, and translating them into suitable material for news in print, broadcasting, cable, and the Internet. Using video and graphics to reinforce the story concept. Considering the needs of the media and the audience. Theories of how content changes as the medium changes.

520 Seminar in Political Communication (3) Relationships among mass media, public relations and government and their roles in democratic society. Governmental public relations, political campaigns, coverage of military, executive, legislative and judicial branches of government, special interest groups and public access to government information.

522 Seminar in Journalism Issues and Theory (3) Discussion of the important issues in journalism from a variety of theoretical viewpoints. Study of the basic literature on theory involving journalism (print, broadcasting, cable, and the Internet) and its application to current problems.

525 Public Opinion (3) Role of press in developing and influencing public consensus. Social theories of public opinion and analysis of media's response. (Same as Public Relations 525.)


550 Writing And Editing Projects (3) Specialized writing or editing interests: agriculture, politics, labor, finance, science, technical, general publications.

Registration Permission: Consent of instructor.

555 Seminar in the Technology and Economics of Media and Information Systems (3) Examines how economics and technology shape development and operations of media and information systems. Focus on industry structures, market definitions, and impacts of emerging competition. Implications of emerging technologies on costs, market definitions, and supply and demand characteristics. Discussion of emerging/new media and implications on existing systems. Comparison of traditional and emerging industries, markets, and models.

Comment(s): Requires admission to the program or consent of the instructor.

556 Seminar in Mass Media Health Communication (3) Methods, problems, theories, and issues of communication in health field. Media's reporting of health issues. Setting of media's health agenda; strategic uses of media in social marketing efforts; public communication of complex social/medical issues. Discussion of relevant communication theories including uses and gratifications, reasoned action, health belief model, social cognitive and framing.

560 Advanced Web Publishing (3) Electronic research and publishing. Social, legal and ethical challenges surrounding online publishing. Project planning and Storyboarding techniques for designing and creating site on Web. (DE) Prerequisite(s): 488.

590 Project (3) Capstone project under guidance of faculty. Applications of principles from previous coursework.

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated. Maximum 6 hours.

593 Seminar in Journalism And Electronic Media Issues (3) Contemporary topics in communications.

Repeatability: May be repeated. Maximum 6 hours.

Registration Permission: Consent of instructor.

597 Independent Study (3) Repeatability: May be repeated. Maximum 6 hours.

Registration Permission: Consent of instructor.

Judaic Studies (595)
405 Modern Jewish Thought (3) (See Religious Studies 405.)
425 Early Christian and Byzantine Art to 1350 (3) (See Art History 425.)
431 Medieval Art of the West, 800-1400 (3) (See Art History 431.)

Landscape Architecture (596)
500 Thesis (1-15) Grading Restriction: P/No Credit only.
Repeatability: May be repeated.

503 Landscape Architecture: Histories and Theories I (3) Survey of landscape history and theory from pre-history to approximately 1500 in Europe, Asia, and the Americas. Examination of theories, land forms, settlement patterns, in cultural and historical contexts.

Registration Restriction(s): Master of Landscape Architecture – landscape architecture major.

504 Landscape Architecture: Histories and Theories II (3) Survey of landscape history and theory from approximately 1500 to the present in Europe, Asia, and the Americas. Examination of theories, land forms, settlement patterns, in cultural and historical contexts.

511 A Cultural History of Regional Public Policy and the Land (3) Historical, cultural, and theoretical perspectives of Regional Public Entities (i.e., Tennessee Valley Authority, Department of Energy, National Park Service, U.S. Forest Service) and their policies and impacts on the land. Case studies and site visits.

512 Contemporary Landscape Architecture Design and Discourses (3) Case studies of existing and emerging trends in landscape design and theory.

513 Strategies and Case Studies in Landscape Stewardship and Restoration Ecology (3) Case studies of historical and emerging strategies and techniques of the preservation of various scales of landscapes.

514 Studies in Emerging Global Strategies of Practice (3) Case studies in varying scales and types of international professional landscape architecture practices.

515 Directed Readings in Landscape Architecture (3) Directed readings with faculty.

Registration Permission: Consent of program coordinator required.

520 Visualization/Representations II (3) Advanced exploration of drawing as a means of visual thinking and method of communication, addressing perceptual phenomenon. Includes further development of analytical methodologies while focusing on digital techniques with specific relationships to large scale projects and portfolio production. (DE) Prerequisite(s): Plant Sciences 380.

531 Advanced Landscape Architecture Construction (3) Documentation of landscape, hardscape, and architectural elements in the landscape with an emphasis on appropriate design and detailing for sustainability. Includes site engineering elements and principles. (DE) Prerequisite(s): Plant Sciences 350.

540 Planting Design (3) Analysis of plant forms, function and composition. Problems faced in design of small scale areas with emphasis on orientation, arrangement and use. (DE) Prerequisite(s): Plant Sciences 220.

541 Landscape/Site Design I (3) Introduction to basic contour mapping and cartographic practices. Engages cultural, historical, and conceptual issues. Techniques and design of natural terrain. Focus on rural (non-urban) settings. Physical and mechanical properties of soils, theory of compaction, strength of soils, analysis of homogeneous slopes. (DE) Prerequisite(s): Master of Landscape Architecture – landscape architecture major.

542 Landscape/Site Design II (3) Techniques, concepts, and practices of landscape and garden design in an urban (non-rural) setting. Engages cultural, historical, and conceptual issues.

543 Landscape Architecture Design I (6) Fundamentals of landscape design exploring basic themes/issues of inhabitation, space-making and constructing cultural identities. Studio work focuses on a range of explorations from small- to medium-scale projects using a mixture of analog and digital media.

(See Art History 543.)
544 Landscape Architecture Design II (6) Focus on large scale community and site planning and land use issues. Particular emphasis on both urban and rural development through sustainable design for both human health and natural environments. Exploration of topical/thematic issues using a mixture of analog and digital media.
(DE) Prerequisite(s): 543.

545 Landscape Architecture Design III (6) Advanced studio with urban design focus.
(DE) Prerequisite(s): 544.

560 Professional Practices (3) Management and organizational theories and practices for delivering professional design services: historical perspective of the profession in the United States; assessment of building and landscape industries and their influences on practice; analysis of basic management functions within professional firms, legal and ethical concerns/imperatives confronting contemporary practitioners, introduction to special obligations and privileges of design professionals.
(DE) Prerequisite(s): 542.

570 Capstone Studio (6) Advanced, thematically-based (non-thesis) studio.
(DE) Prerequisite(s): 545.

(DE) Prerequisite(s): 544.

593 Independent Study in Landscape Architecture (1-9) Independent study on an issue of mutual interest between the student and faculty member.
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission(s): Consent of instructor and approval of graduate program in landscape architecture.

Latin American Studies (600)
430 Contemporary Brazilian Studies (3) (See Portuguese 430.)
432 Topics in the Literature and Culture of Portuguese-speaking World (3) (See Portuguese 432.)
456 Latin American Government and Politics I (3) (See Political Science 456.)
465 Latin American Film and Culture (3) (See Spanish 465.)
479 Disenchanted Texts in Hispanic Literature (3) (See Spanish 479.)
510 Special Topics (3)
Repeatability: May be repeated. Maximum 6 hours.

Law (613)
801 Civil Procedure I (3) Binding effect of judgments, selecting proper court (jurisdiction and venue), ascertaining applicable law, and federal and state practice.


803 Contracts I (3) Basic agreement process and legal protections afforded contracts: offer and acceptance, consideration and other bases for enforcing promises; the Statute of Frauds, unconscionability and other controls of promissory liability. Introduction to relevant portions of Article 2 of the Uniform Commercial Code.

804 Contracts II (3) Continuation of Contracts I. Issues arising after contract formation: interpretation, duty of good faith; conditions, impracticability and frustration of purpose; remedies; third party beneficiaries; assignment and delegation. Considerable coverage of Article 2 of the Uniform Commercial Code with respect to remedies, anticipatory repudiation, impracticability and good faith.

805 Legal Process I (3) Lawyer-like use of cases and statutes in prediction and persuasion. Analysis and synthesis of common law decision: statutory interpretation; fundamentals of expository legal writing and legal research.

806 Legal Process II (3) Continuation of Legal Process I. Formal legal writing, appellate procedure, and oral advocacy.

807 Torts I (3) Intentional torts, defenses and privileges related to intentional torts; negligence: standard of care, professional malpractice, and liability of owners and occupiers of land; defenses based on plaintiff’s conduct: contributory and comparative negligence, assumption of risk, failure to take precautions, and avoidable consequences; causation, proximate cause; duty rules; and questions of joint and several or several liability.

808 Torts II (3) Vicarious liability and related concepts; strict liability for dangerous animals and abnormally dangerous activities; products liability; nuisance, defamation and invasion of privacy; economic torts: misrepresentation and interference with contract and prospective opportunities; immunities: those of government, governmental employees, charities and family members, and damages.

809 Criminal Law (3) Substantive aspects of criminal law; general principles applicable to all criminal conduct; specific analysis of particular crimes; defenses to crimes.

810 Property (4) Introductory course treating issues of ownership, possession, and title in the areas of landlord-tenant relations; estates in land and future interests; co-ownership and marital property; real estate sales agreements and conveyances; title assurance and recording statutes; servitudes; and selected aspects of nuisance law, eminent domain and zoning.

812 Constitutional Law (4) Fundamental principles of American constitutional law: federalism, separation of powers, equal protection of law, and constitutional protection of other fundamental individual rights.

813 Evidence (4) Rules regulating introduction and exclusion of oral, written and demonstrative evidence at trials and other proceedings, including relevance, competence, impeachment, hearsay, privilege, expert testimony, authentication, and judicial notice.
(DE) Corequisite(s): 920 for students electing concentration in advocacy.

814 Legal Profession (3) Legal, professional and ethical standards applicable to lawyers.
Credit Restriction: Not open to students who have taken 815.

815 Introduction to Advocacy and Professional Responsibility (3) Theory and morality of advocacy in adversarial system, and legal, ethical, and professional standards applicable to lawyers and especially lawyers as advocates.

818 Fundamental Concepts of Income Taxation (3) Introduction to basic statutory analysis, fundamental principles of federal individual income tax, and pervasive income tax concerns that arise in practice. Federal concept of gross income, pattern of exclusions, exemptions and deductions from gross income used to arrive at tax base; special treatment of capital gains and losses; and rate structure.

819 Economic Principles of Income Taxation (3) Survey of time value of money and related economic principles in federal income tax system. Taxation of employment compensation arrangements and of various financial arrangements and products, and introduction to tax accounting.
(DE) Prerequisite(s): 818.

821 Administrative Law (3) Administrative agency decision-making processes and judicial review of administrative decisions: procedural standards for informal and formal administrative adjudication and rule-making (attention to federal Administrative Procedure Act); constitutional due process standards in administrative settings; and availability, scope and timing of judicial review of agency actions.

822 Legislation (3) Interpretation and drafting of statutes, legislative process, and legislative power; comparison of judicial views on legislative processes with both realties of legislative process and applicable constitutional principles.


827 Business Associations (4) Legal problems associated with the formation, operation, and dissolution of unincorporated and incorporated business firms; legal rights of duties of firm participants (principals and agents; partners, joint venturers, limited partners, limited liability partners, and members and managers of limited liability companies; and corporate shareholders, directors, and officers) and others with whom those participants interact in connection with the firm’s business.

828 Corporate Finance (3) Legal issues arising in conjunction with the purchase, sale, and repurchase of securities in capital formation and investment transactions, including: private and public debt, equity, and convertible securities offerings; dividends and other shareholder distributions; and mergers and acquisitions.
(DE) Prerequisite(s): 827.
830 Securities Regulation (3) Basic structure and operation of the federal securities laws, including legal issues associated with: primary and secondary public and private securities offerings; Section 11 of the Securities Act of 1933, as amended, Rule 10b-5 under the Securities Exchange Act of 1934, as amended, and other antifraud provisions; periodic reporting and other disclosure requirements; the regulation of proxy solicitations, tender offers, and securities transactions involving officers, directors, and other insiders; and the regulation of stock markets and professional service providers in the securities industry.

(DE) Prerequisite or (DE) Corequisite: 827.

833 Representing Enterprises (3-5) Capstone course for concentration in business transactions. Simulated business transactions and completion of major planning drafting project. Transaction topics include formation of new business, acquisition of existing business, development of real estate project, various financing transactions and corporate reorganization.

Repeatability: Not repeatable. May be taken once for 3-5 hours.

(DE) Prerequisite(s): 818, 826, 827, 840, 842, 940, and 972.

Recommended Background: Completion of all courses for concentration in business transactions.

Comment(s): Up to two of the prerequisites may be taken as corequisites.

834 Antitrust (3) Federal antitrust laws; monopolization, price-fixing, group boycotts, and anticompetitive practices generally; government enforcement techniques and private treble damage suits.

840 Commercial Law (4) Basic coverage of most significant provisions of Uniform Commercial Code: security interests in personal property (Art. 9 of U.C.C. and relevant Bankruptcy Code provisions); commercial paper, including checks, notes and other negotiable instruments (Arts. 3 and 4 of U.C.C.); sales of goods, including coverage of portions of Art. 2 of U.C.C. not covered in Contracts.

842 Contract Drafting Seminar (2) Practical fundamentals of drafting contracts of different types.

843 Debtor-Creditor Law (3) Basic elements of federal bankruptcy law: claims, property of estate, automatic stay, trustee's avoidance powers, assumption and rejection of contracts, priority of distributions, and distinction between liquidation and rehabilitation. Enforcing judgments outside of bankruptcy.

844 Business Reorganizations and Workouts (3) An examination of reorganization under chapter 11 of the United States Bankruptcy Code from petition date to confirmation of a plan of reorganization as well as coverage of the use of extensions, compositions, workouts and other non-bankruptcy methods of adjusting the rights or parties to business transactions. Although not required as prerequisites, an understanding of the subject matter of Commercial Law and especially Debtor/Creditor law is strongly recommended. The course satisfies the expository writing requirement.

847 Advanced Constitutional Law (2-3) Advanced study of issues in American constitutional law. Specific course offerings vary. Subjects include: constitutional structure of American governmental institutions, federalism, separation of governmental powers: relationship between legislative and executive branches, relationship among states and between states and federal government, and constitutional amendment process; state constitutional law, Tennessee constitution and differences between state and federal constitutional law; Bill of Rights and 14th Amendment to Constitution; constitutional rights as protected by Bill of Rights and 14th Amendment.

Repeatability: May be repeated if topic differs. Maximum 9 hours.

(DE) Prerequisite(s): 812.

848 Civil Rights Actions (3) Litigation to vindicate constitutional rights in private actions against the government and its officials, as well as rights protected by other civil rights legislation: elements of cause of action under 42 U.S.C. sec. 1983; actions against federal government officials under the Bivens doctrine; institutional and individual immunities; relationship between state and federal courts in civil rights actions; and remedies for violations of constitutional and other civil rights.

849 Discrimination and the Law (3) Comparison of race, sex, and other forms of discrimination with respect to education, employment, housing, political participation and other social and economic activities; historical landmarks and current issues in discrimination law.

850 Supreme Court (3) History of Supreme Court and of procedures by which Court arrives at decisions; influences of justices' ideology and role of Court in political system.

854 Investigatory Criminal Procedure (3) Police practices and constitutional rights of persons charged with crimes: arrest; search and seizure; identification; interrogation and confessions; electronic eavesdropping; and right to counsel.

855 Adjudicatory Criminal Procedure (3) Pre- and post-trial procedures in criminal case: bail; preliminary hearing; grand jury; prosecutorial discretion; discovery; speedy trial; plea bargaining; jury trial; and double jeopardy. Federal Rules of Criminal Procedure.

859 Criminal Law Seminar (2) Advanced problems in criminal law and administration of justice.

(DE) Prerequisite(s): 809.

862 Family Law (3) Survey of laws affecting formal and informal family relationships: premarital disputes; ante nuptial contracts; creation of common law and formal marriage; legal effects of marriage; support obligations within family; legal separation, annulment, divorce, alimony, and property settlements; child custody and child support; abortion; illegitimacy.

863 Children and the Law (3) Legal relationships between children, families and state; juvenile justice; foster care; adoption; educational issues: special education; child abuse and neglect; health care and income maintenance; advocacy for children and families.

866 Environmental Law and Policy (3) Study, through methods of public policy analysis, of responses of legal system to environmental problems: environmental litigation; Clean Air Act; Clean Water Act; National Environmental Policy Act; and selected regulatory issues.

867 Environmental Law Seminar (2) Selected topics in environmental law.

868 Natural Resources (3) Considers how our society allocates and regulates the use of natural resources, including national parks, national forests, coastal resources, minerals, timber, and wildlife.

873 American Legal History (3) Selected topics in American legal history.

877 Jurisprudence (3) Critical or comparative examination of legal theories, concepts, and problems: legal positivism; natural law theory; legal realism; idealism; historical jurisprudence; utilitarianism; Kantianism; sociological jurisprudence; policy science; and critical studies.

879 Law and Economics (3) Relationship between legal and economic thought; application of basic economic concepts to legal problems; economics in legal decision making; scholarly support for and criticism of economic analysis of law. Designed for students with no undergraduate background in economics or mathematics.

881 Law and Literature (3) Reading literary works, development of philosophy and reading technique applicable to both law and life.

886 Public International Law (3) Law-creating processes and doctrines, principles and rules of law that regulate mutual behavior of states and other entities in international system.

887 International Business Transactions (2-3) Doing business with foreign persons and in foreign countries; acquisition and use of property within foreign country; regulation of international business transactions by international organizations and foreign governments; analysis of international conventions and laws of foreign countries affecting business and comparison of those conventions and laws with United States law.

Repeatability: Not repeatable. May be taken once for 2-3 hours.

895 Labor Relations Law (3) Political, social and economic influences in development of federal labor relations laws; employee rights of self-organization; union and employer unfair labor practices; strikes, lockouts, boycotts, and collective bargaining processes; enforcement of collective agreements; individual rights of employees; federal preemption and state regulation.

896 Law of the Workplace (3) Explores federal and state regulation of the employment relationship. Focuses on state common-law doctrines, particularly the employment “at-will” doctrine and its erosion through contract (e.g., employee handbooks), tort (e.g., fraud and defamation), and public policy claims. Addresses limits on employee conduct, including non-compete agreements and trade secret protections; laws dealing with whistleblowers, retaliation, and workplace privacy; and constitutional protections of employees’ free speech and free association rights. Considers federal legislation on minimum wage and overtime, family and medical leave, and ERISA.

897 Employment Discrimination Law (3) Surveys the major federal statutes dealing with discrimination in employment, including the Civil Rights Act of 1964, the Equal Pay Act, the Age Discrimination in Employment Act, and the Americans with Disabilities Act. Considers discrimination based on an employee’s status (e.g., race, sex, sexual orientation, religion, age, and disability), sexual harassment, reverse discrimination, and affirmative action. Examines some practical aspects of practice in this area, particularly administrative requirements for pursuing discrimination litigation.
252 COURSES OF INSTRUCTION

905 Advocacy Clinic (6) Supervised fieldwork requiring students to assume substantial responsibility for representing clients with various civil and criminal legal problems. Exploration and development of fundamental professional skills involved in practicing law: interviewing and counseling clients, negotiating with other attorneys, preparing for trial, managing complex litigation, and presenting evidence.

Credit Restriction: May not receive credit for both 905 and 946 or both 905 and 947. (DE) Prerequisite(s): 920. Comment(s): Third-year standing required.

908 Mediation Clinic (3) Mediation process, theory, strategy, tactics and skills through readings, simulations, and service as mediators in general sessions court and other settings: mediation ethics, relationship of mediation to other dispute resolution methods, roles of attorneys in mediation, and writing of mediation agreements.

(DE) Prerequisite(s): 914 or participation in ABA Representation in Mediation Competition or substantial prior mediation training demonstrated to the satisfaction of the instructor.

909 Non-profit Corporations (3) Examines federal and state laws that govern non-profit corporations and offers practical clinical experience representing local corporations. Teams of students conduct "legal audits" of local non-profit corporations and offer advice to administrators and directors, draft corporate documents, and help clients resolve legal problems.

914 Alternative Dispute Resolution (3) Survey course on various alternatives to the conventional trial process. Introduces several of the more popular alternatives, including negotiation, mediation, and arbitration. Satisfies planning and drafting requirement.

915 Conflict of Laws (3) Jurisdiction, foreign judgments, and conflict of laws.

916 Federal Courts (3) Jurisdiction of federal courts; conflicts between federal and state judicial systems.

918 Remedies (3) Judicial remedies: damages, restitution, and equitable relief; availability, limitations and measurement of various remedies; comparison of contract, tort and property-related remedies.

920 Trial Practice (3) Litigation through simulation, trial problems and preparation: basic trial strategy; professional responsibility; fact investigation and witness preparation; discovery and presentation of evidence; selection and instruction of juries; opening and closing arguments. Written work: pleadings, motions, interrogatories or memoranda.

(DE) Prerequisite(s): 813 (except students in advocacy concentration). (DE) Corequisite(s): 813 for students in the advocacy concentration.

921 Pre-Trial Litigation (3) Civil pre-trial process. Drafting of actual pre-trial documents in civil cases: complaints, answers, motions for summary judgment, class certification papers, motions to dismiss and for summary judgment, and various discovery papers.

922 Advanced Trial Advocacy (3) Study and development of trial skills: trial preparation, advanced direct and cross-examination, expert witnesses, jury selection, jury instruction, technology in courtroom, and motion practice.

(DE) Prerequisite(s): 920.

923 Complex Litigation (3) Advanced civil procedure course dealing with the special problems that arise in litigation involving multiple claims and multiple parties – permissive and compulsory joinder; intervention; disposition of duplicative or related litigation; class actions; discovery in large cases; judicial control of complex litigation; res judicata and collateral estoppel problems.

927 Interviewing, Counseling and Negotiation (3) Development of conceptual and practical frameworks for understanding and analyzing interviewing, counseling and negotiation, and lawyer's role in tasks. Readings of different methods, strategies and perspectives from recent literature involving lawyering skills. Simulations and videotape critiques, drafting of documents. Relevant ethical issues and techniques of dispute resolution.

Comment(s): Not open to students who have taken 904 or 905.

928 Case Development and Resolution (4) Theory and development of skills for case development and management: interviewing, counseling, and fact investigation. Ways of resolving disputes without litigation.

Comment(s): Not open to students who have taken 927.

935 Gratuitous Transfers (3) Gifts; will substitutes; nature, creation, termination and modification of trusts; intestate succession; execution, revocation, probate and contest of wills; statutory protections against disinheritance; and introduction to powers of appointment, basic problems of will construction, powers of attorney, and planning for disability and death.


940 Land Finance Law (3) Financing devices: mortgages, deeds of trust and land contracts; problems of priorities; transfer of secured interests when debt assumed or taken subject to security interest; default, exercise of equity of redemption and/or statutory right of redemption; mechanics and material men's liens; contemporary developments in areas as condominiums, cooperatives, housing subdivisions, and shopping centers.

941 Land Acquisition and Development Seminar (2) Simulated representation of various parties: sellers, buyers, construction lenders, permanent lenders, architects, contractors, subcontractors and consultants, in development of real estate project. Negotiation and drafting of documents essential in large commercial development.

(RE) Prerequisite(s): 940.

943 Land Use Law (3) Private land use controls: nuisance, easements, real covenants, equitable servitude and home owner associations; public land use controls: zoning, subdivision controls, eminent domain, and regulatory takings.

946 Business Law Clinic (6) Supervised fieldwork assuming substantial responsibility for representing clients with various business and transactional matters. Exploration and development of fundamental professional skills involved in practicing business and transactional law. Interviewing and counseling clients, negotiating with other attorneys and parties, planning, negotiating and documenting transactions and dispute resolutions, conducting factual investigations and legal audits of businesses, and monitoring and ensuring compliance with federal, state and local statutes, rules and regulations.

Credit Restriction: Students may not receive credit for both 946 and 905. (DE) Prerequisite(s): 818, 826, 827, and 972. (826 may be waived for those with sufficient business background.) (DE) Prerequisite or (DE) Corequisite: 942.

947 Prosecution Externship (6) Supervised fieldwork required to be admitted to practice as prosecutor and to assume substantial responsibility for prosecution of criminal cases in state or federal courts. Classes on Tennessee or federal criminal law and procedure and prosecution function. Under direct supervision of full-time, experienced prosecutor and other professional prosecutors in office. Assist in investigation of crimes, interview and preparation of witnesses, drafting of relevant documents, negotiation and formal presentation of guilty pleas, presentation of cases to grand jury, and representation of government in preliminary hearings and felony trials.

Credit Restriction: Students may not receive credit for both 947 and 905. (DE) Prerequisite(s): 813, 920, and either 824 or 855. Comment(s): Third-year standing required. Registration Permission: Consent of instructor.

954 Copyright Law (3) Considers copyright theory, doctrine, and practice and how the law is changing in response to globalization and advances in information technology. Topics include the subject matter of the copyright, the exclusive rights provided by the Copyright Act, substantive and procedural aspects of infringement actions, and remedies. Satisfies expository writing requirement.

955 Patent Law (3) Concerns intellectual property, primarily in the U.S. Patentability, including patentable subject matter, utility, enablement and written description, novelty, and nonobviousness; infringement; ownership and licensing; and remedies. Emphasizes essential legal principles, useful as background for non-patent lawyers and as a foundation for patent lawyers. Recommended Background: Intellectual property course.

Comment(s): Science or engineering background not required.

956 Entertainment Law (3) Role of law and lawyer in entertainment industry. Course content varies. Music industry: music copyright laws; artist/manager relationships; recording contract negotiations; industry labor unions; and performing right organizations.

957 Law, Science and Technology (3) Legal implications of advanced technologies; adaptation of law to challenges posed by new kinds of knowledge and new ways of doing things. Biotechnology, regulation of scientific research, space law, legal issues relating to new information technologies, nanotechnologies, and others designated by instructor.

958 Women and The Law (3) Treatment and status of women in American legal system; women as political actors, as family members, as participants in workforce, as targets of violence and as members of legal profession; introduction to current competing approaches to gender justice.
959 Intellectual Property (3) Intellectual property and related interests under federal and state law; patents; trademarks; trade secrets; copyright; right of publicity; unfair competition.

962 Law and Medicine Seminar (2) Effects of legal rules on delivery and quality of medical care; nature of physician-patient relationship; unauthorized practice of medicine; medical education, licensing and specialization; hospital staff privileges; medical malpractice liability; standard of care; pain, causation, defenses, and damages; protection of patient autonomy: Consent, informed consent, conception and abortion, choice of treatment, and death and dying; control of communicable diseases; organ transplantation and medical resource allocation.

963 Health Care Law and Regulation (3) Surveys legal issues confronting the American health care system, considering federal and state law. Topics include quality control; licensing and accreditation; access to health care, including private health insurance, managed care, Medicare, Medicaid, and emergency health care; privacy regulations; relationships between health care entities and physicians; fraud and abuse regulations; antitrust considerations; and research restrictions. Satisfiespository writing requirement if student elects to write a paper.

964 Health Care Policy (2) Considers ethical perspectives on health care policy, relating to decisions both on individual patient care and on systemic resource allocation. Corequisites: Ethics and theories of bioethics, including how these ethical perspectives may inform analysis of current issues in health care law and policy and how they are expressed in the national policy debate. Topics include organizing and financing health care, quality and accountability in health care, equality and discrimination in access to health care, privacy issues raised by new technology, legal and ethical issues in managed care, and tort reform. Satisfies the perspectives requirement.

965 Community Development (3) Considers legal issues faced by under-represented constituencies. Students work on law-related field projects under lawyer supervision, collaborating with organizations that serve or advocate for the under-represented in and around Knoxville. Projects may include legal research, legislative drafting and advocacy, creation of educational materials or events, empirical research, and recording of oral histories.

966 Community Legal Education (3) Considers how to advance the law-related education of under-represented constituencies. Under lawyer supervision, students work on law-related education projects for the under-represented in and around Knoxville. Projects may include classroom talks, and the creation, development or production of law-related written materials, skits, interactive workshops, videos, or Web pages. Satisfies the perspectives requirement.

967 Media Impact on Justice (3) Explores the impact that the media has on the perception and reality of justice in the United States, including its impact on courts, counsel, legislatures, and executive branches.

972 Income Taxation of Business Organizations (3) Survey and comparative analysis of federal patterns of income taxation of partnerships, S corporations, and limited liability companies; introduction to transactional analysis and business planning. Required written exercises: drafting of portions of partnership agreements, opinion letters, and legal memoranda.

973 Wealth Transfer Taxation (3) Taxation of gratuitous transfers of wealth during life (gift tax) and at death (estate tax) and of generation skipping transfers.

975 Tax Theory (3) Method and purposes of governmental revenue collection through examination of economic and political theory; comparative analysis of various actual and proposed patterns of taxation: income tax, consumption tax, sales tax, and value-added tax. Required preparation of expository essay on aspect of tax theory chosen by student.

978 Transactional Tax Planning (3) Advanced study of taxation of business operations, reorganization, and liquidation; tax planning for financially troubled entities, and review of recent transactions involving cutting-edge tax planning and shaping changes in law.

980 Insurance (3) Types of insurance: life, property, health, accident and liability insurance; regulation of insurance industry; interpretation of insurance contracts; insurable interest requirement; conditions, warranties and representations; coverage and exclusions; duties of agents; excess liability; subrogation; and bad faith actions against insurers. Liability insurance defense problems: duty to defend, notice and cooperation issues, and conflicts of interest.

983 Products Liability (3) Scope of doctrine and theories of recovery; potential plaintiffs and defendants; statutory and contractual limitations on recovery; damages; causation; and defenses.

985 Workers’ Compensation (3) Workers’ Compensation system for compensating victims of work-related accidents and diseases; requirements for covered employer-employee relationship; accidental injuries or occupational diseases arising out of and in course of employment; causation; nature of medical and alleged disability; and the employer’s and employee’s rights and duties of compensation remedy against employer and co-employees; and rights and liabilities of non-employers; administrative and procedural aspects of Workers’ Compensation practice; and various law reform measures.

990 Issues in the Law (3) Selected topics.

991 Issues in the Law Seminar (2) Selected topics.

993 Directed Research (1-2) Independent research and writing under direct supervision of faculty member. Proposals must be approved by the supervising faculty member and by the dean or the dean’s designee. Repeatable: May be repeated. Maximum 8 hours.

994 Independent Study (1-4) Independent study under direct supervision of faculty member. Proposals must be approved by the supervising faculty member and by the dean or the dean’s designee. Repeatable: May be repeated. Maximum 12 hours.

995 Transactions: The Tennessee Journal of Business Law (1-2) Performance of duties of staff member or editor of Transactions: The Tennessee Journal of Business Law. Responsibilities vary each semester: writing of case synopsis, writing of article, and/or performing other assigned duties related to operation. Members of Transactions who are not on major editorial board receive one hour of credit for successfully completing two consecutive semesters of service. Members of senior editorial board receive two hours of credit for each full year of satisfactory service. Grading Restriction: Satisfactory/No Credit grading only. Repeatable: May be repeated. Maximum 4 hours.

996 Law Review (1) Performance of duties as staff member or editor of Tennessee Law Review. Responsibilities vary each semester as specified in Tennessee Law Review Policy Manual: writing of case note, comment or article, and/or performance of other assigned duties related to operations of Tennessee Law Review. Credit Restriction: Does not count toward total number of elective upper-division courses taken Satisfactory/No Credit. Repeatable: May be repeated. Maximum 12 hours.

997 Moot Court (1) Participation as member of faculty-supervised inter-scholastic moot court competition. Grading Restriction: Satisfactory/No Credit grading only. Repeatable: May be repeated. Maximum 4 hours.

998 Planning and Drafting Project (1) Preparation and completion of planning and drafting project under faculty supervision in conjunction with substantive courses when such planning and drafting option is provided by course instructor. Repeatable: May be repeated. Maximum 4 hours.

Legal Studies (617)

430 United States Constitutional Law: Sources of Power and Restraint (3) (See Political Science 430.)

431 United States Constitutional Law: Civil Rights and Liberties (3) (See Political Science 431.)

435 Criminal Law and Procedure (3) (See Political Science 435.)

442 Administrative Law and Regulatory Policymaking (3) (See Political Science 442)

445 Administration of Justice (3) (See Political Science 445.)
COURSES OF INSTRUCTION

451 Criminal Justice (3) (See Sociology 451.)
455 Society and Law (3) (See Sociology 455.)
490 Language and Law (3) (See English 490.)
496 The Rhetoric of Legal Discourse (3) (See English 496.)

Life Sciences (621)

500 Thesis (1-15)
  Grading Restriction: P/NP only.
  Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
  Grading Restriction: Satisfactory/No Credit grading only.
  Repeatability: May be repeated.
  Credit Restriction: May not be used toward degree requirements.

505 Research Rotation (2) Laboratory rotations with faculty member on clearly defined projects. Written proposal and oral report.
  Repeatability: May be repeated. Maximum 8 hours.

507 Bioinformatics and Computational Biology (1-3) Topics to be covered include the application of computing, modeling, data analysis, and information technology to fundamental problems in the life sciences.
  Repeatability: May be repeated. Maximum 12 hours.

510 Special Topics in Life Sciences (1-3) Specializations in biotechnology; cellular, molecular, and developmental biology; environmental toxicology; ethnology; plant, physiology and genetics; and physiology.
  Repeatability: May be repeated. Maximum 9 hours.

515 Introduction to Genome Science and Technology I (1) Introduction to research in genome science and technology concentration.
  Grading Restriction: Satisfactory/No Credit grading only.

516 Introduction to Genome Science and Technology II (1) Science and ethics of practice of science.
  Grading Restriction: Satisfactory/No Credit grading only.

520 Genome Science and Technology I (4) Overview of genomics, advanced genetics principles.

521 Genome Science and Technology II (4) Analytical technologies and special techniques.

540 Colloquium (1) Invited speakers. Topics announced in advance.
  Grading Restriction: Satisfactory/No Credit grading only.
  Repeatability: May be repeated. Maximum 12 hours.

541 Colloquium (1) Invited speakers. Topics announced in advance.
  Grading Restriction: Satisfactory/No Credit grading only.
  Repeatability: May be repeated. Maximum 12 hours.

591 Foreign Study (1-15)
  Repeatability: May be repeated. Maximum 15 hours.

592 Off-Campus Study (1-15)
  Repeatability: May be repeated. Maximum 15 hours.

593 Independent Study (1-15)
  Repeatability: May be repeated. Maximum 15 hours.

595 Special Topics in Genome Science and Technology (1-3) Tutorials or lectures in variety of special topics to be chosen by instructor.
  Repeatability: May be repeated. Maximum 12 hours.

596 Special Topics in Genome Science and Technology (1-3) Tutorials or lectures in variety of special topics to be chosen by instructor.
  Repeatability: May be repeated. Maximum 12 hours.

600 Doctoral Research and Dissertation (3-15)
  Grading Restriction: P/NP only.
  Repeatability: May be repeated.

615 Journal Club in Genome Science and Technology (1) Reading and discussion based on current literature.
  Grading Restriction: Satisfactory/No Credit grading only.
  Repeatability: May be repeated. Maximum 12 hours.

695 Advanced Topics in Genome Science and Technology (1-3) Tutorials or lectures on variety of advanced topics to be chosen by instructor.
  Repeatability: May be repeated. Maximum 12 hours.

696 Advanced Topics in Genome Science and Technology (1-3) Tutorials or lectures on variety of advanced topics to be chosen by instructor.
  Repeatability: May be repeated. Maximum 12 hours.

Linguistics (623)

400 Topics in Linguistics (3)
  Repeatability: May be repeated. Maximum 6 hours.

411 Linguistic Anthropology (3) (See Anthropology 411.)

423 The Development of Diachronic and Synchronic Linguistics (3) Development of western linguistic thought from the Hebrews and Greeks through modern times. Readings from Boas, Sapir, Bloomfield, and others.
  Recommended Background: 9 hours of courses required for undergraduate linguistics concentration (300-level or above) or consent of instructor.

425 Introduction to Descriptive Linguistics (3) (See French 425.)

426 Methods of Historical Linguistics (3) (See German 426.)

429 Romance Linguistics (3) (See French 429.)

431 Topics in Hispanic Linguistics (3) (See Spanish 430.)

435 Structure of the German Language (3) (See German 435.)

436 History of the German Language (3) (See German 436.)

471 Sociolinguistics (3) (See English 471.)

472 American English (3) (See English 472.)

474 Teaching English as a Second or Foreign Language I (3) (See English 474.)

476 Second Language Acquisition (3) (See English 476.)

477 Pedagogical Grammar for ESL Teachers (3) (See English 477.)

485 Special Topics in Language (3) (See English 485.)

490 Language and Law (3) (See English 490.)

510 Special Topics (3)
  Repeatability: May be repeated. Maximum 6 hours.

575 Issues in Second/Foreign Language Rhetoric and Composition (3) (See English 575.)

Logistics (626)

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
  Grading Restriction: Satisfactory/No Credit grading only.
  Credit Restriction: May not be used toward degree requirements.

510 Statistics and Operations Management (3) (See Operations and Management Science 540.)

546 Logistics and Supply Chain Strategy (3) Development of strategy for logistics systems and supply chain processes. Executive-level integration of logistics strategy with marketing, production, finance, and other decision areas.
  (DE) Prerequisite(s): 510 and Business Administration 511, 512, 513, and 514.

547 Global Logistics and Supply Chain Management (3) Logistics strategy in global firm: materials management, international sourcing and procurement, global production and distribution, import/export activity, Design and operation of supply chains in global environment.
  (DE) Prerequisite(s): 510 and Business Administration 511, 512, 513, and 514.

593 Independent Study (3-6) Directed research and study.
  Repeatability: May be repeated. Maximum 6 hours.
  Registration Permission: Consent of instructor.

599 Special Topics in Logistics (3-6) Seminar designed to study specific current problem areas in logistics. Topic announced prior to offering.
  Repeatability: May be repeated. Maximum 6 hours.
  Registration Permission: Consent of instructor.

600 Doctoral Research and Dissertation (3-15)
  Grading Restriction: P/NP only.
  Repeatability: May be repeated.

611 Theoretical Foundations (3) (See Marketing 611.)

612 Quantitative Research Methods (3) (See Marketing 612.)

613 Supply Chain Management Thought (3) Survey of concepts and research methods of interorganizational systems. Supply chains will be studied from multiple perspectives including the following: institutional design and structure, transaction cost economics, operations and logistics cost economics, exchange behaviors and strategies, supply chain relationship types, and evaluation of supply chain performance.
614 Evolution of Logistics Thought (3) Survey of concepts, frameworks, theory, research issues, and empirical research in content areas related to logistics and supply chain management. Conceptual foundations, issue controversies, and future directions.

615 Survey of Models in Marketing and Logistics Research (3) Survey of models and methodologies and their application in logistics and marketing research, topical coverage at discretion of instructor.

693 Independent Study (1-6) Directed research on subject of mutual interest to student and staff member. 
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

Management (625)

440 Organizational Psychology (3) (See Psychology 440.)

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

521 Human Resource Management (3) Personnel functions and human resources management. Community relations, recruiting, selection, training, performance evaluation, wage and salary administration, legal framework as it affects personnel.

551 Management of New Ventures (3) Integration of various functional disciplines and their application to general management of ventures formed both within larger corporations and independently. Preparation of a venture plan, case analysis.

571 International Management (3) Analysis of environment of international business firms and impact of internal and external factors on managerial decisions.

593 Directed Independent Study (1-3) Topic of mutual interest. Available only by prearrangement with supervising faculty member.
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 6 hours.

595 Selected Topics in Current Management Issues (3) In-depth consideration of current issues. Managerial impact of emerging topics.
Registration Permission: Consent of instructor.

600 Doctoral Research and Dissertation (3-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

Management Science (627)

500 Thesis (1-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

526 Advanced Applications of Systems Modeling and Simulation (3) (See Industrial Engineering 526.)

531 Mathematical Programming (3) Linear programming solution procedures, duality, sensitivity, and parametric analysis, linear-fractional, piecewise-linear, separable and integer programming, transportation linear programs.
Recommended Background: Fundamentals of matrix algebra course.

532 Stochastic Models in Management Science (3) Discrete-time Markov chains, Poisson processes, continuous-time Markov chains, renewal theory, and queuing theory.
(DE) Prerequisite(s): Statistics 563 and mathematical analysis course or consent of instructor.

533 Computational Mathematical Programming (3) Computational aspects of mathematical programming models, in particular for large systems.
(DE) Prerequisite(s): 531 and proficiency in computer language.

534 Management Science Methods in Business (3) Application of methods from 531, 532, and 533 to real world problems in business/industry.

551 Leveraging Information Through Descriptive and Prescriptive Modeling (3) Concepts and tools for emulating business operations (descriptive modeling) and for determining optimal operational or tactical strategies (prescriptive modeling). Visualization, optimization, and simulation concepts reinforced through hands-on experience with technologies: geographic information systems (GIS), spreadsheet-based models, simulation packages, and supply chain optimization software.

593 Management Science Problems (1-6) Directed study on subject of mutual interest.
Repeatability: May be repeated. Maximum 9 hours.

600 Doctoral Research and Dissertation (3-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

631 Integer Programming (3) Theoretical and computational aspects of linear programming with integer variables, branch and bound, cutting plane, and group theoretic algorithms.
(DE) Prerequisite(s): 531 or equivalent.

651 Nonlinear Optimization (3) Kuhn-Tucker theory in nonlinear programming, solution procedures for constrained and unconstrained nonlinear programs, search techniques, quadratic programming, duality and sensitivity analysis. (Same as Industrial Engineering 602.)
(DE) Prerequisite(s): 531 or equivalent and proficiency in computer language.

681 Special Topics (3)
Repeatability: May be repeated. Maximum 9 hours.
(DE) Prerequisite(s): 531 and 532.
Registration Permission: Consent of instructor.

691 Management Science Seminar (1) Subjects selected from current literature.
Grading Restriction: Satisfactory/No Credit grading only.

692 Management Science Seminar (1) Subjects selected from current literature.
Grading Restriction: Satisfactory/No Credit grading only.

Marketing (632)

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

510 Principles of Marketing Management for Non-MBA Students (3) For students from other disciplines interested in obtaining knowledge of marketing discipline at graduate level.

520 Marketing and Customer Value (3) Frameworks, techniques, and processes required for customer relationship management and demand planning in organizations. Twin problems of analyzing markets and customers and translating these analyses into actionable marketing strategies.
(DE) Prerequisite(s): Business Administration 511, 512, and 513 or consent of instructor.

530 MBA Marketing Concentration (6) Product management: Complex, interdisciplinary nature of product development and product management. Strategic issues during product life cycle, from idea conception to product development to commercialization to eventual product dismissal. Integrated communications: Strategies and tactics associated with communicating value to customers. One-to-one marketing approaches, role of personal selling in communication mix, and advertising and promotions management. Global marketing management: Cross-national forces that enable firms to design and maintain competitive market positioning. Geographic competition, and competitive action.

593 Independent Study (3) Directed research and study.
Repeatability: May be repeated. Maximum 6 hours.
Recommended Background: MBA core.
Registration Permission: Consent of instructor.

599 Special Topics Seminar (3) Topics vary: market forecasting, market segmentation, services marketing, marketing channels, and related issues.
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

600 Doctoral Research and Dissertation (3-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

611 Theoretical Foundations (3) Theoretical foundations and frameworks common to business research. Historical and philosophy of science perspectives. (Same as Logistics 611.)
612 Quantitative Research Methods (3) Quantitative research process: problem formulation, measurement reliability, validity and scale development, experimental design and analysis, survey design and analysis, sampling, ethical considerations, and international issues in quantitative research. (Same as Logistics 612.)

613 Qualitative Research Methods (3) Examination of qualitative research theoretical foundations and methodologies. Application of qualitative research methods to theory building research. Topics include formulating research questions, designing qualitative research studies, sampling, data generation techniques, data analysis techniques, evaluating qualitative research, and writing qualitative research reports.

614 Contemporary Marketing Thought (3) Representative topics comprising content of marketing knowledge; macromarketing, markets, channels, and competitive behavior; marketing strategy; marketing mix tools; and ethical issues in marketing. Examination of research for contributions to advancing knowledge and opportunities for new research. Offered every other year.

Registration Permission: Consent of instructor.

615 Consumer Behavior Research (3) Theoretical perspective and research processes describing people in their roles as buyers, users, and evaluators of goods and services. Includes coverage of both end user consumers and industrial buyers. Topics of interest include motivation, personality, attitude formation and change, information processing, choice, decision making for buying and selling activities as well as operational management decision-making processes, consumption, post-purchase consumption, and demographic differences, consumer socialization, and ethical considerations. Offered every other year.

Registration Permission: Consent of instructor.

616 Measurement (3) Measurement and measurement process: design and development of tools, process of testing, and determination of reliability and validity.

617 Special Topics (3) Topics vary: marketing strategy, advanced consumer behavior, research methodology, influence and persuasion theory and strategy, pricing issues, international marketing issues, and nonprofit organization marketing issues.

693 Independent Study (1-6) Directed research on subject of mutual interest to student and faculty member. Repeatable: May be repeated. Maximum 6 hours.

Materials Science and Engineering (638)

405 Structural Characterization of Materials (4) X-ray diffraction and fluorescence; scanning and transmission electron microscopy; microanalytical techniques.

421 Mechanical Behavior of Materials II (3) Description of stress and strain. Linear elastic constitutive equations; isotropic and anisotropic moduli in various materials. Yield criteria; brittle fracture; crazing; plastic strain constitutive equations. Forming operations and limit criteria.

(DE) Prerequisite(s): 302 and Engineering Science 321.

429 Introduction to Ceramic Matrix Composites (3) Characteristics of composites, ceramic matrix composites. Macromechanics and materials design. Overview of fabrication techniques; microstructural characterization. Physical and mechanical property evaluation; current and potential applications.

(DE) Prerequisite(s): 201 and Engineering Science 321.


(DE) Prerequisite(s): 201.

472 Fundamental Principles of Composite Materials (3) Physical principles basic to the design, manufacture, and application of fiber reinforced polymers, metals and ceramics.

(DE) Prerequisite(s): 302 or equivalent.

474 Biomaterials (3) Metals, polymers and ceramics utilized in orthopedic, cardiovascular, and dental surgical implant devices; corrosion and degradation problems. Material properties of primary importance; tissue response to synthetic materials.

(DE) Prerequisite(s): 201.


(DE) Prerequisite(s): 201.

484 Introduction to Maintainability Engineering (3) (See Nuclear Engineering 484.)

500 Thesis (1-15) Grading Restriction: P/NP only. Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.

Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Credit Restriction: May not be used toward degree requirements.

503 Graduate Seminar in Materials Science and Engineering (1) Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 6 hours.

504 Graduate Seminar in Polymer Engineering (1) Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 6 hours.

505 Engineering Analysis (3) (See Chemical Engineering 505.)

507 Application of Linear Algebra in Engineering Systems (3) (See Chemical Engineering 507.)

509 Multidisciplinary Project (1) (Same as Industrial Engineering 509.)

511 Fundamentals of Materials Science and Engineering I (3) Chemical bonding, structures, defects, scattering, thermodynamics, diffusion, phase diagrams, microstructures, and phase transformations.

512 Fundamentals of Materials Science and Engineering II (3) Physical properties: electrical and thermal conduction, elementary quantum physics, band theory, dielectric materials, magnetic and optical properties. Mechanical behavior: stress and strain at a point, elastic constitutive equations, phenomenological bulk behavior, and deformation mechanisms.


(DE) Prerequisite(s): 511.

516 Mechanical Metallurgy (3) Deformation and fracture of metals and alloys: dislocation theory, strengthening mechanisms, macro-scale descriptions of plasticity, fracture mechanics, fatigue, and time-dependent behavior.

(DE) Prerequisite(s): 512.

522 Defects in Crystals (3) Analytical and experimental analysis of defect interactions in solids.

(DE) Prerequisite(s): 421 or consent of instructor.

524 Metallurgical Thermodynamics (3) Applications of chemical thermodynamics to metallurgical problems: refining, oxidation, surface treatments, alloy systems.

(DE) Prerequisite(s): 570 or equivalent.

525 Welding Metallurgy (3) Welding processes; physical metallurgy of welding; phase transformations; heat flow; residual stresses; theories of hot cracking, cold cracking and porosity formation; applications to process utilization.

526 Welding Metallurgy (3) Welding processes; physical metallurgy of welding; phase transformations; heat flow; residual stresses; theories of hot cracking, cold cracking and porosity formation; applications to process utilization.

531 Advanced Corrosion (3) Analyses of corrosion processes in terms of polarization measurements and Pourbaix diagram. Influence of environmental and mechanical factors contributing to pitting, crevice, fretting, wear, fatigue and stress corrosion.

(DE) Prerequisite(s): 470 or consent of instructor.
644 Optoelectronic Processes in Polymeric Materials (3) This course introduces fundamental molecular orbital and energy band theories and discusses (1) optical and electronic properties of polymeric materials, (2) principles, design and characterization of polymer optoelectronic devices, and (3) applications of laser spectroscopy in polymer characterization. The focus is to understand electron related processes and opto-electronic characterizations of polymeric materials and devices. The fundamentals of laser spectroscopy are also explained in determining structure-property relationships in polymer research.

(DE) Prerequisite(s): 543 or equivalent.
Registration Permission: Consent of instructor.

672 Introduction to Transmission EM and Electron Diffraction (3) Fundamentals of electron scattering, reciprocal space, the Ewald Sphere construction. Basic electron optics, operation of the transmission electron microscope TEM (includes some laboratory sessions) and sample preparation.

The kinematical theory of imaging of perfect and imperfect crystals in the TEM. Problems with the kinematic theory. Introduction to the dynamical theory of TEM imaging. The effect of inelastic scattering in the TEM. Fundamentals of analytical electron microscopy. The Scanning Transmission Electron Microscope (STEM) and its relation to the TEM.

(DE) Prerequisite(s): 405 or 511 or 572.
Registration Permission: Consent of instructor.

673 Introduction to Scanned Probe Microscopies (3) A survey of techniques for surface imaging and characterization. Young's Topographiner field emission, and the beginning of scanning tunneling microscopy (STM). Practical operation of the STM (includes laboratory sessions). Image resolution and interpretation in the STM, analytical STM imaging. The theory and control of feedback loops in SPM. The generalized Scanning Probe Microscope (SPM) and the Atomic Force Microscope (AFM). Theory of operation of AFM, limits to resolution, and image interpretation (includes laboratory session). Important variants of the SPM including scanning capacitance, scanning near field optical, and scanning thermal microscopes. The metrology of nanoscale structures.

Registration Permission: Consent of instructor.

676 Advanced Topics in Materials Science and Engineering (3) Latest developments and/or advanced special topics.

Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

678 Seminar in Recent Advances in Materials Science and Engineering (3) Directed and independent study of advanced topics.

Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

Mathematics (641)

400 History of Mathematics (3) Development of major ideas in mathematics from ancient to modern times and the influence of these ideas in science, technology, philosophy, art, and other areas. Includes at least one in-class essay examination and 3,000 words of writing outside classroom.

(DE) Prerequisite(s): 251 or 257 and 300.

403 Mathematical Methods for Engineers and Scientists (3) Matrix computations, numerical methods, partial differential equations, Sturm-Liouville Theory and special functions as used in engineering and science.

Credit Restriction: Does not satisfy major requirements for the mathematics major (Bachelor of Science or Master of Science).

(DE) Prerequisite(s): 231, 241, and familiarity with operating system and programming language.

404 Applied Vector Calculus (3) Topics from multivariable and vector calculus; line and surface integrals, divergence theorem and the theorems of Gauss and Stokes.

(DE) Prerequisite(s): 241 or 247.

405 Models in Biology (3) Difference and differential equation models of biological systems.

Credit Restriction: May not be applied toward graduate degree.

(DE) Prerequisite(s): 142 or 148 or 152.

411 Mathematical Modeling (3) Construction and analysis of mathematical models used in science and industry. Projects emphasized.

Recommended Background: Courses in differential equations and linear algebra.

421 Combinatorics (3) Introduction to problems of construction and enumeration for discrete structures such as sequences, partitions, graphs, finite fields and geometries, and experimental designs.

(DE) Prerequisite(s): 323.

423 Probability (3) Axiomatic probability, univariate and multivariate distributions, conditional distributions and expectations, moment generating functions, laws of large numbers and central limit theorem.

(DE) Prerequisite(s): 241 and 323.
490 Readings in Mathematics (1-3) Open to superior students. Independent study with faculty guidance. 
   Repeatability: May be repeated. Maximum 9 hours. 
   Comment(s): Consent of faculty mentor to supervise independent work required. 
   Registration Permission: Consent of department head. 

499 Seminar in Mathematics (1-3) Topics vary. Requires out-of-class projects and in-class presentations by students. Students must register for the number of credit hours announced for a particular seminar. 
   Repeatability: May be repeated. Maximum 9 hours. 
   Registration Permission: Consent of instructor. 

500 Thesis (1-15) 
   Grading Restriction: P/NP only. 
   Repeatability: May be repeated. 

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. 
   Grading Restriction: Satisfactory/No Credit grading only. 
   Repeatability: May be repeated. 
   Credit Restriction: May not be used toward degree requirements. 

504 Discrete Mathematics for Teachers (3) Mathematical logic and methods of argument, sets, functions and relations, combinatorics, and discrete structures. Normally, the first graduate course for students seeking Master of Mathematics degree. 
   Credit Restriction(s): May not apply toward mathematics major (Master of Science). 
   Recommended Background: 1 year of calculus or equivalent. 
   Comment(s): For students in Master of Mathematics program and for students in graduate programs in the College of Education, Health, and Human Sciences. 

505 Analysis for Teachers (3) Development of differential and integral calculus, proofs of basic theorems. 
   Credit Restriction(s): May not apply toward mathematics major (Master of Science). 
   Recommended Background: 1 year of calculus or equivalent. 
   Comment(s): For students in Master of Mathematics program and for students in graduate programs in the College of Education, Health, and Human Sciences. 

506 Algebra for Teachers (3) Algebraic structures: integral domains and fields and their applications to algebra of integers and polynomials. 
   Credit Restriction(s): May not apply toward mathematics major (Master of Science). 
   Recommended Background: 1 year of calculus or equivalent. 
   Comment(s): For students in Master of Mathematics program and for students in graduate programs in the College of Education, Health, and Human Sciences. 

   Credit Restriction(s): May not apply toward mathematics major (Master of Science). 
   Recommended Background: 1 year of calculus or equivalent. 
   Comment(s): For Students in Master of Mathematics program and for students in graduate programs in the College of Education, Health, and Human Sciences. 

509 Seminar for Teachers (3) 
   Repeatability: May be repeated. Maximum 12 hours. 
   Credit Restriction(s): May not apply toward mathematics major (Master of Science). 
   Comment(s): For Students in Master of Mathematics program and for students in graduate programs in the College of Education, Health, and Human Sciences. 
   Registration Permission: Consent of instructor. 

510 Applied Mathematics Laboratory (1) Computer applications in applied mathematics: software packages for matrix analysis, symbolic algebra, and differential equations. 
   Repeatability: May be repeated. Maximum 2 hours. 
   (DE) Corequisite(s): 511. 

511 Methods in Applied Mathematics I (3) Fundamentals and techniques associated with discrete models of physical, engineering and biological systems: difference equations, networks and graphs, optimization, and other topics. 
   Recommended Background: Courses in advanced calculus and linear algebra. 

512 Methods in Applied Mathematics II (3) Fundamentals and techniques associated with continuous models of physical, engineering, and biological systems: development, solution and qualitative analysis of ordinary and partial differential equations, and calculus of variations. 
   (DE) Prerequisite(s): 511. 

   Recommended Background: Advanced courses in ordinary and partial differential equations and advanced calculus. 

514 Mathematical Principles of Fluid Mechanics II (3) Continuation of 513. 
   (DE) Prerequisite(s): 513. 

515 Analytical Applied Mathematics I (3) Analysis of advanced techniques in modern context for applied problems: dimensional analysis and scaling, perturbation theory, variational approaches, transform theory, wave phenomena and conservation laws, stability and bifurcation, distributions, and integral equations. 
   Recommended Background: Courses in advanced calculus, linear algebra, and either advanced differential equations or 512. 

516 Analytical Applied Mathematics II (3) Continuation of 515. 
   (DE) Prerequisite(s): 515. 

517 Mathematical Methods in Physics I (3) (See Physics 571.) 

518 Mathematical Methods in Physics II (3) (See Physics 572.) 

519 Seminar in Applied Mathematics (1-3) 
   Repeatability: May be repeated. Maximum 12 hours. 

521 Enumerative Combinatorics I (3) Sieve methods, recursion, generating functions, and permutation groups applied to enumeration of discrete structures. Incidence algebras and combinatorics of partially ordered sets. 

522 Enumerative Combinatorics II (3) Continuation of 521. 
   (DE) Prerequisite(s): 521. 

523 Probability I (3) Probability spaces and random variables, expectation, characteristic functions, convergence of random variables. 
   Recommended Background: One year of advanced calculus and 323. 

524 Probability II (3) Continuation of 523. Law of large numbers, central limit theorem, conditional expectation, martingales. Other topics as selected by instructor. 
   (DE) Prerequisite(s): 523. 

525 Statistics I (3) Formulation of statistical models, sufficiency; methods of estimation and optimal theory, asymptotic efficiency; the confidence procedures and hypothesis testing, uniformly most powerful tests; Bayesian statistics. 
   Recommended Background: One year of advanced calculus and 425. 

526 Statistics II (3) Continuation of 525. Estimation and tests in general linear models; non-parametric models, rank methods for comparison, robust tests. Other topics as selected by instructor. 
   (DE) Prerequisite(s): 525. 

527 Stochastic Modeling (3) Variable topics in probability applied to real world situations. Topics may include queuing theory, branching processes, Monte Carlo simulation, stochastic finance and other topics as selected by instructor. 
   Recommended Background: One year of advanced calculus and one year of undergraduate probability or mathematical statistics. 

529 Seminar in Stochastics (1-3) 
   Repeatability: May be repeated. Maximum 12 hours. 

   Recommended Background: One year of advanced calculus and undergraduate differential equations. 

532 Ordinary Differential Equations II (3) Continuation of 531. The nonlinear theory of differential equations including Liapunov stability, critical point analysis, and Poincare-Bendixon theory. 
   (DE) Prerequisite(s): 531. 

534 Calculus of Variations (3) Necessary and sufficient conditions for weak and strong extrema in one-dimensional variation problems; Lagrangian mechanics. Multiple integrals. Basic elements of direct methods. 
   Recommended Background: At least one senior-level course in differential equations or advanced calculus. Mathematical maturity. 

   Recommended Background: One year of advanced calculus. 

   (DE) Prerequisite(s): 535.
537 Mathematical Principles of Continuum Mechanics I (3) Conservation principles, equations of equilibrium and motion for fluids and elastic solids, constitutive relations and stress, convexity properties, bifurcation phenomena, existence theory. Recommended Background: Courses in advanced calculus and advanced differential equations.

538 Mathematical Principles of Continuum Mechanics II (3) Continuation of 537. (DE) Prerequisite(s): 537.

539 Seminar in Differential Equations (1-3) Repeatability: May be repeated. Maximum 12 hours.

540 Real Analysis (3) Measure theory, Lebesgue integration, Hölder and Minkowski inequalities, Radon-Nikodym theorem, Fubini's theorem. Recommended Background: One year of advanced calculus.

546 Complex Analysis (3) Holomorphic functions, Cauchy's theorem, Maximum Modulus theorem, Schwarz's lemma, normal families, Riemann mapping theorem. (DE) Prerequisite(s): 545.

547 Applied Linear Analysis (3) Banach and Hilbert spaces, linear operators and spectral theory, Sobolev spaces, applications. (DE) Prerequisite(s): 545.

549 Seminar in Analysis (1-3) Repeatability: May be repeated. Maximum 12 hours.

550 Modern Algebra I (3) Groups and rings. Recommended Background: One year of undergraduate abstract algebra.

551 Modern Algebra II (3) Continuation of 550; modules, fields and Galois theory. (DE) Prerequisite(s): 551.

552 Number Theory I (3) Introduction to algebraic number theory. Recommended Background: One year of undergraduate abstract algebra.

555 Number Theory II (3) Continuation of 552. (DE) Prerequisite(s): 555.

559 Seminar in Algebra (1-3) Repeatability: May be repeated. Maximum 12 hours.

561 Topology I (3) Topological spaces and continuous functions, separation axioms, product and quotient topologies, connectedness, compactness, complete metric spaces. Recommended Background: One year of advanced calculus.

562 Topology II (3) Continuation of 561. Fundamental group and covering spaces. (DE) Prerequisite(s): 561.


568 Riemannian Geometry II (3) Continuation of 567. (DE) Prerequisite(s): 567.

569 Seminar in Topology and Geometry (1-3) Repeatability: May be repeated. Maximum 12 hours.

571 Numerical Mathematics I (3) Direct and iterative methods for linear systems. The algebraic eigenvalue problem and the singular decomposition theorem. Newton and quasi-Newton methods for systems of nonlinear equations. (Same as Computer Science 571.) Recommended Background: Courses in advanced calculus and basic numerical analysis.


574 Finite Element Methods (3) Finite element techniques for solution of boundary and initial-boundary value problems. Variational formulation. Finite dimensional subspaces and their approximating properties; rates of convergence. Computer implementation. (Same as Computer Science 574.) Recommended Background: Courses in partial differential equations, linear algebra and numerical analysis.

575 Matrix Theory and Techniques in Numerical Analysis (3) Advanced topics in study of iterative and direct methods for large systems of linear equations: sparse matrix analysis, relationship to modern computer architectures. (Same as Computer Science 575.) Repeatability: May be repeated. Maximum 9 hours. Recommended Background: Courses in linear algebra and numerical analysis.

576 Linear and Nonlinear Programming (3) Linear programming, the simplex and interior methods. Integer, convex, stochastic and other topics in nonlinear programming. Applications to real world problems. Recommended Background: Courses in numerical algorithms, linear algebra and advanced calculus.

577 Optimization (3) Mathematical foundations of constrained and unconstrained optimization. Lagrange multipliers, the Farkas lemma, the Kuhn-Tucker-Karush theorem. Analysis of major algorithms and applications to real world problems. Recommended Background: Courses in numerical algorithms, linear algebra and advanced calculus.

578 Numerical Methods for Partial Differential Equations (3) Numerical approximation of solutions of partial differential equations including conservation laws and hyperbolic, parabolic, and elliptic problems. Derivation, physical meaning, and implementation of schemes. Recommended Background: A course in partial differential equations or 512 or 515, and familiarity with an operating system and a programming language.

579 Seminar in Numerical Mathematics (1-3) Repeatability: May be repeated. Maximum 12 hours.

581 Mathematical Ecology I (3) Deterministic and stochastic models of populations, communities, and ecosystems. (Same as Ecology and Evolutionary Biology 581.) (DE) Prerequisite(s): 431 and 453.

582 Mathematical Ecology II (3) Continuation of 581. (Same as Ecology and Evolutionary Biology 582.) (DE) Prerequisite(s): 581.

583 Mathematical Evolutionary Theory (3) Population genetics and evolutionary ecology. (Same as Ecology and Evolutionary Biology 583.) (DE) Prerequisite(s): 431 and 453.

585 Optimal Control Theory (3) Deterministic optimal control. Examples involving calculus of variations, optimal trajectories, and engineering control problems. Introduction to stochastic control. Recommended Background: One year of advanced calculus and undergraduate differential equations.

589 Seminar in Mathematical Ecology (1-3) Repeatability: May be repeated. Maximum 12 hours.

593 Independent Study (1-12) Repeatability: May be repeated. Maximum 12 hours.

598 Graduate Reading in Mathematics (1-3) Independent study with faculty guidance. Repeatability: May be repeated. Maximum 6 hours. Comment(s): Graduate standing required. Registration Permission: Consent of instructor.

599 Seminar in Mathematical Presentations (1) Grading Restriction: P/NP only. Repeatability: May be repeated.

600 Doctoral Research and Dissertation (3-15) Grading Restriction: P/NP only. Repeatability: May be repeated.

617 Geometry of Groups (3) Geometry of Lie groups, symmetric spaces and discrete groups. Topics vary. Repeatability: May be repeated. Maximum 12 hours. (DE) Prerequisite(s): 561 and 562 or 567 and 568.

619 Seminar in Applied Mathematics (1-3) Repeatability: May be repeated. Maximum 12 hours.

623 Advanced Probability I (3) Selected topics in modern theory of probability and stochastic processes. Repeatability: May be repeated. Maximum 12 hours. (DE) Prerequisite(s): 523 and 524.

624 Advanced Probability II (3) Continuation of 623. Repeatability: May be repeated. Maximum 12 hours. (DE) Prerequisite(s): 623.

629 Seminar in Combinatorics (1-3) Repeatability: May be repeated. Maximum 12 hours.

635 Advanced Partial Differential Equations I (3) Selected topics in classical and modern theoretical partial differential equations. Repeatability: May be repeated. Maximum 12 hours. (DE) Prerequisite(s): 535 and 536.

636 Advanced Partial Differential Equations II (3) Continuation of 635. Repeatability: May be repeated. Maximum 12 hours. (DE) Prerequisite(s): 635.
COURSES OF INSTRUCTION

Mathematics Education (642)

485 Teaching of Mathematics, Grades 7-12 (3) Preparation of teaching plans, evaluation, materials for teaching mathematics. Teaching simulation and directed observation in schools.
Comment(s): Admission to teacher education required.

522 Programs and Materials in School Mathematics (3) Examination, development and use of materials for creating an active learning environment for learning mathematics for all ages.

523 Diagnosis and Correction of Children’s Difficulties in Learning Mathematics (3) Children’s difficulties in learning mathematics and procedures for helping classroom teachers correct difficulties.
(DE) Prerequisite(s): 522 or consent of instructor.

530 Teaching Mathematics to Young Children: K-4 (3) Unit planning, daily planning, grouping and other strategies of teaching mathematics. Course is for those with little preparation in teaching elementary school mathematics.

543 Teaching Mathematics in Middle School: 5-8 (3) Unit planning, daily planning, grouping and other strategies of teaching mathematics. Course is for those with little preparation in teaching elementary school mathematics.


581 Mathematics Curriculum (3) Past, present and future issues influencing mathematics curriculum in schools, elementary through college. Teacher’s role in curriculum development and implementation. Rationales for curriculum decisions.

583 Teaching Mathematics in Senior High Schools and Community Colleges (3) Topics appropriate for high school and community/junior college mathematics curriculum. Special problems related to enrichment, problem solving, and use of microcomputers. Opportunities for special projects.

622 Research Trends in Mathematics Teacher Education (3) Analysis of current research trends in mathematics teacher education and impact of such research on development of teachers both pre-service and in-service.
Recommended Background: Minimum 9 hours of 500-level mathematics education courses.

683 Advanced Studies in Mathematics Education (3) Analysis of current research in mathematics education and implications of research for classroom practice.
Recommended Background: 2 graduate courses in mathematics education.

Mechanical Engineering (650)

Not all the courses listed below are available at both the University of Tennessee, Knoxville, and UTSI campuses.

449 Mechanical Engineering Laboratory (3) Designing, conducting and reporting results of experimental exercises. Test standards and specifications. Analysis of data and formation of conclusions.
(DE) Prerequisite(s): 344 and 345.
(DE) Corequisite(s): 475.

451 Control Systems (3) Analysis and design of feedback control systems using transient and frequency response techniques. Stability analysis in the time and frequency domain.
(DE) Prerequisite(s): 363.

455 Finite Element Analysis (3) Conversion of fundamental conservation principles in mechanics to simulation form via finite element implementation. Applications in heat transfer, solid mechanics, mechanical vibrations, fluid mechanics and heat/mass transport. Extensive computer lab experiments using Matlab-based and commercial software systems.
(DE) Prerequisite(s): 321, 344, and 363.

466 Elements of Machine Design II (3) Application of strength and properties of materials. Design factors, theories of failure to design of machine elements. Mini-design experiences.
(DE) Prerequisite(s): 321 and Materials Science and Engineering 201.

475 Thermal Engineering (3) Thermal systems with emphasis on turbo-machinery, heat exchangers, gas-vapor mixtures and psychrometry, and fuels and combustion. Chemical equilibrium and system analysis and design.
(DE) Prerequisite(s): 344.

483 Introduction to Reliability Engineering (3) (See Nuclear Engineering 483.)
494 Selected Topics in Mechanical Engineering (1-4) Problems and topics related to developments and practice in mechanical engineering. 
Repeatability: Not Repeatable. May be taken once for 1-4 hours.
Registration Permission: Consent of instructor.

495 Selected Topics in Mechanical Engineering (1-4) Problems and topics related to developments and practice in mechanical engineering. 
Repeatability: Not Repeatable. May be taken once for 1-4 hours.
Registration Permission: Consent of instructor.

500 Thesis (1-15) 
Grading Restriction: P/NP only.
Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

504 Product Development Process (1) Basic elements in product development process and project management. Business and engineering interrelations to development and commercial manufacturing of new products. Multidisciplinary teams to explore possible new product opportunities. (Same as Industrial Engineering 504.) 
Registration Permission: Consent of instructor.

Recommended Background: Electronics and computer circuits course.
Registration Permission: Consent of instructor.

506 Product Selection and Evaluation (2) Development of operational requirements and features for new product having potential for business venture. Market potential, design feasibility and manufacturing requirements. Design alternatives created and evaluated against set of performance requirements determined from market analysis. Preferred product concept selected by end of semester. (Same as Industrial Engineering 506.) 
(DE) Prerequisite(s): 504.

507 Application of Linear Algebra in Engineering Systems (3) (See Chemical Engineering 507.)

508 Integrated Product, Process and Manufacturing System Design (3) (See Industrial Engineering 508.)

509 Multidisciplinary Project (1) (See Industrial Engineering 509.)

510 Prototype Development and Evaluation (3) Prototype of selected product made and tested against required operating conditions. Design changes implemented to meet customer’s needs. Fabrication drawings and manufacturing plans finalized for introduction of product to marketplace. Prototype development managed using project management plan. 
(DE) Prerequisite(s): 555.

Recommended Background: Undergraduate heat transfer course.

512 Heat Transfer II (3) Analysis of steady-state and time-dependent heat conduction by numerical methods. Analysis of laminar and turbulent convection heat transfer in internal and external flows, forced and buoyant driven flows.
(DE) Prerequisite(s): 541.

514 Phase Change Heat Transfer (3) Mechanisms and modeling of nucleation, transition and film boiling processes; critical heat flux; forced convection boiling and post dry-out heat transfer; condensation processes; heterogeneous nucleation; dropwise and filmwise condensation; flow condensation; liquid-solid phase change processes; moving phase fronts; mathematical modeling.
(DE) Prerequisite(s): 344 and 511.

Recommended Background: Undergraduate fluid mechanics and heat transfer course.

519 Technology Product Development and Entrepreneurship (3) Technology and innovation, technology transfer, patent protection, legal formation and intellectual property, knowledge management, generation, and transmission, launching a technology based business, sources of capital, small business growth and operation. Multidisciplinary teams will develop a business based on a technological product. 
(DE) Prerequisite(s): 506 or consent of instructor.

521 Thermodynamics I (3) Macroscopic thermodynamics, including First and Second Law analyses, availability, phase and chemical equilibrium criteria, combustion, gas mixtures, and property relations, determination of thermodynamic properties from molecular structure, spectroscopic data, kinetic theory, statistical mechanics, quantum physics, Schroedinger equation. 
(DE) Prerequisite(s): 332.

522 Thermodynamics II (3) Macroscopic thermodynamics, including First and Second Law analyses, availability, phase and chemical equilibrium criteria, combustion, gas mixtures, and property relations, determination of thermodynamic properties from molecular structure, spectroscopic data, kinetic theory, statistical mechanics, quantum physics, Schroedinger equation. 
(DE) Prerequisite(s): 332.

525 Combustion and Chemically Reacting Flows I (3) Fundamentals: thermochemistry, chemical kinetics and conservation equations; phenomenological approaches to laminar flames; diffusion and premixed flame theory; single droplet combustion; deflagration and detonation theory; stabilization of combustion waves in laminar streams; flammability limits of premixed laminar flames; introduction to turbulent flames. 
(DE) Prerequisite(s): 522 and 541 or consent of instructor.

526 Combustion and Chemically Reacting Flows II (3) Advanced topics: phenomenological approaches to turbulent flames; fundamentals of turbulent flow; application of probability density functions to turbulent flames; turbulent reacting flows with premixed and/or non-premixed reactants; spray combustion models; fluidized bed combustion; chemically reacting boundary layer flow; gas turbine and/or rocket motor combustors; furnaces; introduction to supersonic combustion and hypersonic flows. 
(DE) Prerequisite(s): 525.

527 Thermal Systems Analysis I (3) Application of basic principles of heat transfer, fluid mechanics, and thermodynamics to develop solution models for parametric analysis of thermal systems problems via commercial software. 
(DE) Prerequisite(s): 344.

(DE) Prerequisite(s): 527.

530 Foundations of Nanomechanics (3) Fundamental aspects of small-scale mechanics and thermodynamics needed to understand properties and behavior of engineered nanoscale systems. Role of nanomechanics in the contemporary nanotechnology research. Essential practical tools used by engineers and researchers for the analysis and characterization of nanostructures, nanocomposite materials, and complex multiscale phenomena in solids and liquids. 
(DE) Prerequisite(s): 321 and 331.

531 Advanced Biomechanics I (3) (See Biomedical Engineering 531.)

533 Dynamics (3) Kinematics and dynamics of particles in three dimensions. Rotating coordinate systems. Hamilton’s principle. Lagrange’s equations of motion. Kinematics and dynamics of rigid bodies. (Same as Aerospace Engineering 533, Engineering Science 533.) 
(DE) Prerequisite(s): 391 or Mathematics 431 and an undergraduate vibrations course.

534 Mechanical Vibrations (3) Vibrations of linear, discrete, undamped and damped systems. Lagrange’s equations for holonomic systems. Modal analysis. Laplace transform. Response to mechanical transients. (Same as Aerospace Engineering 535; Biomedical Engineering 534; Engineering Science 534.)
Recommended Background: An undergraduate vibrations course.

537 Mechanical Systems Analysis (3) Application of basic principles of rigid body dynamics, strength of materials, and continuum mechanics to development of models for parametric analysis of mechanical systems using commercial software. 
(DE) Prerequisite(s): 231 and 321.

539 Continuum Mechanics (3) (See Engineering Science 539.)
621 Advanced Topics in Mechanical Systems (3) Advanced theory and applications in control systems, dynamics, mechanics, strength of materials and vibrations.

Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

631 Advanced Biomechanics II (3) (See Biomedical Engineering 631.)

642 Advanced Topics in Thermodynamics (3) Comparison of macroscopic and microscopic approach; equilibrium of pure substances, metastable states. Non-equilibrium thermodynamics.

Registration Permission: Consent of instructor.


(DE) Prerequisite(s): 540 and 542.

647 Nonlinear Control Systems (3) Qualitative behavior of nonlinear systems; Lyapunov stability theory; passivity and absolute stability theory; frequency domain methods; nonlinear feedback systems; nonlinear design techniques.

(DE) Prerequisite(s): 547 or Electrical and Computer Engineering 512.

651 Advanced Topics in Computational Fluid Dynamics (3) (See Engineering Science 651.)

652 Advanced Computational Fluid Dynamics Practice (3) (See Engineering Science 652.)

659 Advanced Mechanics of Materials II (3) Plane stress and plane strain in rectangular and polar coordinates; stress functions. Torsion of noncircular sections - disks, thick-walled tubes, thick-walled pressure vessels. Theory of rectangular and circular plates, with holes, axisymmetric shells. Stress concentrations. (Same as Aerospace Engineering 659; Biomedical Engineering 659; Engineering Science 659.)

(DE) Prerequisite(s): 559 or consent of instructor.

661 Advanced Vibrations (3) Analysis of linear and nonlinear single degree of freedom systems. Random vibration. Mechanical transients.

(DE) Prerequisite(s): 534.

671 Advanced Topics in Applied Artificial Intelligence (3) (See Nuclear Engineering 671.)


(DE) Prerequisite(s): 586 or consent of instructor.

Medieval Studies (674)

401 Dante and Medieval Culture (3) (See Italian 401.)

402 Petrarch and Boccaccio (3) (See Italian 402.)

405 Medieval literature (3) (See English 401.)

406 Chaucer (3) (See English 402.)

410 Medieval French Literature (3) (See French 410.)

415 Medieval Architecture (3) (See Architecture 415.)

431 Medieval Art of the West, 800-1400 (3) (See Art History 431.)

441 Northern European Painting, 1350-1600 (3) (See Art History 441.)

451 The Art of Italy, 1250-1450 (3) (See Art History 451.)

475 Ancient and Medieval Political Thought (3) (See Political Science 475.)

510 Special Topics (3)

Repeatability: May be repeated. Maximum 6 hours.

Microbiology (684)

410 Microbial Physiology (3) Examination of concepts in microbial physiology and the structure and function of microbial cells.

(DE) Prerequisite(s): 310.

(DE) Corequisite(s): Biochemistry and Cellular and Molecular Biology 401.


(DE) Prerequisite(s): 310.

429 Medical Microbiology Laboratory (2) Laboratory exercises in medically important areas of microbiology including microorganisms, pathogenesis, and immunology.

(DE) Prerequisite(s): 319 and 430.

429 Medical Microbiology Laboratory (2) Laboratory exercises in medically important areas of microbiology including microorganisms, pathogenesis, and immunology.

(DE) Prerequisite(s): 319 and 430.

430 Immunology (3) Principles of inflammation and immunity; immunoglobulin structure and theories of formation and diversity. Complement, hypersensitivities, cell cooperation and recognition in immune mechanisms; and soluble factors.

(DE) Prerequisite(s): Biology 240.

440 Virology (3) Pathogenesis and molecular biology of viruses.

(DE) Prerequisite(s): 310.

470 Microbial Ecology (3) Physiological diversity and taxonomy of microorganisms from natural environments. Emphasis on the functional role of microorganisms in natural and simulated ecosystems.

(DE) Prerequisite(s): 310.

500 Thesis (1-15)

Grading Restriction: P/NP only.
Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.

Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

520 Microbial Pathogenesis (3) Broad study of host-pathogen relationships including the biochemical, cellular, genetic, genomic and evolutionary factors which play a role in microbial pathogenesis.

Credit Restriction: Students may not receive credit for both 420 and 520.

540 Genomics and Bioinformatics (3) Fundamentals of a new scientific discipline based on sequencing genomes (entire DNA) of individual organisms. Goals, principles and types of genome analysis are covered in a traditional lecture course. Computational tools for genome analysis (bioinformatics) are presented in both lecture and hands-on (computer-laboratory) settings.

Credit Restriction: Students may not receive credit for both 480 and 540.

550 Molecular Epidemiology and Mycology (3) (See Entomology and Plant Pathology 550.)

575 Applied Microbiology and Bioengineering (3) (See Chemical Engineering 575.)

591 Foreign Study (1-9)

Repeatability: May be repeated. Maximum 9 hours.

592 Off-Campus Study (1-9)

Repeatability: May be repeated. Maximum 9 hours.

593 Independent Study (1-9)

Repeatability: May be repeated. Maximum 9 hours.

595 General Seminar (1) Lectures and seminars by invited speakers, faculty, and graduate students.

Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 18 hours.

596 Laboratory Rotation (1) Familiarization with research areas in department through series of rotations in laboratories of individual faculty members.

Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 3 hours.

600 Doctoral Research and Dissertation (3-15)

Grading Restriction: P/NP only.
Repeatability: May be repeated.

601 Journal Club in Microbial Physiology (1) Readings and discussions based on current literature.

Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 18 hours.

602 Journal Club in Microbial Pathogenesis (1) Readings and discussions based on current literature.

Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 18 hours.

603 Journal Club in Immunology (1) Readings and discussions based on current literature.

Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 18 hours.

604 Journal Club in Virology (1) Readings and discussions based on current literature.

Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 18 hours.
8. Strategies and techniques for teaching music at this level.

570 Studies in Multicultural Music Education (3)
Study of music literature and regional cinema movements, film theory/criticism, or other topics. Taught in English. Content varies. Focus from historical, philosophical and regional perspectives on particular directors, stars, film genres, national and regional cinema movements, film theory/criticism, or other topics. Taught in English. (Same as Cinema Studies 582.)

574 Analysis for Teaching for Professional Development (2)
Strategies to document and analyze effectiveness of teaching and professional development. Study and application of various approaches.

575 Professional Internship in Teaching (1-8)
Teaching and teaching-related experiences in professional settings in public schools.

576 Teaching Internship in Comprehensive School (1-8)

577 Teaching Internship in Comprehensive School (1-8)

580 Seminar in Music Education (3)
Class investigation and individual reporting of pertinent topics and issues in music education.

590 Special Topics in Music Education (1-3)
Registration Permission: Consent of instructor.

591 Clinical Studies (4)
Group and individual seminar activities during full-time internship. Application and evaluation of professional core competencies. Completion and presentation of portfolio and analysis of teaching project.

593 Special Problems in Music Education (3)
Registration Permission: Consent of instructor.

Music Ensemble (708)

502 Jazz-Saxophone Ensemble (1)
Registration Permission: Consent of School of Music.

503 Small Jazz Ensemble (1)
Registration Permission: Consent of instructor.

504 Jazz Ensemble (1)
Registration Permission: Consent of School of Music.

505 Studio Orchestra (1)
Registration Permission: Consent of instructor.

506 Trombone Choir (1)
Registration Permission: Consent of instructor.

510 Percussion Ensemble (1)
Registration Permission: Consent of instructor.

511 Marimba Choir (1)
Registration Permission: Consent of instructor.

515 Chamber Music Ensemble (1)
Registration Permission: Consent of instructor.

530 Chamber Singers (1)
Registration Permission: Consent of instructor.

540 Opera Theatre (1)
Registration Permission: Consent of instructor.

550 Concert Band (1)
Registration Permission: Consent of instructor.

552 Symphonic Band (1)
Registration Permission: Consent of School of Music.

553 Wind Ensemble (1)
Registration Permission: Consent of School of Music.
554 Varsity Band (1)
Registration Permission: May be repeated. Maximum 12 hours.
Comment(s): Repeats auditions and/or the consent of instructor.

559 Marching Band (1)
Registration Permission: May be repeated. Maximum 12 hours.
Comment(s): Repeats auditions and/or the consent of instructor.

570 Symphony Orchestra (1)
Registration Permission: May be repeated. Maximum 12 hours.
Comment(s): Repeats auditions and/or the consent of instructor.

580 Concert Choir (1)
Registration Permission: May be repeated. Maximum 12 hours.
Comment(s): Repeats auditions and/or the consent of instructor.

583 Men's Chorale (1)
Registration Permission: May be repeated. Maximum 4 hours.
Comment(s): Repeats auditions and/or the consent of instructor.

589 Women's Chorale (1)
Registration Permission: May be repeated. Maximum 12 hours.
Comment(s): Repeats auditions and/or the consent of instructor.

590 Accompanying (1)
Registration Permission: May be repeated. Maximum 12 hours.
Comment(s): Repeats auditions and/or the consent of instructor.

Music General (698)

500 Thesis (1-15)
Grading Restriction: P/NP only.
Registration Permission: Consent of instructor.
Repeatability: May be repeated.

501 Graduate Recital (2)
Registration Permission: Consent of School Director.
Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Registration Permission: Consent of instructor.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

510 Music Bibliography (3) Bibliographic methodology in music.
Registration Permission: Consent of instructor.

511 Lecture Recital (2)

520 Musical Styles (3) Elements of design and their role in definition of musical styles.
Registration Permission: Consent of instructor.

521 Special Topics in Performance (1-3)
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of School Director.

540 Secondary Applied Music (1) May be taken by music majors desiring applied study on a 2nd or 3rd instrument.
Regrettably: May be repeated. Maximum 12 hours.
Comment(s): Repeats auditions and payment of applied music fee.

Music Instrumental (710)

490 Instrumental Conducting (3) Knowledge and skills in instrumental conducting. Various periods and composers and relationship of different styles to the conductor's art. Musical analysis and practice in conducting.
(DE) Prerequisite(s): Music Education 320 or equivalent.

560 Orchestral Repertoire (1) Intensive weekly master class focused on the performance of standard orchestral repertoire used in most orchestral auditions.
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

580 Band History and Literature I (3) Antiquity to 1900.
Registration Permission: Consent of instructor.

581 Band History and Literature II (3) 1900 to present.

583 Recitative for Instrumental Conductors (1) Problems in conducting recitatives.
Grading Restriction: Satisfactory/No Credit grading only.
Registration Permission: Consent of instructor.

584 Practicum for Instrumental Conductors (1) Intern experience in field other than area of major interest.
Grading Restriction: Satisfactory/No Credit grading only.

590 Advanced Instrumental Conducting (2) Physical techniques of conducting, study and analysis of scores, rehearsal techniques. Attention to individual problems. Requires applied music fee.
Repeatability: May be repeated. Maximum 8 hours.
Registration Permission: Consent of instructor.

595 Instrumental Conducting Performance (1) Preparation and juried performance of band or orchestral works.
Registration Permission: Consent of instructor.

Music Jazz (711)

410 Advanced Improvisation (3) Development of individual skills and solving individual problems in jazz improvisation.
(DE) Prerequisite(s): 210 and 220.

420 Jazz Pedagogy (1) Methods and materials relating to teaching of jazz, designing and administering jazz programs, and rehearsal techniques for jazz ensembles.
Registration Permission: Consent of instructor.
Repeatability: May be repeated. Maximum 12 hours.

Music Keyboard (712)

410 Organ Practicum (1) Improvisation, hymn playing, and accompanying on the organ.
Registration Permission: Consent of instructor.
Repeatability: May be repeated. Maximum 3 hours.
Comment(s): Requires organ proficiency at the 200 level.

420 Piano Literature I (3) From 1750 to the middle 19th century.

430 Piano Literature II (3) Middle 19th century to the present.

460 The Organ and Its Literature I (3) Development of the organ and organ literature from the Middle Ages to approximately 1750. Problems of style and interpretation. Pedagogical literature and methods.
(DE) Corequisite(s): Musicology 110.
Registration Permission: Consent of instructor.

470 The Organ and Its Literature II (3) Development of the organ and organ literature from 1750 to the present. Problems of style and interpretation. Pedagogical literature and methods.
(DE) Corequisite(s): Musicology 110.
Registration Permission: Consent of instructor.

480 Teaching Class Piano (3) Historical survey and evaluation of teaching materials and methodology for college and/or adult beginning piano classes with collateral teaching experience.
Registration Permission: Consent of instructor.

Comment(s): 485 and 495 must be taken in sequence.
Registration Permission: Consent of instructor.

490 Internship (2) Opportunity for pedagogy students to gain experience in teaching beginning students under the supervision of experienced instructors.
Contact Hour Distribution: Includes weekly discussion seminars.

491 Internship (2) Opportunity for pedagogy students to gain experience in teaching beginning students under the supervision of experienced instructors.
Contact Hour Distribution: Includes weekly discussion seminars.

495 Suzuki Piano Method II (2) Study of procedures and literature of the Suzuki Piano Method Books 3 and above.
Comment(s): 485 and 495 must be taken in sequence.
Registration Permission: Consent of instructor.

520 Piano Literature Seminar (3) Topics vary.
Repeatability: May be repeated. Maximum 9 hours.

531 Recital Project (2) Vocal recital. Preparation and accompaniment of full recital for accompanying concentrations only.
Registration Permission: Consent of instructor.

540 Advanced Piano Pedagogy (2) Topics vary. Evaluation and study of methods and materials for teaching piano at all levels. Supervised laboratory teaching.
Repeatability: May be repeated. Maximum 8 hours.
Registration Permission: Consent of instructor.

541 Recital Project (2) Instrumental recital. Preparation and accompaniment of full recital for accompanying concentrations only.
Registration Permission: Consent of instructor.

560 Organ Literature Seminar (3) Topics vary.
Repeatability: May be repeated. Maximum 6 hours.

Music Performance (713)

403 Flute (1-3)
Repeatability: May be repeated. Maximum 8 hours.
(DE) Prerequisite(s): 304 and Music General 101.
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 304.
Registration Permission: Consent of instructor.
404 Flute (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 403 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 403.  
Registration Permission: Consent of instructor.  

405 Oboe (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 306 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 306.  
Registration Permission: Consent of instructor.  

406 Oboe (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 405 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 405.  
Registration Permission: Consent of instructor.  

410 Bassoon (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 311 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 311.  
Registration Permission: Consent of instructor.  

411 Bassoon (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 410 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 410.  
Registration Permission: Consent of instructor.  

415 Clarinet (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 316 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 316.  
Registration Permission: Consent of instructor.  

416 Clarinet (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 420 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 420.  
Registration Permission: Consent of instructor.  

420 Saxophone (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 321 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 321.  
Registration Permission: Consent of instructor.  

421 Saxophone (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 420 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 420.  
Registration Permission: Consent of instructor.  

425 Horn (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 326 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 326.  
Registration Permission: Consent of instructor.  

426 Horn (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 425 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 425.  
Registration Permission: Consent of instructor.  

430 Trumpet (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 331 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 331.  
Registration Permission: Consent of instructor.  

431 Trumpet (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 430 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 430.  
Registration Permission: Consent of instructor.  

435 Trombone (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 336 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 336.  
Registration Permission: Consent of instructor.  

436 Trombone (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 435 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 435.  
Registration Permission: Consent of instructor.  

440 Baritone (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 341 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 341.  
Registration Permission: Consent of instructor.  

441 Baritone (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 440 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 440.  
Registration Permission: Consent of instructor.  

445 Tuba (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 346 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 346.  
Registration Permission: Consent of instructor.  

446 Tuba (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 445 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 445.  
Registration Permission: Consent of instructor.  

450 Percussion (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 351 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 351.  
Registration Permission: Consent of instructor.  

451 Percussion (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 450 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 450.  
Registration Permission: Consent of instructor.  

455 Voice (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 356 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 356.  
Registration Permission: Consent of instructor.  

456 Voice (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 455 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 455.  
Registration Permission: Consent of instructor.  

460 Violin (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 361 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 361.  
Registration Permission: Consent of instructor.  

461 Violin (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 460 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 460.  
Registration Permission: Consent of instructor.  

465 Viola (1-3)  
Repeatability: May be repeated. Maximum 8 hours.  
(DE) Prerequisite(s): 366 and Music General 101.  
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 366.  
Registration Permission: Consent of instructor.
466 Harpsichord (1-3)
Repeatability: May be repeated. Maximum 8 hours.
(DE) Prerequisite(s): 465 and Music General 101.
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 465.
Registration Permission: Consent of instructor.

470 Cello (1-3)
Repeatability: May be repeated. Maximum 8 hours.
(DE) Prerequisite(s): 371 and Music General 101.
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 371.
Registration Permission: Consent of instructor.

471 Cello (1-3)
Repeatability: May be repeated. Maximum 8 hours.
(DE) Prerequisite(s): 470 and Music General 101.
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 470.
Registration Permission: Consent of instructor.

472 Electric Bass (1-3)
Repeatability: May be repeated. Maximum 8 hours.
(DE) Prerequisite(s): 373 and Music General 101.
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 373.
Registration Permission: Consent of instructor.

473 Electric Bass (1-3)
Repeatability: May be repeated. Maximum 8 hours.
(DE) Prerequisite(s): 472 and Music General 101.
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 472.
Registration Permission: Consent of instructor.

474 String Bass (1-3)
Repeatability: May be repeated. Maximum 8 hours.
(DE) Prerequisite(s): 375 and Music General 101.
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 375.
Registration Permission: Consent of instructor.

475 String Bass (1-3)
Repeatability: May be repeated. Maximum 8 hours.
(DE) Prerequisite(s): 474 and Music General 101.
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 474.
Registration Permission: Consent of instructor.

480 Piano (1-3)
Repeatability: May be repeated. Maximum 8 hours.
(DE) Prerequisite(s): 381 and Music General 101.
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 381.
Registration Permission: Consent of instructor.

481 Piano (1-3)
Repeatability: May be repeated. Maximum 8 hours.
(DE) Prerequisite(s): 480 and Music General 101.
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 480.
Registration Permission: Consent of instructor.

483 Guitar (1-3)
Repeatability: May be repeated. Maximum 8 hours.
(DE) Prerequisite(s): 384 and Music General 101.
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 384.
Registration Permission: Consent of instructor.

484 Guitar (1-3)
Repeatability: May be repeated. Maximum 8 hours.
(DE) Prerequisite(s): 483 and Music General 101.
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 483.
Registration Permission: Consent of instructor.

485 Harpsichord (1-3)
Repeatability: May be repeated. Maximum 8 hours.
(DE) Prerequisite(s): 386 and Music General 101.
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 386.
Registration Permission: Consent of instructor.

486 Harpsichord (1-3)
Repeatability: May be repeated. Maximum 8 hours.
(DE) Prerequisite(s): 485 and Music General 101.
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 485.
Registration Permission: Consent of instructor.

489 Organ (1-3)
Repeatability: May be repeated. Maximum 8 hours.
(DE) Prerequisite(s): 390 and Music General 101.
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 390.
Registration Permission: Consent of instructor.

490 Organ (1-3)
Repeatability: May be repeated. Maximum 8 hours.
(DE) Prerequisite(s): 489 and Music General 101.
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 489.
Registration Permission: Consent of instructor.

494 Composition (1-3)
Repeatability: May be repeated. Maximum 8 hours.
(DE) Prerequisite(s): 395 and Music General 101.
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 395.
Registration Permission: Consent of instructor.

495 Composition (1-3)
Repeatability: May be repeated. Maximum 8 hours.
(DE) Prerequisite(s): 494 and Music General 101.
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 494.
Registration Permission: Consent of instructor.

496 Composition with Electronic Media (1-3)
Repeatability: May be repeated. Maximum 8 hours.
(DE) Prerequisite(s): 396 and Music General 101.
Comment(s): Requires audition, registration for ensemble appropriate to degree program, and C or higher in 396.
Registration Permission: Consent of instructor.

499 Improvisation (1-2)
Repeatability: May be repeated. Maximum 4 times.
Credit Restriction(s): May not be used to satisfy applied music requirement.
(DE) Prerequisite(s): Music General 101.
Comment(s): Requires audition and registration for ensemble appropriate to degree program.
Registration Permission: Consent of instructor.

503 Flute (1-4)
Repeatability: May be repeated. Maximum 8 hours.
Comment(s): Requires audition.
Registration Permission: Consent of instructor.

505 Oboe (1-4)
Repeatability: May be repeated. Maximum 8 hours.
Comment(s): Requires audition.
Registration Permission: Consent of instructor.

510 Bassoon (1-4)
Repeatability: May be repeated. Maximum 8 hours.
Comment(s): Requires audition.
Registration Permission: Consent of instructor.

515 Clarinet (1-4)
Repeatability: May be repeated. Maximum 8 hours.
Comment(s): Requires audition.
Registration Permission: Consent of instructor.

520 Saxophone (1-4)
Repeatability: May be repeated. Maximum 8 hours.
Comment(s): Requires audition.
Registration Permission: Consent of instructor.

525 Horn (1-4)
Repeatability: May be repeated. Maximum 8 hours.
Comment(s): Requires audition.
Registration Permission: Consent of instructor.

530 Trumpet (1-4)
Repeatability: May be repeated. Maximum 8 hours.
Comment(s): Requires audition.
Registration Permission: Consent of instructor.

535 Trombone (1-4)
Repeatability: May be repeated. Maximum 8 hours.
Comment(s): Requires audition.
Registration Permission: Consent of instructor.

540 Baritone (1-4)
Repeatability: May be repeated. Maximum 8 hours.
Comment(s): Requires audition.
Registration Permission: Consent of instructor.

545 Tuba (1-4)
Repeatability: May be repeated. Maximum 8 hours.
Comment(s): Requires audition.
Registration Permission: Consent of instructor.
550 Percussion (1-4)
Repeatability: May be repeated. Maximum 8 hours.
Comment(s): Requires audition.
Registration Permission: Consent of instructor.

551 Accompanying and Coaching (1-4)
Repeatability: May be repeated. Maximum 8 hours.
Comment(s): Requires audition.
Registration Permission: Consent of instructor.

555 Voice (1-4)
Repeatability: May be repeated. Maximum 8 hours.
Comment(s): Requires audition.
Registration Permission: Consent of instructor.

560 Violin (1-4)
Repeatability: May be repeated. Maximum 8 hours.
Comment(s): Requires audition.
Registration Permission: Consent of instructor.

565 Viola (1-4)
Repeatability: May be repeated. Maximum 8 hours.
Comment(s): Requires audition.
Registration Permission: Consent of instructor.

570 Cello (1-4)
Repeatability: May be repeated. Maximum 8 hours.
Comment(s): Requires audition.
Registration Permission: Consent of instructor.

572 Electric Bass (1-4)
Repeatability: May be repeated. Maximum 8 hours.
Comment(s): Requires audition.
Registration Permission: Consent of instructor.

575 String Bass (1-4)
Repeatability: May be repeated. Maximum 8 hours.
Comment(s): Requires audition.
Registration Permission: Consent of instructor.

580 Piano (1-4)
Repeatability: May be repeated. Maximum 8 hours.
Comment(s): Requires audition.
Registration Permission: Consent of instructor.

583 Guitar (1-4)
Repeatability: May be repeated. Maximum 8 hours.
Comment(s): Requires audition.
Registration Permission: Consent of instructor.

585 Harpsichord (1-4)
Repeatability: May be repeated. Maximum 8 hours.
Comment(s): Requires audition.
Registration Permission: Consent of instructor.

590 Organ (1-4)
Repeatability: May be repeated. Maximum 8 hours.
Comment(s): Requires audition.
Registration Permission: Consent of instructor.

594 Composition (1-3)
Repeatability: May be repeated. Maximum 8 hours.
Comment(s): Requires audition.
Registration Permission: Consent of instructor.

595 Composition with Electronic Media (1-3)
Repeatability: May be repeated. Maximum 8 hours.
Comment(s): Requires audition.
Registration Permission: Consent of instructor.

599 Improvisation (1-4)
Repeatability: May be repeated. Maximum 8 hours.
Comment(s): Requires audition.
Registration Permission: Consent of instructor.

Music Technology (717)

540 Computer Music Transcription (3) Projects in notation, playback, and publication of music incorporating elements of word processing, graphic design, sequencing, and page layout. Study of MIDI protocol as applied to computer music work station design.
Credit Restriction: May be applied toward the concentration in music theory with technology emphasis.
Registration Permission: Consent of instructor.

550 Computer Projects (3) High-level programming languages used to design and implement computer-managed instruction; Internet development tools; writing of documentation for computer projects.
(DE) Prerequisite(s): 540 or equivalent.

560 Technology in Music Research (3) Use of technology for research projects in music analysis or pedagogy: development and execution of research project.
(DE) Prerequisite(s): 550.

Music Theory (714)

430 Counterpoint I (3) Study of species counterpoint in modal and tonal styles with emphasis on works of Palestrina and J.S. Bach.
(DE) Prerequisite(s): 210 with a grade of C or higher.

440 Counterpoint II (3) Writing of contrapuntal forms of the 18th century and fugue analysis of works from the 18th through the 20th centuries.
(DE) Prerequisite(s): 430 with grade C or higher.

450 Choral Arranging (2) Analysis of scores and writing of arrangements for choruses.
(DE) Prerequisite(s): 210 and 240 with grade C or higher or consent of instructor.

520 Analytical Techniques (3) Analytical techniques, contemporary approaches. Tonal and neoclassical music.
Registration Permission: Consent of instructor.

530 Music Theory Pedagogy (3) Techniques, methods, and materials involved in college-level theory programs. Use of technology and review of existing software.
Registration Permission: Consent of instructor.

531 Independent Study (1-15)
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Consent of instructor.

Music Voice (715)

410 Song Literature I (2) German songs.
Credit Restriction: Graduate credit not available for students in vocal performance.

420 Song Literature II (2) French, Italian, Russian, Scandinavian, Czechoslovakian, British, and American art songs.
Credit Restriction: Graduate credit not available for students in vocal performance.

Comment(s): Does not fulfill deficiency requirements for graduate students in voice or accompanying.

510 Vocal Literature Seminar (3) Topics vary.
Repeatability: May be repeated. Maximum 8 hours.

520 Performance Techniques for Singers (1) Improvisation, movement, and basic techniques for dramatic vocal performance.
Repeatability: May be repeated. Maximum 2 hours.
Comment(s): Restricted to students in a vocal concentration.

530 Opera Performance (1) For satisfaction of performance requirement. May be fulfilled by undertaking a major operatic role or by demonstrating a cumulative performance record which may include a project approved and supervised by the voice faculty.
Repeatability: May be repeated. Maximum 4 hours.
Registration Permission: Consent of instructor.

540 Opera Production (1-3)
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

550 Advanced Vocal Pedagogy I (2) Study of vocal production, examination of different methods.

560 Advanced Vocal Pedagogy II (2) Study of teaching materials, observation of studio teaching, analysis of vocal problems in selected students, and supervised teaching.

565 Special Projects in Vocal Pedagogy (3) Course is available only for graduate students majoring in vocal pedagogy.
Registration Permission: Consent of instructor.

579 Vocal Chamber Music Performance (1) For satisfaction of performance requirement. May be used to substitute for Music Voice 530 when approved and supervised by the voice faculty.
Registration Permission: Consent of instructor.
575 Internship in Vocal Pedagogy I (1) Opportunity for vocal pedagogy students to develop and improve applied teaching skills through a shared practicum experience in a seminar setting. Includes supervised instruction.
   Registration Permission: Consent of instructor.
   Repeatability: May be repeated. Maximum 2 hours.
   Comment(s): Available only for graduate students majoring in vocal pedagogy.

580 Choral Literature I (2) A historical survey of the development of the major choral genre.

585 Choral Literature II (2) A survey by historical period of choral literature that is considered part of the standard choral repertoire.

590 Advanced Choral Conducting (2) Expansion and continued refinement of conducting technique. Score reading and preparation, rehearsal techniques, and interpretation of styles and performance practices.
   Repeatability: May be repeated. Maximum 8 hours.

594 Project in Choral Conducting Performance (1-3) Public performance, critical document; recording project.
   Repeatability: May be repeated. Maximum 36 hours.
   Registration Permission: Consent of instructor.

595 Choral Conducting Seminar (3) Topics vary.
   Repeatability: May be repeated. Maximum 36 hours.
   (DE) Prerequisite(s): 590 or consent of instructor.

Musicology (706)

410 Studies in Genre (3) Historical, cultural, analytical, and musicological issues related to a single musical genre, style, or repertory. Topics vary.
   Repeatability: May be repeated. Maximum 6 hours.

420 History of Opera (3) The development of opera from its inception to the present. Readings and discussion focus on an understanding of the historical trajectory of opera, both as a musico-theatrical work and as a cultural practice.
   Recommended Background: 100-level musicology course.
   Registration Permission: Consent of instructor.

430 History of the Symphony (3) Overview of orchestral repertories from 1600 to the present.
   Recommended Background: 100-level musicology course.
   Registration Permission: Consent of instructor.

450 Composer Seminar (3) Biographical, historical, and cultural study of a composer, or a group of related composers. Topics vary.
   Repeatability: May be repeated. Maximum 6 hours.

460 Music Aesthetics (3) Nature of music and musical experience, sense perception and emotions, music, and the role of artist in society. Aesthetic viewpoint of individuals and historical eras through selected writings.

480 Music in Christian Worship (3) Hymnody, liturgies, and liturgical music.

540 Medieval and Renaissance Music (3) Musical phenomena from c. 900 to c. 1600, selected from chant, troubadour song, early polyphony, madrigal, mass, and motet. Genres considered against historical, cultural, analytical, and literary frameworks, including words-music relationships, the role of music in devotion, sacred and secular interchanges, oral and written transmissions.
   (DE) Prerequisite(s): 400.
   (DE) Corequisite(s): Music General 510.
   Registration Permission: Consent of instructor.

550 Music in the Baroque Period (3) Aspects of western European art music, c. 1600 to c. 1750, from historical and cultural perspectives. Genre, national identities, the roles of voices and instruments, the emergence of tonality, issues of gender, and music’s role in social, religious and performance practices.
   (DE) Prerequisite(s): 400.
   (DE) Corequisite(s): Music General 510.
   Registration Permission: Consent of instructor.

560 Music in the Classic Period (3) The development of classical style from preclassic to the music of Haydn, Mozart and early Beethoven. Focus on aesthetic, cultural and social frameworks pertaining to various genres and composers. Selected vocal and orchestral works examined with respect to themes of appropriation, politics, narratives, and biographical references.
   (DE) Prerequisite(s): 400.
   (DE) Corequisite(s): Music General 510.
   Registration Permission: Consent of instructor.

570 Music in the 19th Century (3) Music of the nineteenth century from Beethoven to the post-Romantics with a focus on aesthetic, cultural and social contexts. Opera, symphony, art song, piano works, and others examined against the frameworks of cultural theory, gender studies, orientalism, politics and philosophy.
   (DE) Prerequisite(s): 400.
   (DE) Corequisite(s): Music General 510.
   Registration Permission: Consent of instructor.

580 Music in the 20th Century (3) Composers, repertoires, and issues in twentieth-century art music of western Europe and the United States. New roles for composers and performers, confluences of ‘high’ and ‘low’ art forms, influences of technology, and music’s place in the formation of national, political, and gendered identities.
   (DE) Prerequisite(s): 400.
   (DE) Corequisite(s): Music General 510.
   Registration Permission: Consent of instructor.

585 Topics in Music of the Americas (3) Historical or cultural study of a topic concerned with music and musical practice in the Americas. Topics vary.
   Repeatability: May be repeated. Maximum 6 hours.
   (DE) Prerequisite(s): 400.
   (DE) Corequisite(s): Music General 510.
   Registration Permission: Consent of instructor.

586 Topics in Opera (3) Topics vary within operatic repertory from the 17th century to the present including music and drama; interdisciplinary, race, or gender studies; realism; nationalism; expressionism; minimalism.
   Repeatability: May be repeated. Maximum 6 hours.

590 Introduction to Ethnomusicology (3) Ethnomusicology as a scholarly discipline. History, theories, and methodologies as applied to study of music in culture.
   (DE) Prerequisite(s): 400.
   (DE) Corequisite(s): Music General 510.
   Registration Permission: Consent of instructor.

593 Independent Study (1-15)
   Repeatability: May be repeated. Maximum 18 hours.
   Registration Permission: Consent of director.

595 Seminar in Ethnomusicology (3) Exploration of a methodological, theoretical, or ethnographic topic in ethnomusicology. Topics vary.
   Repeatability: May be repeated. Maximum 6 hours.
   (DE) Prerequisite(s): 400.
   (DE) Corequisite(s): Music General 510.

596 Seminar in Historical Musicology (3) Topics vary; specific musical genre, composer, or phenomenon.
   Repeatability: May be repeated. Maximum 6 hours.

Nuclear Engineering (716)

403 Nuclear and Radiological Engineering Laboratory II (3) Cross section measurements, diffusion properties of neutrons, shielding, dynamics and controls, alpha and beta spectroscopy, radiation fields and dosimetry.
   (DE) Prerequisite(s): 304.

404 Nuclear Fuel Cycle (3) Topics relative to nuclear fuel cycle including, mining, milling, fabrication, in-core management, reprocessing, waste disposal. Regulatory and radiation health issues and requirements.
   (DE) Prerequisite(s): 400 or equivalent.

406 Radiation Shielding (3) Types of radiation sources, fundamentals of gamma ray and neutron attenuation, biological effects, approximate methods of shield design, discrete ordinates, and Monte Carlo.
   (DE) Prerequisite(s): Physics 232.

   (DE) Prerequisite(s): 301.

431 Radiation Protection (3) External and internal dosimetry, biological effects of radiation, radiation detection, radiation risk assessment.
   (DE) Prerequisite(s): 301.

470 Nuclear Reactor Theory I (3) Fundamentals of reactor physics relative to cross sections. Kinematics of elastic scattering. Reactor kinetics, reactor systems and nuclear data. Analytical and numerical methods applicable to general criticality problems, eigenvalue searches, perturbation theory, and multigroup diffusion equations.
   (DE) Prerequisite(s): 301.
483 Introduction to Reliability Engineering (3) Probabilistic failure models, parameter estimation (maximum likelihood, Bayes techniques). Model identification and comparison, accelerated life tests, failure prediction, system reliability, preventive maintenance and warranties. (Same as Chemical Engineering 483, Industrial Engineering 483; Mechanical Engineering 483.)

484 Introduction to Maintainability Engineering (3) Principles of maintenance and reliability engineering, and maintenance management. Topics include information extraction from machinery measurements, rotating machinery diagnostics, nondestructive testing, life prediction, failure models, lubrication oil analysis, establishing predictive maintenance program, and computerized maintenance management systems. (Same as Chemical Engineering 484; Industrial Engineering 484; Materials Science and Engineering 484; Mechanical Engineering 484.)

Registration Permission: Consent of instructor.

494 Special Topics in Nuclear Engineering (3) Problems related to recent developments and practice.

Repeatability: May be repeated. Maximum 6 hours.

Registration Permission: Consent of instructor.

500 Thesis (1-15)

Grading Restriction: P/NP only.

Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated.

Credit Restriction: May not be used toward degree requirements.

509 Multidisciplinary Project (1) (See Industrial Engineering 509.)

511 Transport Processes in Nuclear Engineering (3) Rheology of Newtonian and non-Newtonian fluids; integral and system conservation equations for single and multi-component fluids; in-depth development of differential conservation equations for mass, energy, and momentum; exact and approximate solutions of equations of motion; boundary layer analysis; numerical analysis of fluid flow and heat transfer.

512 Transport Processes in Nuclear Engineering (3) Rheology of Newtonian and Boltzmann fluids; integral and system conservation equations for single and multi-component fluids; in-depth development of differential conservation equations for mass, energy, and momentum; exact and approximate solutions of equations of motion; boundary layer analysis; numerical analysis of fluid flow and heat transfer.

521 Nuclear Systems Dynamics and Control (3) Introduction to state variable methods for system dynamics and control analysis and application of these methods to nuclear plant dynamics, simulation and control problems.

522 Experimental Methods in Reactor Dynamics (3) Introduction to time domain and frequency domain techniques. Measurement, analysis, and interpretation of process signals for reactor surveillance and diagnostics. Introduction to time-series modeling.

(DE) Prerequisite(s): 521.


543 Selected Topics in Nuclear Criticality Safety (3) Criticality safety computational and experimental methods for enrichment, fabrication, storage, reprocessing, and transport applications; overview of safety practices and regulatory requirements.

(DE) Prerequisite(s): 421 or consent of instructor.

550 Radiation Measurements Laboratory (3) Physics and electronics associated with radiation detection and measurement, methods of data analysis. Applicability of particular detector measurements and fundamentals of radiation detection instrumentation operation.

(DE) Prerequisite(s): 551.


(DE) Corequisite(s): 301.

552 Radiological Assessment and Dosimetry (3) Transport of radionuclides in environment, food chain pathways, internal dosimetry and personnel dosimetry.

(DE) Prerequisite(s): 551 or consent of instructor.

567 Medical Physics I (3) Ionizing radiation use in radiation therapy to cause controlled biological effects in cancer patients. Physics of interaction of various radiation modalities with body equivalent materials and physical aspects of clinical applications.

Contact Hour Distribution: Lecture and lab.

Registration Permission: Consent of instructor.

568 Medical Physics II (3) Physics of ionizing radiation therapy with emphasis on quality assurance, treatment planning, radiation protection, and special treatment procedures.

Contact Hour Distribution: Lecture and lab.

(DE) Prerequisite(s): 567.


(DE) Prerequisite(s): 470 or consent of instructor.

572 Nuclear System Design (3) Design and analysis of a nuclear system, interface with non-nuclear aspects of system design: system reliability and economics; class project.

Registration Permission: Consent of instructor.

577 Neural Networks in Engineering (3) Neural network technology for intelligent systems; radial basis neural networks, structure of neural computing systems, programming. (Same as Biomedical Engineering 577; Engineering Science 577; Mechanical Engineering 577.)

Registration Permission: Consent of instructor.

578 Fuzzy Systems in Engineering (3) Fuzzy numbers, fuzzy environment, uncertainty and randomness, approximate reasoning, fuzzy models and structures, decision process in fuzzy environment, fuzzy computing, fuzzy logic controllers, fuzzy expert systems and other engineering applications. (Same as Engineering Science 578.)

579 Advanced Monitoring and Diagnostic Techniques (3) Fundamentals of machine monitoring and diagnosis and application of advanced statistical and artificial intelligence based techniques such as ridge regression, principal component analysis (PCA), linear and non-linear partial least squares (PLS), neural networks, and fuzzy logic.

(DE) Prerequisite(s): Statistics 571.

Registration Permission: Consent of instructor.

581 Reactor Shielding (3) Application of analytic/deterministic solutions of Boltzmann transport equation to shield design problems. Spherical harmonics, moments method, discrete ordinates, adjoint calculations, coupled analysis, and fast reactor shield design.

(DE) Prerequisite(s): 406 or equivalent.

582 Monte Carlo Analysis (3) General overview of the Monte Carlo method for solving problems in physics and engineering. Random sampling, evaluation of integrals, analog particle transport, techniques of variance reduction, forward and adjoint modes of analysis, importance function biasing, splitting/weight window survival biasing and contribution theory. Particular emphasis on solving neutral particle radiation transport problems using the MCNP code system.

Registration Permission: Consent of instructor.

585 Process System Reliability and Safety (3) Qualitative and quantitative techniques for assessing and improving process systems reliability and safety. Fault tree analysis and associated dependent failure analysis.

(Same as Chemical Engineering 585.)

Registration Permission: Consent of instructor.

594 Culminating Integrated Project Report (3) (See Mechanical Engineering 594.)

597 Special Topics in Nuclear Engineering (3) Lectures and recitation on relevant advances in nuclear engineering.

Registration Permission: Consent of instructor.

598 Nuclear Engineering Practice (3-9) Experience in solving and reporting on engineering problems.

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated. Maximum 15 hours.

Comment(s): Enrolment limited to alternative plan students.

Registration Permission: Consent of department.

600 Doctoral Research and Dissertation (3-15)

Grading Restriction: P/NP only.

Repeatability: May be repeated.

611 Selected Topics in Reactor Theory (3) Transport theory, control rod theory, stochastic methods. Selected topics from literature.

(DE) Prerequisite(s): 572.

612 Selected Topics in Reactor Theory (3) Transport theory, control rod theory, stochastic methods. Selected topics from literature.

(DE) Prerequisite(s): 572.
621 Selected Topics in Radiation Protection (3)
(DES) Prerequisite(s): 551 and 552.

(DES) Prerequisite(s): Statistics 571.
Registration Permission: Consent of instructor.

671 Advanced Topics in Applied Artificial Intelligence (3) Recent advances in engineering applications of artificial intelligence. (Same as Engineering Science 671; Mechanical Engineering 671.)
(DES) Prerequisite(s): 577.

697 Special Topics in Nuclear Engineering (3) Investigation of new developments.
Registration Permission: Consent of instructor.

Nursing (720)

400 Aging and Society (3) An examination of the health and social effects of longevity and the aging process including societal and personal attitudes about old age. Resources, trends, issues, and potentials of aging are explored. Volunteer community service, a service learning component, is required.
Comment(s): Open to students in all colleges.

402 Gerontology Practicum (3) Off-campus supervised experience in gerontology. Offered as part of the gerontology minor.
Comment(s): Open to students in all colleges.
Registration Permission: Consent of instructor.

409 Genetic Disorders, Vulnerable Families and Health Advocacy (3) Examination of health and social implications of Human Genome Project with emphasis on genetic disorders that result in chronic illness or disability. Strategies for building collaborative partnerships to effect health advocacy for vulnerable populations.

500 Thesis (1-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.
Registration Restriction(s): Master of Science in Nursing – nursing major.

501 Nursing Research: Methods, Design, and Analysis (3) Basic principles of research process in application to clinical questions; critical evaluation of nursing and health-related research.
Recommended Background: Graduate level statistics course.
Registration Restriction(s): Master of Science in Nursing – nursing major.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

504 Advanced Health/Physical Assessment (3) Development of advanced clinical reasoning and assessment skills to determine client health status and needs. Application of physiological, pathophysiological, and psychosocial concepts with implications for advanced practice nursing.
Contact Hour Distribution: 2.5 didactic and .5 lab.
Registration Restriction(s): Master of Science in Nursing – nursing major.

505 Advanced Clinical Pharmacology (3) Pharmacological agents utilized to treat common, recurrent health problems; indications, contraindications, side and interactive effects of commonly prescribed drugs.
Recommended Background: Undergraduate pharmacology course or consent of instructor.
Comment(s): Open to non-degree students.

(DES) Prerequisite(s): 505.
Registration Restriction(s): Master of Science in Nursing – nursing major/anesthesia concentration.

507 Concepts for Advanced Practice Nursing: Health Promotion and Health Policy (4) Exploration of advanced nursing practitioners and their role in the dynamic health care system. Emphasis on health policy, health promotion and the organizational, social, ethical, political, economic, and technological factors that impact advanced practice nursing and the delivery/promotion of health care.
Contact Hour Distribution: 3 didactic and 1 seminar.
Registration Restriction(s): Master of Science in Nursing – nursing major.

509 Graduate Seminar in Public Health (1) (See Public Health 509.)

510 Theoretical Foundations of Nursing (3) Historical evolution of nursing science; nursing’s metaparadigm and selected philosophies, conceptual models and theories as structures which guide critical thinking in analysis, reasoning, and decision making for advanced practice nursing.
Registration Restriction(s): Master of Science in Nursing – nursing major.

511 Statistical Applications to Nursing Research (3) Descriptive and inferential statistics: statistical concepts and applications to clinical settings and their applications to advanced practice nursing.
Comment(s): Open to non-degree students.

512 Issues in Advanced Practice Nursing (1) Seminar provides a forum for collaborative deliberation on issues impacting the practice of advanced practice nursing and helps advanced practice nursing student transition to their independent practice roles.
Registration Restriction: Master of Science in Nursing – nursing major.

513 Advanced Practice Role Seminar (1) Seminar lays the foundation for the socialization of the advanced practice nurse in today’s dynamic and challenging health care delivery environment.
Registration Restriction: Master of Science in Nursing – nursing major.

515 Advanced Pathophysiology for Nursing Practice (3) Advanced physiologic and pathophysiologic concepts, principles, and theories applied to deviations of human systems.
Recommended Background: Undergraduate pathophysiology course.
Registration Restriction(s): Master of Science in Nursing – nursing major.

516 Advanced Pathophysiology: Neurological/Cardiovascular with Anesthesia Implications (2) Review of anatomy and physiology and integration of pathophysiology involved in patients requiring anesthetic care for cardiac surgical procedures (both children and adults) with and without cardiopulmonary bypass, intercranial surgical procedures for vascular and mass occupying lesions, patients requiring somatosensory evoked potential monitoring, and patients requiring anesthesia for non-cardiac and non-neurological procedures who present with either neurological and/or cardiovascular comorbidity.
(DES) Prerequisite(s): 524 and 525.
(DES) Corequisite(s): 523.
Registration Restriction(s): Master of Science in Nursing – nursing major/anesthesia concentration.

517 Advanced Pathophysiology: Respiratory/Renal with Anesthesia Implications (2) Review of anatomy and physiology and integration of pathophysiology involved in administration of anesthesia for patients who present with renal or respiratory pathology. Pathological implications of acute and chronic renal failure, renal transplantation, pulmonary disease states: obstructive and restrictive diseases, one lung ventilation, and acute pulmonary disease states and their management.
(DES) Prerequisite(s): 524 and 525.
(DES) Corequisite(s): 523.
Registration Restriction(s): Master of Science in Nursing – nursing major/anesthesia concentration.

518 Advanced Pathophysiology: Obstetrics/Regional Anesthesia (2) Review of anatomy and physiology and integration of pathophysiology involved in administration of regional blockade of upper and lower extremities. Local anesthetic pharmacology, indication for regional anesthesia, contraindications to specific blockade, and techniques for clinical administration of regional blockade. Regional anesthetic considerations for obstetric patient.
(DES) Prerequisite(s): 524 and 525.
(DES) Corequisite(s): 523.
Registration Restriction(s): Master of Science in Nursing – nursing major/anesthesia concentration.

519 Psychopharmacology in Advanced Practice (3) Examination of the neurobiological basis of psychiatric illness and the use of psychopharmacological agents to modify symptoms and outcomes. Evaluation of the role of psychoactive medications in relation to the use of other psychotherapeutic interventions.
Recommended Background: Undergraduate pharmacology course or consent of instructor.
522 Integrated Health Science for Anesthesia (3) Fundamental principles of chemistry and physics as related to practice of nurse anesthesia. Correlation of principles to clinical anesthesia practice. (DE) Prerequisite(s) or (DE) Corequisite(s): 524. Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

523 Advanced Principles of Nurse Anesthesia Practice (2) Advanced concepts/principles of anesthetic management and legal implications of nurse anesthesia practice. Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

524 Basic Principles of Anesthesia I (3) An introduction to the scientific principles upon which anesthesia administration is based. The focus of this course is on the sound basic principles of safe anesthesia delivery for the beginning practitioner. Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

525 Basic Principles of Anesthesia II (3) A continuation of 524 which builds upon the previous course to provide advanced elementary scientific principles upon which nurse anesthetists implement plans of care which have been developed. The focus of this course is on the sound basic principles of safe anesthesia management for the beginning practitioner. Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

526 Professional Issues in Nurse Anesthesia (2) Exploration of historical and current issues surrounding nurse anesthesia education, practice, and the profession. Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

527 Nursing of Women and Children: Clinical Experience in Children’s Health (1-5) Clinical experience in the role of pediatric nurse practitioner or clinical nurse specialist in variety of health care settings serving children. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 15 hours. (RE) Prerequisite(s): 550 or 551. Registration Restriction(s): Master of Science in Nursing – nursing major.

528 Well Child Care: Assessment of Growth, Development, and Behavior (2) Comprehensive and preventative care for the well child. Appropriate screening tools and related development theories. Focus is on the well child ages 0 to 21 years. (RE) Prerequisite(s): 522 and 527. Registration Restriction(s): Master of Science in Nursing – nursing major.

529 Clinical Practice: Adult and Older Adult (1-5) Clinical experience in the role of the adult or gerontological nurse practitioner, or adult or gerontological clinical nurse specialist in a variety of health care settings serving the adult and older adult populations. Contact Hour Distribution: All practicum. Repeatability: May be repeated. Maximum 18 hours. (RE) Prerequisite(s): 504 and 505. (DE) Prerequisite(s): 515.

530 Adult Health Nursing I (2) Advanced nursing practice for health promotion, health assessment, and maintenance of adult clients. Application of theory and research to advanced practice nursing in a variety of settings. (RE) Prerequisite(s): 504 and 505. (DE) Prerequisite(s): 515. (DE) Prerequisite(s) or (DE) Corequisite(s): 507. Registration Restriction(s): Master of Science in Nursing – nursing major.

531 Adult Health Nursing II (2) Continuation of 530. Emphasis on health restoration and management of advanced practice nursing care to adult clients with complex health problems and their families. Application of theory and research to advanced practice nursing in a variety of settings. (RE) Prerequisite(s): 530 and 501. Registration Restriction(s): Master of Science in Nursing – nursing major.


533 Homeland Security I (5) Advanced planning and leadership in response to human-made and natural disasters, as well as mass casualties related to terrorism or breach of homeland security. Contact Hour Distribution: 2 didactic and 3 practicum/field supervision. (DE) Corequisite(s): 532.

534 Homeland Security II (5) Continuation of Homeland Security I, providing emphasis on incident management, including ethical issues, and the impact of culture and psychology on the human response to terrorism, disaster, mass casualty events, and large population emergencies. Contact Hour Distribution: 2 didactic and 3 practicum/field supervision. (RE) Prerequisite(s): 533.

535 Homeland Security III (7) Application of advanced practice knowledge and skills to assess preparedness for mass casualty and homeland security disasters, toxic exposures or terrorist activity; to mobility available resources; and effectively use communication to integrate local response into broader area, national, and international response. Contact Hour Distribution: 2 didactic and 5 practicum/field supervision. (RE) Prerequisite(s): 534.

536 Homeland Security IV (8) Advanced care concepts provided to those affected by specific types of disasters, toxic exposures, terrorist events, or large population emergencies. Contact Hour Distribution: 2 didactic and 6 practicum/field supervision. (RE) Prerequisite(s): 535. Registration Restriction(s): Master of Science in Nursing – nursing major.

537 Global Issues in Health Care Delivery During Disaster (3) Examination of topics relevant to health care delivery and international humanitarian assistance in disaster, mass casualty events, and large population emergencies. Topics include ethics; international human rights; interface of culture, politics, and religion; psychological impact on survivors, aid workers, and health professionals; vulnerable populations. (RE) Prerequisite(s): 532 and 533. (DE) Prerequisite(s): 507 and 510. Registration Restriction(s): Master of Science in Nursing – nursing major.

538 Gerontological Nursing I (2) Advanced nursing practice for health promotion, health assessment, and maintenance of older adults. Application of theory and research to advanced practice nursing in a variety of settings. (RE) Prerequisite(s): 504 and 505. (DE) Prerequisite(s): 515.

539 Gerontological Nursing II (2) Continuation of 538. Emphasis on health restoration and management of advanced practice nursing care for older adult clients with complex health problems and their families. Application of theory and research to advanced practice nursing in a variety of settings. (RE) Prerequisite(s): 538 and 501. (DE) Prerequisite(s) or (DE) Corequisite(s): 582.

544 Clinical Nurse Anesthesia Practicum/Seminar I (2-11) Integration and application of theoretical foundations and development of clinical skills in nurse anesthesia practice under supervision of Certified Registered Nurse Anesthetist (CRNA) and/or anesthesiologist. Repeatability: May be repeated. Maximum 11 hours. Comment(s): Admission to nurse anesthesia concentration required. The nurse anesthesia practicum/seminars must be taken in sequence.

545 Clinical Nurse Anesthesia Practicum/Seminar II (2-11) Integration and application of theoretical foundations and development of clinical skills in nurse anesthesia practice under supervision of Certified Registered Nurse Anesthetist (CRNA) and/or anesthesiologist. Repeatability: May be repeated. Maximum 11 hours. (RE) Prerequisite(s): 544. Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

546 Clinical Nurse Anesthesia Practicum/Seminar III (2-11) Integration and application of theoretical foundations and development of clinical skills in nurse anesthesia practice under supervision of Certified Registered Nurse Anesthetist (CRNA) and/or anesthesiologist. Repeatability: May be repeated. Maximum 11 hours. (RE) Prerequisite(s): 545. Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

547 Clinical Nurse Anesthesia Practicum/Seminar IV (2-11) Integration and application of theoretical foundations and development of clinical skills in nurse anesthesia practice under supervision of Certified Registered Nurse Anesthetist (CRNA) and/or anesthesiologist. Repeatability: May be repeated. Maximum 11 hours. (RE) Prerequisite(s): 546. Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.
548 Clinical Nurse Anesthesia Practicum/Seminar V (2-11) Integration and application of theoretical foundations and development of clinical skills in nurse anesthesia practice under supervision of Certified Registered Nurse Anesthetist (CRNA) and/or anesthesiologist.

Repeatability: May be repeated. Maximum 11 hours.

(RE) Prerequisite(s): 547.

Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

549 Clinical Nurse Anesthesia Practicum/Seminar VI (2-11) Integration and application of theoretical foundations and development of clinical skills in nurse anesthesia practice under supervision of Certified Registered Nurse Anesthetist (CRNA) and/or anesthesiologist.

Repeatability: May be repeated. Maximum 11 hours.

(RE) Prerequisite(s): 548.

Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

550 Nursing of Women and Children I (2) Advanced practice nursing of women, infants and children; health promotion and nursing interventions for actual or potential health problems of women, children, and families.

(REG) Prerequisite(s): 504 and 505.

(REG) Corequisite(s): 507.

(DF) Corequisite(s): 553 or 527 or 564.

Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

551 Nursing of Women and Children II (2) Continuation of 550. Advanced practice nursing of women, infants and children; role refinement of nurse practitioner or clinical specialist in health maintenance and restoration for women, children, and families.

(REG) Prerequisite(s): 550 and 501.

(REG) Corequisite(s): 553 or 527 or 564.

Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

552 Care of the Critically-Ill Neonate (2) Advanced practice nursing of women, infants and children; health promotion and nursing interventions for actual or potential health problems of women, children, and families.

(REG) Prerequisite(s): 550.

Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

553 Nursing Care of Women and Children: Clinical Experience in Women's Health (1-5) Clinical experience in the role of women's health care nurse practitioner or clinical nurse specialist in a variety of health care settings serving women.

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated. Maximum 15 hours.

(REG) Prerequisite(s): 550 or 551.

Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

554 Care of the Well Woman and Minor Acute Illnesses (2) Comprehensive and preventative care for the well woman and the woman with minor acute conditions. Focus is on women of all ages.

(REG) Prerequisite(s): 550.

Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

555 Care of the Pregnant Woman (2) Physiology and pathophysiology of the pregnant woman. Recommended advanced nursing interventions in selected conditions. Focus is on the pregnant and newly delivered woman.

(REG) Prerequisite(s): 550.

Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

556 Care of Complex Health Problems in Women (2) Physiology and pathophysiology of the complex health problems common in women and the pregnant woman. Recommended advanced nursing interventions in selected health problems.

(REG) Prerequisite(s): 550 or 501.

Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

560 Mental Health Nursing I (6) Theories of advanced therapeutic interventions for clients experiencing actual and potential mental health problems: advanced practice nursing in specialty of mental health; clinical practice with clients of various ages in acute care and community settings.

Contact Hour Distribution: 2 didactic and 4 practicum.

(REG) Prerequisite(s): 504.

(DF) Corequisite(s): 505 and 515.

(REG) Corequisite(s): 507 and 510.

Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

561 Mental Health Nursing II (7) Continuation of 560. Advanced practice nursing in community settings for families and groups with actual and potential mental health problems.

Contact Hour Distribution: 2 didactic and 5 practicum.

(REG) Prerequisite(s): 504 and 501.

(DF) Corequisite(s): 553 or 527 or 564.

Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

562 Acute Illnesses in Children (2) Physiology and pathophysiology of acute minor illnesses in children and the recommended interventions in selected conditions for the APN. Focus is on ill children ages 0 to 21 years.

(REG) Corequisite(s): 550.

Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

563 Care of the Child with a Chronic Condition (2) Physiology and pathophysiology of chronic illnesses in children and the recommended interventions in selected conditions for the APN. Focus is on chronically ill children ages 0 to 21 years.

(REG) Corequisite(s): 551.

Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

564 Nursing of Women and Children: Clinical Experience in Infant's Health (1-5) Clinical experience in the role of neonatal nurse practitioner or clinical nurse specialist in a Level III intensive care nursery.

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated. Maximum 15 hours.

(REG) Corequisite(s): 550 or 551.

Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

565 Teaching Practicum (1-6) Individually designed teaching experience in collegiate nursing program or nursing practice setting. Objectives to be developed collaboratively by student and faculty.

Grading: Satisfactory/No Credit or letter grade.

Repeatability: May be repeated. Maximum 6 hours.

(REG) Prerequisite or (DE) Corequisite: 566.

Registration Permission: Consent of instructor.

566 Educational Principles and Strategies (3) Exploration and analysis of selected education, curriculum, teaching-learning, measurement, and evaluation principles and theories as applied to instruction of undergraduate nursing students, staff development, and patient education.

Grading Restriction: Consent of instructor.

567 Embryology and Neonatal Pathophysiology for Advanced Neonatal Nursing Practice (3) Pathophysiological challenges confronting infants born at preterm gestation and neonates with clinical disorders arising from alterations in embryogenesis. Emphasis on the role of neonatal advanced practice nurses in assessing subtle changes in the clinical condition in these infants.

(REG) Corequisite(s): 504 and 505.

Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

568 Care of the Neonate (2) Physiology and pathophysiology of the neonate and the recommended interventions in selected conditions for the advanced practice nurse. Focus is on the well infant and health consequences of congenital conditions, prematurity and illness.

(REG) Corequisite(s): 550.

Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

569 Care of the Ill Neonate (2) Physiology and pathophysiology of the neonate and the recommended interventions in selected conditions for the advanced practice nurse. Focus is on the ill neonate.

(REG) Corequisite(s): 550.

Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

570 Family Nurse Practitioner I (6) Application of advanced health/physical assessment and diagnostic reasoning in nursing management and primary care of individuals and their families with actual and potential acute health problems; clinical experience in role of family nurse practitioner in variety of settings.

Contact Hour Distribution: 2 didactic and 4 practicum.

(REG) Prerequisite(s): 504.

(DF) Corequisite(s): 505 and 515.

Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

571 Family Nurse Practitioner II (3) Continuation of 570. Emphasizes increasing advanced nursing competencies in the management and primary care of individuals and their families in all developmental life stages.

(REG) Corequisite(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.

572 Family Nurse Practitioner II Clinical (2) Continuation of 571. Clinical experience in a variety of settings emphasizing advanced nursing competencies in the management and primary care of individuals and their families in all developmental life stages.

Contact Hour Distribution: 2 practicum.

(REG) Prerequisite(s): 571.

Registration Restriction(s): Master of Science in Nursing – nursing major/nurse anesthesia concentration.
573 Family Nurse Practitioner III (8) Continuation of 572. Advanced nursing management of multiple/complex health problems of individuals and families in all developmental life stages; role refinement and exploration of major issues of the family nurse practitioner; clinical experience in a variety of settings.

Contact Hour Distribution: 2 didactic and 6 practicum.
(RE) Prerequisite(s): 501 and 572.
(DE) Prerequisite or (DE) Corequisite: 582.
Registration Restriction(s): Master of Science in Nursing – nursing major.

577 Special Topics (1-3) Topic is determined by faculty and student interest.
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

582 Scholarly Inquiry for Advanced Practice Nursing (3) Non-thesis option. Utilization of research process through experiential or critical evaluation of science in area of interest. Conducted under faculty guidance and culminating in scholarly product.
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite or (DE) Corequisite: 501 or consent of instructor.
Registration Restriction(s): Master of Science in Nursing – nursing major.

583 Directed Clinical Practice (1-10) Additional opportunities for advanced nursing practice. Objectives to be developed collaboratively by student and faculty.
Graduation: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 14 hours.
Comment(s): Enrollment in or completion of graduate-level courses in clinical nursing required.
Registration Restriction(s): Master of Science in Nursing – nursing major.

585 Seminar in Gerontology (1) (See Health 585.)

590 Nursing Administration: Macro-Analysis (6) Exploration, analysis, and application of selected organizational, management, and leadership theories and financial principles to delivery of nursing services. Structure, functions, organization, behaviors, and adaptive processes of health care organizations.
Contact Hour Distribution: 2 didactic and 4 practicum.
(RE) Prerequisite(s): 510.
(DE) Prerequisite or (DE) Corequisite: 501 and 507.
Registration Restriction(s): Master of Science in Nursing – nursing major.

591 Nursing Administration: Micro-Analysis (6) Utilization of human and financial resources, conflict resolution, and organizational development with application to mid-level and top-level nursing administration positions.
Contact Hour Distribution: 2 didactic and 4 practicum.
(RE) Prerequisite(s): 510.
(DE) Prerequisite or (DE) Corequisite: 501 and 507.
Registration Restriction(s): Master of Science in Nursing – nursing major.

592 Nursing Administration: Macroanalysis (2) Exploration, analysis, and application of selected organizational, management, and leadership theories and financial principles to delivery of homeland security nursing services. Structure, functions, organization, behaviors, and adaptive processes of health care organizations.
(RE) Prerequisite(s): 510.
(DE) Corequisite(s): 533.
Registration Restriction(s): Master of Science in Nursing – nursing major.

593 Independent Study (1-3) Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

600 Doctoral Research and Dissertation (3-15) Grading Restriction: P/NP only.
Repeatability: May be repeated.
Registration Restriction(s): Doctor of Philosophy – nursing major.

601 Philosophy and Theory for Nursing Science (3) Philosophical and historical context of knowledge for nursing science; in-depth analysis of health-related theories as frameworks for knowledge-building; concept development in theory building.
Registration Restriction(s): Doctor of Philosophy – nursing major.

603 Nursing Research and Inquiry (3) Philosophical, theoretical, and methodological bases for nursing inquiry.
(RE) Prerequisite(s): 503.
Registration Restriction(s): Doctor of Philosophy – nursing major.

605 Middle-Range Theoretical Formulations for Nursing Science Development (3) Extant and emerging middle-range theories instrumental in nursing science development.
(RE) Prerequisite(s): 603.
(DE) Corequisite(s): 608.
Recommended Background: Inferential statistics course.
Registration Restriction(s): Doctor of Philosophy – nursing major.

606 Nursing Research Seminar (3) Selected topics pertaining to dissertation proposal process, research experience, and defense.
Registration Restriction(s): Doctor of Philosophy – nursing major.

607 Qualitative Nursing Research (3) Critique and application of qualitative nursing research methods.
(RE) Prerequisite(s): 603.

608 Quantitative Nursing Research (3) Critique and application of quantitative nursing research methods.
(RE) Prerequisite(s): 603.
Recommended Background: Multivariate statistics course.
Registration Restriction(s): Doctor of Philosophy – nursing major.

609 Research Practicum (1-3) Supervised individual or group research experience under guidance of faculty.
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of instructor.
Registration Restriction(s): Doctor of Philosophy – nursing major.

610 Nursing Science Seminar (2) Critical Analysis and synthesis of literature in selected focus area within nursing science.
Registration Restriction(s): Doctor of Philosophy – nursing major.

612 Health and Nursing Policy/Planning (3) Policies affecting nursing education and practice; health policies and political processes; interactions between health professionals, consumer groups, and government in health policy development and health planning activities.
Registration Restriction(s): Doctor of Philosophy – nursing major.

613 Nursing Leadership in Complex Systems (3) Analysis and evaluation of nursing leadership/management in complex professional, academic and health care systems.
Registration Restriction(s): Doctor of Philosophy – nursing major.

614 Nursing Preceptorship (1-3) Individually-designed practicum, field, or internship experiences in variety of administrative, educational, research, or clinical practice settings.
Repeatability: May be repeated. Maximum 6 hours.
(RE) Prerequisite(s): 601.
Registration Restriction(s): Doctor of Philosophy – nursing major.

Nutrition (726)

500 Thesis (1-15) Grading Restriction: P/NP only.
Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

509 Graduate Seminar in Public Health (1) (See Public Health 509.)

511 Advances in Carbohydrate, Lipid and Protein Metabolism (4) The physiological impact of dietary carbohydrates, lipids and proteins, with an emphasis on nutritional and hormonal regulation of intermediary metabolism, bioenergetics and gene regulation.
Recommended Background: Advanced nutrition course.

512 Advances in Vitamin and Mineral Metabolism (3) Advances in the requirements, utilization, metabolism and physiological impact of micro-nutrients with an emphasis on vitamins and minerals in the context of human nutrition.
Recommended Background: Advanced nutrition course.

513 Community Nutrition I (3) Orientation to community; assessment of nutrition problems, needs, and resources; functional roles of public health nutritionist. Concurrent field experiences.
Recommended Background: Advanced nutrition course or consent of instructor.

514 Community Nutrition II (3) Planning, implementation, and evaluation of public health nutrition programs. Concurrent field experiences.
(DE) Prerequisite(s): 513 or consent of instructor.

515 Field Study in Community Nutrition (1-12) Personal participation in and analysis of state or regional community nutrition program. Location of in-depth study to be selected in consultation with instructor.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 12 hours.
(DE) Prerequisite(s): 513 and 514.
Registration Permission: Consent of instructor.

516 Maternal and Child Nutrition (3) Nutrition principles related to growth and development during pregnancy, infancy, and childhood to age 5, high risk conditions.
Recommended Background: Advanced nutrition course or consent of instructor.
517 Childhood and Adolescent Nutrition (3) Application of nutrition principles to school age children; effects of diseases on growth and health maintenance; nutritional assessment and counseling for nutrition. Recommended Background: Introduction to nutrition or consent of instructor.

518 Nutrition and Aging (3) Nutritional problems of adults; nutritional requirements, dietary intakes; effects of nutrition on biological aging. Recommended Background: Advanced nutrition course or consent of instructor.

521 Physiological Basis for Diet and Disease (3) Altered nutrient needs as result of metabolic changes that occur in selected disease states. Recommended Background: Nutrition in disease course or consent of instructor.

522 Nutrition Counseling (2) Individual eating habits and disorders, evaluation strategies for effectiveness of helping process. Recommended Background: Nutrition in disease course or consent of instructor.

540 Seminar in Nutrition (1) Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 6 hours.

541 Research Methods (2) Basic principles of planning, conducting, and interpreting nutrition and foodservice systems administration research. Required for the student facilities and/or faculty time before degree is completed. Registration Permission: Consent of instructor.

544 Survey Methods in Food and Nutrition (2) Application of survey research methods to nutrition projects: assessment of food consumption, nutrient intake, nutritional status, sociocultural-economic parameters, food production and service. (DE) Prerequisite(s): 540 or Logistics 510 or consent of instructor.

547 Field Experience (3-9) Experience in food-related industry or agency under supervision of faculty member. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 20 hours. Registration Permission: Consent of instructor.

548 Directed Study in Nutrition (1-3) Advanced study in nutrition. Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of instructor.

549 Special Topics (1-3) Recent advances in nutrition or food systems administration. Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of instructor.

600 Doctoral Research and Dissertation (3-15) Grading Restriction: P/NP only. Repeatability: May be repeated.

602 Advanced Topics in Nutrition Science (1-3) Comprehensive individual study and group discussion of topics related to current problems in nutrition. Repeatability: May be repeated. Maximum 12 hours. (DE) Prerequisite(s): 512 or consent of instructor.

Operations and Management Science (738)

540 Statistics and Operations Management (3) Analysis of methods and models for understanding supply chain processes. Introduction to management strategies and techniques applicable to design of systems in logistics and operations processes. (Same as Logistics 510.) (DE) Prerequisite(s): Business Administration 511, 512, and 513 or consent of instructor.

541 Operations Management (3) Techniques applicable to design of systems in operations planning and control in manufacturing and service industries. Modeling real-world systems through problem definition, supporting data structure design, model design, solution, implementation, and maintenance. (DE) Prerequisite(s): 540 or Logistics 510 or consent of instructor.

Philosophy (745)

400 Special Topics (3) Repeatability: May be repeated if topic differs. Maximum 6 hours.

411 Modern Religious Philosophies (3) (See Religious Studies 411.)

419 Science as Method (3) (See Ecology and Evolutionary Biology 419.)

420 Topics in History of Philosophy (3) One or more figures or movements from antiquity through mid-20th century. Repeatability: May be repeated. Maximum 9 hours. Recommended Background: 6 hours of philosophy courses or consent of instructor.

435 Intermediate Formal Logic (3) Metatheory of formal logic and philosophy of logic. Registration Permission: Consent of instructor.

440 Contemporary Ethical Theory (3) Repeatability: May be repeated if topic differs. Maximum 6 hours. Recommended Background: 6 hours of philosophy courses or consent of instructor.

443 Advanced Business Ethics (3) Advanced topics in business ethics. Repeatability: May be repeated if topic differs. Maximum 6 hours. (DE) Prerequisite(s): One of the following – 241, 242, 243, 244, 245, 246, 340.

445 Advanced Environmental Ethics (3) Advanced topics in environmental ethics. Repeatability: May be repeated if topic differs. Maximum 6 hours. (DE) Prerequisite(s): One of the following – 241, 242, 243, 244, 245, 246, 340.

446 Advanced Bioethics (3) Advanced topics in bioethics. Repeatability: May be repeated if topic differs. Maximum 6 hours. (DE) Prerequisite(s): One of the following – 241, 242, 243, 244, 245, 246, 340.

472 Philosophy of Language (3) Problems of meaning, reference and truth. What is the relation between words and the world? How do sentences manage to be about the world? What is it for something to be true? Recommended Background: 3 philosophy courses 200 level or above.

473 Philosophy of Mind (3) Problems of mind and body in relation to consciousness and personal identity. Recommended Background: 6 hours of philosophy courses or consent of instructor.

500 Thesis (1-15) Grading Restriction: P/NP only. Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Credit Restriction: May not be used toward degree requirements.

510 Philosophical Research (1-15) Paper workshop (writing, revising papers, getting papers ready to publish). Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 15 hours. Credit Restriction: May not be applied toward degree requirements.

520 Topics in Ancient or Medieval Philosophy (3) Intensive critical work on major philosopher or school. Repeatability: May be repeated. Maximum 9 hours.

522 Topics in Modern Philosophy (3) Intensive critical work on major philosopher or school. Repeatability: May be repeated. Maximum 9 hours.

524 Topics in 20th-Century Philosophy (3) Intensive critical work on major philosopher or school. Repeatability: May be repeated. Maximum 9 hours.

528 Topics in Contemporary Philosophy (3) Intensive critical work on themes in late 20th-century philosophy. Repeatability: May be repeated. Maximum 9 hours.

540 Topics in Ethics or Value Theory (3) Repeatability: May be repeated. Maximum 9 hours.

542 Topics in History of Ethics (3) Dominant movements in history of ethics. Repeatability: May be repeated. Maximum 9 hours.

543 Topics in Business Ethics (3) Content may vary. Repeatability: May be repeated if content differs. Maximum 9 hours.

544 Topics in Applied Ethics (3) Content may vary. Repeatability: May be repeated. Maximum 9 hours.

545 Topics in Environmental Ethics (3) Content may vary. Repeatability: May be repeated if content differs. Maximum 9 hours.

546 Topics in Bioethics (3) Content may vary. Repeatability: May be repeated if content varies. Maximum 9 hours.

549 Practicum in Applied Ethics (1-3) Repeatability: May be repeated if content differs. Maximum 9 hours. Credit Restriction: Does not count toward hours required for the degree.

575 Topics in Metaphysics and Epistemology (3) Repeatability: May be repeated. Maximum 9 hours.

577 Topics in Philosophy of Mind (3) Relation of mental to physical and the role of words in discourse about mental activities, thinking and feeling. Repeatability: May be repeated. Maximum 9 hours.

585 Special Topics (3) Repeatability: May be repeated. Maximum 9 hours.
589 PhD Practicum in Applied Ethics (1-15) Supervised experience in such settings as health care, business, legal, or environmental institutions.

Repeatability: May be repeated. Maximum 30 hours.
Credit Restriction: Does not count toward hours required for the degree.
Comment(s): Open to PhD students in philosophy with consent of the Graduate Committee.

590 Topics in Social and Political Philosophy (3) Philosophical problems concerning social and political life: family, state, freedom, justice; major theoretical responses: anarchism, social contract, Marxism.

Repeatability: May be repeated. Maximum 9 hours.

591 Foreign Study (1-15) Repeatability: May be repeated. Maximum 15 hours.

592 Off-Campus Study (1-15) Repeatability: May be repeated. Maximum 15 hours.

593 Independent Study (1-15) Grading Restriction: Satisfactory/No Credit or letter grade. Repeatability: May be repeated. Maximum 30 hours.

600 Doctoral Research and Dissertation (3-15) Grading Restriction: P/NP only. Repeatability: May be repeated.

601 Proseminar (3) Topically focused seminar with emphasis on development of philosophical skills and methods. Required of all first-year graduate students in philosophy.

620 Topics in Ancient or Medieval Philosophy (3) Repeatability: May be repeated. Maximum 9 hours.

622 Topics in Modern Philosophy (3) Repeatability: May be repeated. Maximum 9 hours.

624 Topics in Contemporary Philosophy (3) Repeatability: May be repeated. Maximum 9 hours.

640 Topics in Ethics or Value Theory (3) Repeatability: May be repeated. Maximum 9 hours.

644 Topics in Applied Ethics (3) Content may vary. Repeatability: May be repeated if content differs. Maximum 9 hours.

Physics (773)

411 Introduction to Quantum Mechanics (3) Fundamental principles of quantum mechanics and methods of calculation. Solution of the Schroedinger equation for simple systems. Application to atomic, molecular, nuclear, and condensed matter physics.

(DE) Prerequisite(s): 240 or equivalent and Mathematics 435.
Comment(s): 411 and 412 must be taken in sequence.

412 Introduction to Quantum Mechanics (3) Fundamental principles of quantum mechanics and methods of calculation. Solution of the Schroedinger equation for simple systems. Application to atomic, molecular, nuclear, and condensed matter physics.

(DE) Prerequisite(s): 240 or equivalent and Mathematics 435.
Comment(s): 411 and 412 must be taken in sequence.

Contact Hour Distribution: 3 hours and 3 labs.
(DE) Prerequisite(s): 431 or 136 or 138 or 232.
Registration Permission: Consent of instructor.

431 Electricity and Magnetism (3) Electrostatics, magnetostatics, and coupled electric and magnetic fields, Maxwell's Equations, and electromagnetic waves and radiation.
(DE) Prerequisite(s): 136 or 138 or 232.

432 Electricity and Magnetism (3) Electrostatics, magnetostatics, and coupled electric and magnetic fields, Maxwell's Equations, and electromagnetic waves and radiation.
(DE) Prerequisite(s): 136 or 138 or 232.

461 Modern Physics Laboratory (3) Introduction to fundamental and modern techniques in experimental physics, and to the theory and practice of measurement and data analysis. Selected experiments in nuclear, atomic, molecular and solid state physics, and modern optics.
Contact Hour Distribution: 6 hours lab per week.
(DE) Prerequisite(s): 240 or 411.

462 Modern Physics Laboratory (3) Advanced experiments and experimental techniques in modern physics. Experimental team work. Thorough quantum mechanical interpretation of results and preparation of scientific reports.
Contact Hour Distribution: 6 hours lab per week.
(DE) Prerequisite(s): 461.

469 Senior Seminar (1-3) Topics of current interest.
Repeatability: May be repeated with consent of department. Maximum 6 hours.

500 Thesis (1-15) Grading Restriction: P/NP only. Repeatability: May be repeated.

501 Graduate Research Participation (3) Advanced research techniques under supervision of staff research director whose research area coincides with interests of student.
Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated with consent of department. Maximum 18 hours.
Comment(s): Open to all graduate students in good standing.
Registration Permission: Consent of department and research director.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 9 hours.
Credit Restriction: Not to be used toward degree requirements.

503 Physics Colloquium (1) Lectures and discussion on current research topics. Continuous registration required for current graduate students.
Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 6 hours.

505 Physics of Fluids (3) Fluid physics, overview of fluid mechanics and associated computational techniques; general description of laminar and turbulent flows; subsonic, supersonic and hypersonic flows; continuum, transitional and free-molecular flows; pipe flow, nozzle flow and sonic orifice; compressible flow; expansion flows; reattachment and nonreacting flowfields; shock-tube physics; and introduction to method of characteristics and Monte Carlo computational techniques.

506 Experimental Methods (3) Introduction to experimental methods of spectroscopy through hands on operation of FTIR, Raman, NMR, photoelectron, laser and mass spectrometers. Principles and hazards of cw and pulsed lasers, radiation detectors, photomultiplier tubes, image intensifiers, image converters; high-vacuum systems including oxygen-based devices, data acquisition techniques including lock-in amplifiers, box-car integrators, digital electronics methods and micro-computer data acquisition.

507 Contemporary Optics (3) Topics in geometrical, physical, Fourier, and nonlinear optics and introductory laser physics. Extensive use of computer calculations and design of practical and sophisticated optical systems.

508 Laser Physics (3) Mode analysis, stable and unstable resonators; rate equations and population inversion, saturation, relaxation oscillations, fluctuations and noise, laser stability; quantum theory of laser, photon coherence; mode-locking, Q-switching and frequency stabilization; specific laser types: semiconductor and solid-state, excimer, copper vapor and dye lasers.

511 Theoretical Physics I (3) Concepts and applications in applied physics. Topics: one-body, two-body and rigid body dynamics, ideal fluid, small oscillations and waves, elements of special relativity, electrostatics and magneto-static problems, and other modern applications of current interest, in areas of biophysics and astrophysics.
Recommended Background: Familiarity with computational methods.

512 Theoretical Physics II (3) Concepts and applications in applied physics. Topics: electrostatic and magneto-static problems, EM waves, duality and quantization, absorption and emission, statistical ensemble and thermal equilibrium, and other modern applications of current interest, in areas of quantum chemistry, biophysics, optics, spectroscopy, and astrophysics.
Recommended Background: Familiarity with computational methods.

513 Problems in Theoretical Physics I (3) Fundamentals of physics: classical mechanics (Newtonian mechanics, Lagrangian and Hamiltonian dynamics) and electrostatics and magnetostatics.

514 Problems in Theoretical Physics II (3) Fundamentals of physics: electrodynamics, relativity, and quantum mechanics.

521 Quantum Mechanics (3) Fundamental principles of quantum mechanics, angular momentum, electron spin, particles in electric and magnetic fields, perturbation theory, variational methods, scattering theory; second quantization, quantization of electromagnetic field, emission, absorption, and scattering of light, bremsstrahlung, pair creation and annihilation. Application of quantum mechanics to problems of atomic, molecular, nuclear, and solid state physics.
522 Quantum Mechanics (3) Fundamental principles of quantum mechanics, angular momentum, electron spin, particles in electric and magnetic fields, perturbation theory, variational methods, scattering theory; second quantization, quantization of electromagnetic field, emission, absorption, and scattering of light, bremsstrahlung, pair creation and annihilation. Application of quantum mechanics to problems of atomic, molecular, nuclear, and solid state physics. (DE) Prerequisite(s): 521.

531 Classical Mechanics (3) Variational formulation, Lagrange’s and Hamilton’s equations, constraints, canonical transformations, Hamilton-Jacobi theory and action-angle variables.

532 Advanced Classical Mechanics (3) Advanced topics in classical mechanics, KAM theorem and Hamiltonian chaos, dissipative chaos. Topics may vary according to interest of students and instructor. (DE) Prerequisite(s): 521.

541 Electromagnetic Theory (3) Review of electrostatics, magnetostatics, and quasi-static problems; Maxwell’s field equations and their solutions in dielectric and conducting media; electrostatics and relativity, retarded potentials and gauge transformations, radiation produced by accelerating charges. (DE) Prerequisite(s): 571.

542 Electromagnetic Theory (3) Advanced treatment of Electrodynamics, collisions between charged particles, bremsstrahlung, multipole fields. Topics may vary according to interest of students and instructor. (DE) Prerequisite(s): 541.

551 Statistical Mechanics (3) Ergodic theory, classical ensemble theory, quantum mechanical ensembles, relation of statistical mechanics to thermodynamics, transport theory and approach to equilibrium, phase transition, fluctuations, and correlations. (DE) Prerequisite(s): 531, 531, and 541.


561 The Theory of Relativity (3) Geometry of space-time, relativistic electrodynamics, particle mechanics and continuum mechanics, Einstein’s field equations, Schwarzschild solutions, the classical test of general relativity. (DE) Prerequisite or (DE) Corequisite: 531 and 541.


572 Mathematical Methods in Physics II (3) Advanced Problems. Topics may vary according to interests of students and instructor. (Same as Mathematics 518.) (DE) Prerequisite(s): 571.

573 Numerical Methods in Physics (3) Numerical methods for solution of physical problems, use of digital computers, analysis of errors. (DE) Prerequisite(s): 571 or consent of instructor.

591 Foreign Study (1-15)
Repeatability: May be repeated. Maximum 15 hours.

592 Off-Campus Study (1-15)
Repeatability: May be repeated. Maximum 15 hours.

593 Independent Study (1-15)
Repeatability: May be repeated. Maximum 15 hours.

594 Special Problems (3) Especially assigned theoretical or experimental work on problems not covered in other courses. Repeatability: May be repeated. Maximum 9 hours.

599 Seminars (1-3) (a) Mechanics; (b) Radiation; (c) Heat and Thermodynamics; (d) Electricity and Magnetism; (e) Modern Physics. Repeatability: May be repeated with consent of department. Maximum 18 hours.

600 Doctoral Research and Dissertation (3-15)
Grading Restriction: P/NP only. Repeatability: May be repeated.

601 Atomic Physics (3) Survey of research problems and methods. Topics of current interest. Comment(s): Intended for all graduate students.

602 Atomic Physics (3) Advanced problems. Comment(s): For students specializing in the field.

605 Laser Spectroscopy (3) Applications of lasers to spectroscopy of atomic and molecular systems; absorption, laser-induced fluorescence, and Raman spectroscopy; molecular and atomic coherence, quantum beats, resonance fluorescence, photon echoes, self-induced transparency; saturation and Doppler-free spectroscopy; laser cooling and trapping. (DE) Prerequisite(s): 521 and 541.

610 Quantum Optics (3) Quantum theory of emission and absorption of radiation; frequency-dependent susceptibility; coherence theory; field quantization and coherent photon states; interaction of radiation with atoms; photon optics, counting and higher-order coherence; atomic scattering phenomena. (DE) Prerequisite(s): 522.

611 Advanced Quantum Mechanics and Field Theory (3) Survey of problems and methods. Topics of current interest. Comment(s): Intended for all graduate students.

612 Advanced Topics in Quantum Field Theory (3) Renormalization, Lamb shift, anomalous magnetic moments, gauge theories, electroweak theory, quantum chromodynamics, grand unified theories, and advanced topics in laser physics and quantum optics. Topics vary according to interest of students, instructor, and present state of physics. (DE) Prerequisite(s): 611 or consent of instructor.

615 Astrophysics and Cosmology (3) Stellar evolution: hydrostatic equilibrium, energy production and transport, star birth, main sequence, red giants, variable stars, and stellar explosions. General relativity and gravitation, white dwarfs, neutron stars, pulsars, and black holes.

616 Astrophysics and Cosmology (3) Galaxies and the interstellar medium. Active galaxies, quasars, and supermassive black holes. Large-scale structure, the expanding Universe, cosmologies, big bang, cosmic background radiation, inflation, dark matter, formation of structure, and fate of the Universe. The Planck scale and quantum gravity.

621 Nuclear Physics (3) Survey of research problems and methods. Topics of current interest. Comment(s): Intended for all graduate students.

622 Nuclear Physics (3) Advanced problems. Comment(s): Intended for students specializing in the field.

626 Elementary Particle Physics (3) Survey of elementary particle physics: experimental methods, conservation laws, invariance principles, and models of interactions. Comment(s): Intended for all graduate students.

627 Elementary Particle Physics (3) Advanced topics – quark models, electroweak interactions, and unification of elementary forces. Comment(s): Intended for students specializing in the field.

642 Advanced Topics in Modern Physics (3) Advanced theoretical or experimental topics not covered in other courses. Repeatability: May be repeated with consent of department. Maximum 9 hours.

643 Computational Physics (3) Developing computer algorithms for solving representative problems in various fields of physics, celestial dynamics in astrophysics, boundary value problems in electromagnetism, atomic and nuclear structures, band structure in solid state physics, transport problems in statistical mechanics, Monte Carlo simulation of liquids, fitting and interpolation of data, correlation analysis, or optimization strategy. (DE) Prerequisite(s): 521, 531, and 571.

671 Advanced Solid State Physics (3) Survey of research problems and methods. Topics of current interest. Comment(s): Intended for all graduate students.

672 Advanced Solid State Physics (3) Advanced problems. Comment(s): Intended for students specializing in the field.

Plant Sciences (791)

410 Nursery Management and Production (3) Management methods as applied to retail and wholesale nurseries and landscape contracting firms. Methods of producing liners. Container and field-grown woody ornamental plants. Contact Hour Distribution: 2 hours and 1 lab. (DE) Prerequisite(s): 220, 330, and Environmental and Soil Sciences 210 or consent of instructor.
421 Native Plants in the Landscape (3) Native plants and plant communities as a basis for landscaping and environmental restoration. Weekly lecture coupled with either an outing or service practicum of invasive exotic plant removals or planting of natives. Study and work sites will primarily be demonstration projects of the University of Tennessee Environmental Landscape Design Lab. They include local schoolyard habitats, greenways, wetlands, streambanks, and shorelines.

427 Management and Administration of Public Horticulture Institutions (2) Management of resources in non-profit institutions, support organizations and communities. Theoretical framework and institutional mission; strategic planning and programming; financial accounting and budgeting; development and fund raising; personnel policies; volunteer development; marketing and publicity; legal issues; relationships between staff and governing boards; the use of information technology in management and governance systems; and conservation/ preservation roles in community development.

(DE) Prerequisite(s): 226.

429 Field Study of Public Horticulture Institutions (2) Extended 10-12 day field study of various public horticulture institutions such as botanical gardens, arboretums, historical grounds, zoos, conservation areas, cemeteries, and nature preserves. Application and travel fee required.

(DE) Prerequisite(s): 226.


434 Fruit and Vegetable Crops (3) Botanical description, geographical distribution, general cultural practices of warm and cool season vegetables, small fruits, and deciduous tree fruits. A Saturday field trip is required.

Contact Hour Distribution: 2 hours lecture and one 2-hour lab.

(DE) Prerequisite(s): 120 and Biology 110 and 120.

435 Field and Forage Crops (2) Agronomic principles of crop production and management. Crop improvement, cropping systems, tillage, fertilization, pest management, harvest and utilization of major field and forage crops.

Contact Hour Distribution: 2 hours and 1 lab.

(DE) Prerequisite(s): 335.

436 Plant and Garden Photography (2) Principles and techniques of photography as they relate to plants and gardens. Study of equipment options and field shooting under various weather conditions and in different seasons.

Registration Permission: Consent of instructor.

437 Public Garden Operations and Management (2) An analysis of year-round operations and management of public gardens. Case studies involving time and labor management, budget development and management, implementation of volunteer programs, information dissemination methods for public outreach, management of grounds and facilities using the University of Tennessee Institute of Agriculture Gardens as a model.

(DE) Prerequisite(s): 226.

441 Advanced Turfgrass Management (2) Principles and scientific basis of turfgrass culture. Adaptation, ecology, physiology, climatic influences on grass culture. Clipping and water management design.

Contact Hour Distribution: 1-hour lecture and one 1-hour lab.

(DE) Prerequisite(s): 240.

442 Turf Root-zone Construction (2) Construction and management of root-zones for home lawns, golf courses and athletic fields.

(DE) Prerequisite(s): 240.

446 Horticultural Therapy (3) Introduction to the application of horticulture as therapy for treatment, rehabilitation, and/or training of individuals with disabilities.

448 Horticultural Internet Technology (3) Creation and management of information resources for the internet with a focus on development of visual and oral communications skills through a series of individual and team exercises in writing, graphics, and public speaking.

(DE) Prerequisite(s): Communication Studies 210 or 240.

450 Specialty Landscape Construction (3) Methods of design, materials, and construction techniques for specialized components of the landscape industry. Irrigation systems, outdoor lighting, garden ponds and water features.

451 Plant Tissue Culture (3) (See Entomology and Plant Pathology 451.)

454 Plant Biotechniques (3) Lectures will discuss recombinant DNA technology, molecular assisted breeding of economically important crops, gene cloning, and transformation technologies. Examples will be given of food and ornamental crops, pharmaceuticals, and renewable energy sources produced using biotechnology as well as potential risks of this technology. Labs will include electrophoresis, tissue culture, plasmid preps, genomic DNA preps, PCR, plant transformation, and genomic techniques.

Contact Hour Distribution: 1-hour lecture and one 3-hour lab.

(DE) Prerequisite(s): 353 or Biology 240.

457 Weed Management (2) Principles of weed interference, integrated management, and herbicide selectivity and behavior. Specific recommendations for various crop and non-crop situations.

(DE) Prerequisite(s): Environmental and Soil Sciences 210.

458 Turf Weed Management Lab (1) Laboratory addressing practices and principles presented in 457 from the standpoint of turf.

(DE) Prerequisite(s): Environmental and Soil Sciences 210.

(DE) Prerequisite or (DE) Corequisite: 457.

459 Agronomy Weed Management Lab (1) Laboratory addressing practices and principles presented in 457, from the standpoint of agronomy.

(DE) Prerequisite(s): Environmental and Soil Sciences 210.

(DE) Prerequisite or (DE) Corequisite: 457.

480 Advanced Landscape Design (4) Comprehensive application of landscape design skills to a variety of project experiences with an emphasis on landscape planning and analysis, planting design, and materials estimating.

Contact Hour Distribution: Two 3-hour labs.

(DE) Prerequisite(s): 280 and 380.

485 Computer Aided Landscape Design (3) Overview of Computer Aided Design (CAD) as it relates to landscape design and construction. Emphasis on development of landscape design drawings through utilization of LANDCAD software.

Contact Hour Distribution: Two 3-hour labs.

(DE) Prerequisite(s): 280, 380, and Agriculture and Natural Resources 290 or Computer Science 100.

494 Professional Horticultural Communications (3) Communication for public horticulturists through written, oral and visual media. Emphasis on communication skills using proper writing techniques and grammar for print media, brochure design using desktop publishing, slide show development, oral presentation and video use for educational and informational presentations in ornamental horticulture.

(DE) Prerequisite(s): Agriculture and Natural Resources 290 or Computer Science 100.

500 Thesis (1-15) Grading Restriction: P/NP only. Repeatability: May be repeated.

501 Special Topics in Plant Sciences (1-3) Topics to be assigned. Repeatability: May be repeated. Maximum 6 hours.

Registration Permission: Consent of instructor.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed.

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated.

Credit Restriction: May not be used toward degree requirements.

503 Non-Thesis Project (1-2) Library, field, or laboratory project under supervision of faculty member. Repeatability: May be repeated. Maximum 4 hours.

Comment(s): For students in non-thesis option only.

504 Seminar (1) Presentations and discussion of topics. Repeatability: May be repeated. Maximum 2 hours.

505 Seminar Preparation (1) Application of speaking, writing, and organizational skills in preparation and presentation of scientific material to both scientific and general audiences. Preparation of abstracts for scientific presentations. Required of all entering graduate students during their first year of graduate study.

513 Fungal Epidemiology and Disease Control (2) (See Entomology and Plant Pathology 513.)

530 Integrated Pest Management (3) (See Entomology and Plant Pathology 530.)

532 Environmental Plant Ecophysiology (3) Physiological and ecological principles of plants and the relation of those principles to plant responses to the environment. Water relations, gas exchange, stress physiology, seed biology, plant competition, plant defense.

Recommended Background: Plant physiology course.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites</th>
<th>Description</th>
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<tr>
<td>536</td>
<td>Ecology of Grazing Land Systems</td>
<td>(DE) Botany 521 or 522, Botany 321 and Environmental and Soil Sciences 210</td>
<td>Study the interactions of grazing lands with plants and animals, focusing on ecosystems and management.</td>
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<tr>
<td>545</td>
<td>Plant Microtechnique</td>
<td>(See Entomology and Plant Pathology 544.)</td>
<td>Techniques for handling and analyzing plant materials.</td>
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<td>547</td>
<td>Political Science (801)</td>
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<td>Study the political systems and decisions in the United States and abroad.</td>
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<td>548</td>
<td>Survey of Planning</td>
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<td>Understand the planning process and its impact on society.</td>
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<td>550</td>
<td>Survey of History</td>
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<td>Survey of world history from prehistory to the present.</td>
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<td>551</td>
<td>Quantitative Plant Genetics</td>
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<td>Techniques for analyzing genetic variation in plants.</td>
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<td>552</td>
<td>Advanced Plant Breeding Genetics</td>
<td>(DE) Prerequisite(s): Biochemistry and Cellular and Molecular Biology 321 and Environmental and Soil Sciences 210</td>
<td>Principles and methodologies for improving plant genetics.</td>
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<td>553</td>
<td>Internship</td>
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<td>Practical experience in a professional setting.</td>
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<td>Analysis of genetic data in plants.</td>
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<td>555</td>
<td>Internship</td>
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<td>556</td>
<td>Teaching Practicum</td>
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<td>Preparation for teaching plant science.</td>
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<tr>
<td>557</td>
<td>Design and Analysis of Biological Research</td>
<td>(See Animal Science 571.)</td>
<td>Techniques for analyzing biological data.</td>
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<td>558</td>
<td>Doctoral Research and Dissertation</td>
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<td>Research project in plant science.</td>
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<td>Doctoral Research and Dissertation</td>
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<td>561</td>
<td>Statistics for Biological Research</td>
<td>(DE) Prerequisite(s): Mathematics 125 or 152.</td>
<td>Statistical methods for analyzing biological data.</td>
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<td>562</td>
<td>Plant Physiology and Ecology</td>
<td>(See Entomology and Plant Pathology 544.)</td>
<td>Study of plant metabolism and growth.</td>
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<td>563</td>
<td>Plant Metabolism</td>
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<tr>
<td>564</td>
<td>DNA Analysis</td>
<td>(See Entomology and Plant Pathology 643.)</td>
<td>Techniques for analyzing DNA.</td>
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<td>565</td>
<td>Advanced Plant Breeding Genetics</td>
<td>(DE) Prerequisite(s): Biochemistry and Cellular and Molecular Biology 321 and Environmental and Soil Sciences 210</td>
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**Political Science (801)**

403 Survey of Planning | History of city development and of planning. U.S. experience in urban and other levels of planning. State of the art process, comprehensive plan, implementation devices. Planning issues in society. Credit Restriction: May not be applied toward requirements for the Master of Science in Planning. |
425 Media and Politics | Examines the interrelationship between the political system and the media from a political science perspective. |
430 United States Constitutional Law: Sources of Power and Restraint | Judicial review, constitutional powers of the President and Congress, federalism, sources of regulatory authority, and constitutional protection of political and economic rights. (Same as Legal Studies 430.) |
431 United States Constitutional Law: Civil Rights and Liberties | Current issues in civil rights and liberties including, first amendment freedoms, equal protection, privacy and the rights of the accused. (Same as Legal Studies 431.) |
435 Criminal Law and Procedure | An overview of substantive and procedural law in the criminal justice field with emphasis on constitutional questions and public policy issues. (Same as Legal Studies 435.) |
441 Public Budgeting | The process, participants, and politics of government budgeting with emphasis on federal government budgeting. Includes an overview of budget reform measures and their effectiveness. |
442 Administrative Law and Regulatory Policymaking | Legal and political dimensions of rulemaking, enforcement and adjudication by executive agencies. (Same as Legal Studies 442.) |
445 Administration of Justice | Administration and processes of justice system, including judicial administration and decision making in trial and appellate courts. (Same as Legal Studies 445.) |
446 Housing | Nature and demand for housing in the U.S. and abroad. U.S. experience. Private market processes and public influences. Problems of change in housing supply, impact of new technology, and governmental programs to increase supply and quality of housing. |
451 Ethnic Conflict in Foreign Countries | Examines political and violent conflict among ethnic and national groups and the challenges these conflicts pose for democratic and democratizing states. |
452 Black African Politics | Recent evolution and current political environment of black African nations. (Same as Africana Studies 452.) |
454 Government and Politics of China and Japan | Political setting, structure, and political processes in China and Japan. |
456 Latin American Government and Politics | Introduction to the political development of Latin America with an emphasis on contemporary politics. (Same as Latin American Studies 456.) |
459 Government and Politics of Russia and Eastern Europe | System transformation, political processes, and governmental structure in Russia and Eastern European countries. |
461 Policy Making in Democracies | Comparative approach to theory and process of making public policies. |
463 Contemporary Middle East Politics | Governments and movements in the Middle East, their characteristics, bases, and interrelationships. |
471 International Political Economy | The politics of international economics. Topics include globalization, development, trade, crime, the IMF, the WTO, the environment, and challenges to the status quo. |
473 Negotiation, Bargaining and Diplomacy | Diplomacy, negotiation, and foreign policy decision making. Theories of diplomacy and negotiation are applied in a simulation focusing on issues from international crime and global economic stability to world health and the environment. |
474 International Organization | Constitutional framework and key functions of the United Nations. Topics include collective security, peacekeeping, human rights, development, regional organizations, and the role of the Secretary-General. |
475 Ancient and Medieval Political Thought | Major western political thinkers from Socrates to Marsilio of Padua. (Same as Medieval Studies 475.) |
476 Modern Political Thought | Major western political thinkers from Machiavelli to Marx. |
500 Thesis (1-15)  
Grading Restriction: P/INP only.  
Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15)  
Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.  
Grading Restriction: Satisfactory/No Credit grading only.  
Repeatability: May be repeated.  
Credit Restriction: May not be used toward degree requirements.

510 Scope and Methods in Political Science (3)  
Procedures of analysis in political science.

511 Research Design (3)  
Methods for planning and executing research, from case studies to experimental designs: development of research questions and hypotheses; measurement issues; and validity of inferences.

512 Quantitative Political Analysis (3)  
Methods and techniques in quantitative political analysis: univariate and bivariate statistics.

513 Quantitative Political Analysis (3)  
Methods and techniques in quantitative political analysis: multivariate model building.

514 Research and Methodology in Public Administration (3)  
Basic assumptions and techniques of research in public administration; measurement, analysis, and reporting of data.

520 Political Theory (3)  
Survey of major ideas, thinkers and works of Western political theory.

522 American Political Thought (3)  
Systematic examination of the normative and empirical theories of leading American political thinkers from the colonial period to the present.

530 American Government and Politics (3)  
Survey of literature, approaches to research and analysis, critical examination of major works, and overviews of research in various sub fields.  
Repeatability: May be repeated with consent of department. Maximum 9 hours.

531 Theory of Planning (3)  
Analysis of nature and objectives of planning process: role of planners and planning function in public decision making.

532 Presidency (3)  
Systematic examination of the structure, functions and powers of the American presidency as they have evolved from the founding to the present.

533 Congress (3)  
Formal, empirical and theoretical approaches to and models of the institutional workings of Congress and the behavior of legislators.

535 Public Opinion and Political Socialization (3)  
Explores the meaning and measurement of public opinion and contemporary research on the topic; including questions of rationality, tolerance, and party identification.

536 Campaigns, Elections, and Voting Behavior (3)  
Surveys theory and research of American campaigns and elections, with an emphasis on presidential and congressional contests.

537 Political Parties and Interest Groups (3)  
Theoretical and empirical examination of the structure, functions and operations of political parties and interest groups.

539 State and Local Government and Politics (3)  
Theoretical and empirical analysis of government, politics, policymaking and public administration at the state and local levels.

540 Courts and Judicial Processes (3)  
Examination of published research dealing with judicial behavior, judicial policymaking, and courts and political actors.  
Repeatability: May be repeated with consent of department. Maximum 9 hours.

544 Information Systems and Networks in Planning (3)  
Use and impact of computer-based information systems and global networks in planning and public management. Development of practical skills in design of planning-decision support systems, databases, Internet-based tools and geographic information systems (GIS).

545 Planning Research Methods (3)  
Overall structuring of social science research in planning practice: familiarity with structure of planning literature information sources, decision processes and tools, practice in posing research questions relevant to planning, evaluation methods.

547 Planning Technology (3)  
Relationships between information technology, society and planning. Overview of other advanced technologies, economic development, and associated social and planning issues.

548 Public Policy Process (3)  
Theoretical, formal and empirical analysis of the roles, functions and decision-making processes of public policymakers, including legislative, executive and judicial actors.

549 Environmental Policy (3)  
Overview of contemporary environmental policy and its evolution. Examines the roles of values in the environmental arena. Provides a framework for policy analysis and analytical tools for selection and choosing among policy options.

550 Public Administration (3)  
Overview of public administration theory and function.

552 Organization Theory (3)  
Appraisal of major theories of organization and their applicability to public sector.

555 Planning and Transportation (3)  
(See Civil Engineering 558.)

556 Policy Analysis (3)  
Strategies and techniques for identification and analysis of public problems and policy solutions.  
Repeatability: May be repeated with consent of department. Maximum 9 hours.

558 The Politics of Administration (3)  
Examination of public administration in context of American political system, policy making and political roles of public administrators and agencies.  
Repeatability: May be repeated with consent of department. Maximum 9 hours.

560 Public Financial Administration (3)  
Principles and techniques of public finance at state and local levels: budget preparation, execution and audit, risk management, capital planning, major tax structures, economic forecasting, cash management, and debt administration.

562 Public Management (3)  
Interpersonal and leadership skills, techniques and methods for planning, decision making, and implementation of management strategies in public sector.  
Repeatability: May be repeated with consent of department. Maximum 9 hours.

564 Human Resource Management in Public Organizations (3)  
Intensive analysis of contemporary issues, challenges, methods and strategies related to effective management of human resources in public sector.

566 Ethics, Values, and Morality in Public Administration (3)  
Morally-value dilemmas confronting administrators in American political system.

569 Internship in Public Administration (3-9)  
Grading Restriction: Satisfactory/No Credit grading only.  
Repeatability: May be repeated with consent of department. Maximum 9 hours.  
Comment(s): Open to students participating in approved internship programs.

570 Comparative Government and Politics (3)  
Selected topics in modern governments.  
Repeatability: May be repeated with consent of department. Maximum 9 hours.

572 The Politics of Development (3)  
Selected topics dealing with political problems of less developed countries.  
Repeatability: May be repeated with consent of department. Maximum 9 hours.

574 Area Seminar in Comparative Government and Politics (3)  
Selected topics in area studies: African, Asia, Latin America, Middle East, Soviet Union and Eastern Europe or Western Europe.  
Repeatability: May be repeated with consent of department. Maximum 9 hours.

580 International Politics (3)  
Survey of literature and major aspects of international politics.  
Repeatability: May be repeated with consent of department. Maximum 9 hours.

581 Fundamentals of Planning (3)  
History of planning, structure and development of urban areas, operations of contemporary planning, trends and issues.

582 Land Use and Comprehensive Planning (3)  

583 Economic Analysis and Development (3)  
Basic methods of policy analysis and planning. Planning for economic change in cities and regions. Economic development and planning process.

584 Environmental Planning (3)  
Role of planners and planning in maintenance of balance between natural and built environment.

585 Planning Methods (4)  
Preparation of comprehensive plans for urban areas and regions. Development of baseline data and forecasts, formulation of alternative plans and strategies, and development of plan implementation programs.

586 Planning and Property Development (3)  
Process of urban physical growth and change; functioning of private sector real estate development and its relationship to planning. Partnership roles of public and private sectors in urban development and redevelopment.

587 Legal Aspects of Planning (3)  
Legal basis for planning and guiding community development. Legal tools of planning.

588 Sustainable Communities (3)  
Overview of sustainable communities. Project-based classwork in local community.

590 Practicum in Planning (3-6) Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of instructor.

591 Foreign Study (1-15) Repeatability: May be repeated. Maximum 15 hours.

592 Off-Campus Study (1-15) Repeatability: May be repeated. Maximum 15 hours.

593 Independent Study (1-15) Repeatability: May be repeated. Maximum 15 hours.

594 College Teaching in Political Science (1) Instructional effectiveness, techniques, organization, materials for teaching political science at college level.

Grading Restriction: Satisfactory/No Credit grading only. Registration Permission: Consent of instructor.

595 Readings and Special Problems in Political Science (1-3) Repeatability: May be repeated. Maximum 15 hours. Registration Permission: Consent of instructor.

596 Workshops in Computer Applications (1) Training in software applications to support research and decision-making tasks in public service. Successful completion certifies proficiency of MPA students in use of software applications for personal computer.

Grading Restriction: Satisfactory/No Credit grading only. Registration Permission: Consent of instructor.

597 Special Topics in Planning (1-3) Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of instructor.

598 Problems in Planning (1-3) Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of instructor.

600 Doctoral Research and Dissertation (3-15) Grading Restriction: P/NP only. Repeatability: May be repeated.

610 Special Topics in Empirical Theory and Methodology (3) Advanced methods and procedures of analysis in political science. Repeatability: May be repeated with consent of department. Maximum 9 hours.

628 Topics in Political Theory (3) Selected issues and problems in normative political theory. Specific content determined by instructor.

Repeatability: May be repeated with consent of instructor. Maximum 9 hours.

639 Special Topics in American Government and Politics (3) Advanced study of selected topics. Repeatability: May be repeated with consent of instructor. Maximum 9 hours.

641 Special Topics in Courts and Judicial Processes (3) Intensive examination of research literature dealing with particular aspects of judicial decision making.

654 Contemporary Public Policies (3) Problems in one or more public policy areas from political and administrative perspectives. Topics selected by instructor.

Repeatability: May be repeated with consent of department. Maximum 9 hours.

660 Contemporary Perspectives on Public Administration (3) Development of theory in public administration: contemporary critiques and alternatives. Repeatability: May be repeated with consent of instructor. Maximum 9 hours.

668 Special Topics in Public Administration (3) Analysis of selected issues and problems in public administration. Repeatability: May be repeated. Maximum 9 hours.

670 Special Topics in Comparative Government and Politics (3) Research into selected topics. Repeatability: May be repeated with consent of department. Maximum 9 hours.

682 Theory and Analysis of U.S. Foreign Policy Processes (3) Theoretical approaches to decision-making in foreign policy area and analysis of policy-making process. Repeatability: May be repeated with consent of department. Maximum 9 hours.

684 International Law (3) Provides the analytical tools necessary to evaluate the legality of events under international law. Presents the law relevant to politics, such as the use of force, human rights, war crimes, international courts, principles of jurisdiction, and air, space and sea law.

688 Special Topics in International Politics (3) Selected issues and problems in international politics. Specific content determined by instructor.

Repeatability: May be repeated with consent of instructor. Maximum 9 hours.

Portuguese (811)

400 Portuguese for Speakers of Another Romance Language (3) Accelerated class for beginning students of Portuguese with strong background in another Romance language. Introduction to grammar, reading, and culture of Portugal and Brazil.

Recommended Background: 3 hours at the 300-level in another Romance language.

430 Contemporary Brazilian Studies (3) Current Brazilian cultural, political and racial issues placed in a historical perspective with a comparative emphasis. Topics may vary. (Same as Latin American Studies 430.) Repeatability: May be repeated. Maximum 12 hours.

Comment(s): Open to non-majors. Majors will write papers in Portuguese.

432 Topics in the Literature and Culture of the Portuguese-speaking World (3) Examination of the socio-political environment, literary works, and other important cultural practices of the Portuguese-speaking world. Topics may vary. (Same as Latin American Studies 432.) Repeatability: May be repeated. Maximum 12 hours.

Recommended Background: At least one course at the 300-level.

591 Foreign Study (1-15) Repeatability: May be repeated. Maximum 15 hours.

592 Off-Campus Study (1-15) Repeatability: May be repeated. Maximum 15 hours.

593 Independent Study (1-15) Repeatability: May be repeated. Maximum 15 hours.

Psychology (830)


409 Group Facilitation (3) Study of theory and technique through supervised experience in small groups. Repeatability: May be repeated. Maximum 6 hours. Recommended Background: General psychology course or consent of instructor.

410 Sensory Processes and Perception (3) Physiological and psychological theories of perception. Emphasis on audition and vision. (DE) Prerequisite(s): 385 or Mathematics 115 or Statistics 201 or graduate standing.

415 Psychology of Religion (3) History of the psychology of religion with an examination of various philosophical and empirical orientations. Exploration of the psychological function of religion for individuals and society. (Same as Religious Studies 415.) (DE) Prerequisite(s): 110 or consent of instructor.

420 History and Systems of Psychology (3) History of psychological thought. Classical approaches and recent developments. (DE) Prerequisite(s): 110 or consent of instructor or graduate standing.

424 Psychology and the Law (3) Psychological aspects of legal systems. (DE) Prerequisite(s): 110 or consent of instructor.

430 Health Psychology (3) Psychological factors related to health and illness, including stress, personality, and environment. Applications of psychological treatments to physical illness. (DE) Prerequisite(s): 110 or consent of instructor.


434 Psychology of Gender (3) Biological, psychological, and social factors in gender. Importance of gender roles and stereotypes for behavior and experience. (Same as Women’s Studies 434.) (DE) Prerequisite(s): 110 or consent of instructor.

440 Organizational Psychology (3) Social-psychological analysis of organizations, emphasizing role-theory and systems theory. (Same as Management 440.) (DE) Prerequisite(s): 110 and 360 or consent of instructor.

445 Measurement and Testing (3) Theory of test construction and psychological measurement. Statistical methods in measurement. Survey of existing tests. (DE) Prerequisite(s): 110 and 385 or Statistics 201 or consent of instructor.

450 Comparative Animal Behavior (3) (See Ecology and Evolutionary Biology 450.)
459 Comparative Animal Behavior Laboratory (3) (See Ecology and Evolutionary Biology 459.)

461 Physiological Psychology (3) Nervous system and physiological correlates of behavior. Biological basis of emotion, learning, memory and stress.
(DE) Prerequisite(s): 110 or consent of instructor and one of the following sequences: Biology 101 and 102, Biology 130 and 140, or Anthropology 110.

470 Theories of Personality (3) Major theories of human personality and their development.
(DE) Prerequisite(s): 110 or consent of instructor.

475 Adolescent Development (3) Theoretical perspectives and empirical research findings pertinent to adolescent development.
(DE) Prerequisite(s): 110 or consent of instructor.

480 Theories of Learning (3) Classical and current approaches to learning and cognition.
(DE) Prerequisite(s): 110 or consent of instructor.

482 Topics in Psychology (3) Intensive analysis of special topics, such as African-American psychology or evaluation of programs in the community.
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): 110 or consent of instructor.

489 Supervised Research (1-9)
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of instructor.

500 Thesis (1-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

505 Research Design (3) Techniques for planning and conducting research in controlled and natural settings: experiments, quasi-experiments, observational studies, surveys, and program-evaluations. Development of questions and hypotheses for study. Design of studies to maximize validity.
Registration Permission: Consent of instructor.

508 Readings and Special Issues in Psychology (1-3)
Repeatability: May be repeated. Maximum 9 hours.

509 Research Practicum (1-3) Required of first-year graduate students in psychology.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 9 hours.

510 Topics in Psychology (3) Intensive examination of selected issues in psychology.
Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

511 Developmental Psychology (3) Normal processes of human socialization; physical, cognitive, and emotional development from conception through infancy, childhood, and adolescence.
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

512 Life-Span Development (3) Theories and research concerning normal human development throughout life, adulthood and old age.
Registration Permission: Consent of instructor.

513 Foundations of Psychology: Biological Factors, Perception, Learning, Thinking, Motivation (3) Intensive survey.
Registration Permission: Consent of instructor.

515 Colloquium in Experimental Psychology (1) Research and practical issues in experimental psychology.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 4 hours.
Registration Permission: Consent of instructor.

517 Foundations of Counseling Psychology (3) History, theory, research and practice of counseling psychology.
Repeatability: May be repeated. Maximum 6 hours.

521 Analysis of Variance for Social Sciences (3) Analysis of variance and statistical theory: application within social science framework. Contrasts among means, trend analysis, analysis of covariance, analysis of factorial designs, and multivariate approaches to analysis of within subjects data.

522 Multiple Regression for Social Sciences (3) Complexities of regression analyses and theory: application within social science framework. Bivariate correlation and regression, multiple regression, analysis of variable sets, interactions among continuous predictors, reducing collinearity between main effects and application of multiple regression to testing procedures of mediation and moderation.

525 Psychopharmacology (3) Effects of psychoactive drugs on mood and behavior, emphasizing the mechanisms of drug action on neurotransmitter systems. Topics include the relationship between behavior and endogenous neurochemical activity, therapeutic agents used to treat mental disorders, and drugs of abuse.
(DE) Prerequisite(s): 461.
Recommended Background: Physiological psychology or neuropsychology course.

Registration Permission: Consent of instructor.

528 College Teaching in Psychology (3) Concepts, techniques, and materials for teaching psychology at college and/or university level. Supervised practice.
Grading Restriction: Satisfactory/No Credit grading only.
Registration Permission: Consent of instructor.

543 Cognitive Science (3) Theories and research. Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

545 Advanced Animal Behavior (3) (See Ecology and Evolutionary Biology 545.)

546 Ethological Psychology (3) Basic ethology and comparative psychology. Implications for human behavior. (Same as Ecology and Evolutionary Biology 546.)
Registration Permission: Consent of instructor.

547 Conceptual Foundations of Evolution and Behavior (3) Critical evaluation of seminal writings on theory and methods in comparative analysis of behavior. (Same as Ecology and Evolutionary Biology 547.)

550 Social Psychology (3) Survey of theory and research concerning interpersonal interaction and individual behavior in social context.
Registration Permission: Consent of instructor.

554 Laboratory in Psychometrics (3) Further learning about psychometrics theories: item response theory (modern mental test theory), factor analysis, and applications of those methods using computer programs to simulated or empirical data.
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): 555.

555 Psychometrics (3) Basic concepts: factor analysis, scaling, test theories, probability models and their applications, computerized adaptive testing and other topics.
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): Statistics 537 and 538.

558 Interviewing and Observation (3) Sensitizing students to own feelings and beliefs and to feelings of interviewee, and analysis of language content, style, and body language. Exploration of various important aspects of interviewee’s life.
(DE) Corequisite(s): 559.
Comment(s): Admission to doctoral program in clinical psychology or consent of instructor required.

559 Laboratory in Interviewing and Observation (1)
(DE) Corequisite(s): 558.
Comment(s): Admission to doctoral program in clinical psychology or consent of instructor.

560 Psychology of Learning (3) Review of current evidence from research involving human and/or non-human animals.
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): 400.
Registration Permission: Consent of instructor.

565 History and Systems of Psychology (3) History of philosophy concerning psychology. Major systems of psychology which emerged during 20th century.
Comment(s): Graduate standing required.

567 Group Dynamics and Methods (3) (See Counselor Education 554.)

568 Prepracticum in Career Development (3) Didactic instruction and practice in counseling and career exploration.
Comment(s): Admission to doctoral concentration in counseling psychology required.

569 Practicum in Counseling (3) (See Counselor Education 555.)
Personality: Theory and Research I (3) Advanced survey of psychodynamic and neo-Freudian approaches to personality; related research.
Comment(s): Admission to clinical psychology concentration or consent of instructor required.

Personality: Theory and Research II (3) Advanced survey of behavioral and humanistic approaches to personality; related research.
Comment(s): Admission to clinical psychology concentration or consent of instructor required.

Descriptive and Theoretical Psychopathology (3) Current psychiatric taxonomic system. Theories of etiology for various diagnostic categories. Examples from written case vignettes and recorded interviews.
Comment(s): Admission to clinical psychology concentration or consent of instructor required.

Cross-Cultural Counseling: Theory and Research (3) (See Counselor Education 570.)

Object Relations (3) European and American conceptions of normal and psychopathological development of object relations. Significance for psychotherapy, psychoanalysis, and psychoanalytic theory.
Comment(s): Admission to clinical psychology concentration or consent of instructor required.

Practicum in Individual Assessment, Counseling (3) Basic application of individually-administered, standardized assessment instruments: administration, scoring, and integrated interpretation. Supervision in adult evaluation, and referral/traitment planning. Instruments include WAIS; Stanford-Binet; MMPI, PAI, MCMI.
(DE) Prerequisite(s): 687 and 688.
Recommended Background: Formal tests and measurement or equivalent course.

Research Questions and Designs (3) Question-asking process in research and strategies or designs through which answers might be derived.
Comment(s): Admission to clinical psychology concentration or consent of instructor required.

Independent, Off-campus, or Foreign Study (1-9)
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

Psychological Assessment I (3) Basic concepts and techniques of adult assessment: intelligence tests and personality tests.
Comment(s): Admission to clinical psychology concentration or consent of instructor required.

Psychological Assessment II (3) Basic concepts and techniques of adult assessment, intelligence tests and personality tests.
(DE) Prerequisite(s): 594 or consent of instructor.
Comment(s): Admission to doctoral concentration in clinical psychology or consent of instructor required.

Laboratory in Psychological Assessment (1)
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 4 hours.
(DE) Corequisite(s): 594 or 595.
Comment(s): Admission to doctoral concentration in clinical psychology or consent of instructor required.

Developmental Psychopathology (3) Research and theory on pathways to psychological disorders and personal adjustment.
(DE) Prerequisite(s): 571 or consent of instructor.

Ethical Issues in Professional Psychology (3) Conceptual and practical application of ethical issues in human services and research.
Registration Permission: Consent of instructor.

Clinical Psychopathology (3) Formal use of descriptive categories used in the diagnosis of abnormal behavior.
(DE) Prerequisite(s): 597 or consent of instructor.

Doctoral Research and Dissertation (3-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

Seminar in Psychology (3)
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of instructor.

Seminar in Applied Psychometrics (3)
Repeatability: May be repeated. Maximum 9 hours.
(DE) Prerequisite(s): 555 and 557.
Registration Permission: Consent of instructor.

Seminar in Applied Psychology (3)
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of instructor.
679 Internship in Counseling Psychology (1-6) Supervised employment in departmentally approved counseling psychology internship sites. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 12 hours. Comment(s): Admission to the doctoral concentration in counseling psychology required. Registration Permission: Consent of instructor.

683 Seminar in Behavioral Medicine (3) Current research and theory concerning relationships between behavior and health. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 12 hours. Registration Permission: Consent of instructor.

685 Field Placement in Clinical Psychology (3) Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 60 hours. Comment(s): Admission to the doctoral concentration in clinical psychology required. Registration Permission: Consent of instructor.

686 Advanced Psychology Clinic Placement (1-3) Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 24 hours. Comment(s): Admission to the doctoral concentration in clinical psychology or consent of instructor required. Registration Permission: Consent of instructor.

Public Health (839)

400 Consumer Health (3) (See Health 400.)

493 Directed Independent Study (1-3) Individual study of selected issues. Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of instructor.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Credit Restriction: May not be used toward degree requirements.

509 Graduate Seminar in Public Health (1) In-depth discussion of timely topics reflecting scope of public health as discipline and its interrelation with many other academic and professional disciplines. Speakers both internal and external. (Same as Exercise Science 509; Nursing 509; Nutrition 509; Social Work 509.) Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 4 hours.

510 Environmental and Occupational Health (3) Health risks and complexities of personal and community environments impacting individual's health and response to a diverse and dynamic world. Principles of occupational safety and health. Survey of contemporary environmental issues and their implications for healthful living. Comment(s): Admission to MPH or public health nutrition (MS) programs or consent of instructor required.

520 Public Health Policy and Administration (3) Administrative considerations of community-based health care programs and public health practice. Health policy formulation, political environment, and governmental involvement in health, legal responsibilities, and managerial concepts/techniques/process.

521 Organization Theory and Health Care Delivery (3) Administrative and organization theory related to health facilities; operation and management of community hospital. Case discussions and problem-solving exercises; managerial functions and skills.


523 Management in Extended Care Settings (3) Managerial concepts and theoretical foundations essential to supervision and administration of domiciliary health services programs. Management and operation of health services programs for patients and clients in settings which provide activities of daily living and special psychosocial environmental needs. Programs for home health services, comprehensive medical rehabilitation, nursing homes, congregate living centers and similar type health programs. (DE) Prerequisite(s): 521 or consent of instructor.

525 Financial Management of Health Programs (3) Financial management concepts and practices applied to health services programs. Fundamentals of budgeting, costing, financing, rate setting, financial reporting and control. Opportunities to apply techniques. (DE) Prerequisite(s): 520 or consent of instructor.

530 Biostatistics (3) Application of descriptive and inferential statistical methods to health-related problems and programs. Microcomputer applications, use and interpretation of vital statistics and introductory research methodology preparatory for first course in epidemiology. Recommended Background: Introductory statistics course. Comment(s): Admission to MPH or public health nutrition (MS) programs or consent of instructor.

540 Principles of Epidemiology (3) Distribution and determinants of health-related outcomes in specified populations, with applications to control of health problems. Historical origins of discipline, hypothesis formulation, research design, data and error sources, measures of frequency and association, etiologic reasoning, disease screening, and injury control. (DE) Prerequisite or (DE) Corequisite: 530.

542 Advanced Epidemiologic Methods (3) Nature, collection, analysis and interpretation of data pertaining to cohort and case-control studies. Surveillance and surveys. Analytic methods: multiple logistic regression and survival analysis. Experience in critiquing professional literature. (DE) Prerequisite(s): 540 or consent of instructor.

544 Statistical Software for the Health Professional (3) An intermediate level, survey of three software packages used by public health professionals for data analysis, including Microsoft Excel, Epi Info, and SAS. For students in the applied epidemiology graduate certificate program, data management and analysis using the software packages are explored. As a continuation of biostatistics and the introduction and advanced courses in epidemiology, this capstone course emphasizes application. (DE) Prerequisite(s): 530, 540, and 542. Registration Permission: Consent of instructor.

550 Principles and Practices of Community Health Education (3) Theoretical foundations for community health education; opportunities for skill development in variety of educational processes; and introduction to community health analysis.

552 Community Health Problem Solving (4) Dynamics of community organization, community needs assessment, educational interventions, and application of program planning and evaluation techniques. Opportunity to practice skills in realistic settings.


560 Theories and Techniques in Health Planning (4) Overview of health planning concepts and methodologies; systems-oriented planning process. Major elements of planning: formulation and conceptualization of problem, plan design, evaluation and implementation. Health problems of institutions, communities and selected population groups, appropriate diagnoses, and programs for addressing needs.

580 Special Topics (3) Repeatability: May be repeated if topic differs. Maximum 6 hours. Registration Permission: Consent of instructor.

583 Seminar in Gerontology (1-3) (See Health 585.)

587 Internship (3) Internship (community health education, gerontology, or health planning/administration) in either approved organization or research setting under supervision of designated preceptor. Grading Restriction: Satisfactory/No Credit grading only. Comment(s): MPH admission and one semester advance notice required. Registration Permission: Consent of major advisor.

588 Internship (3) Internship (community health education, gerontology, or health planning/administration) in either approved organization or research setting under supervision of designated preceptor. Grading Restriction: Satisfactory/No Credit grading only. Comment(s): MPH admission and one semester advance notice required. Registration Permission: Consent of major advisor.

589 Internship (3) Internship (community health education, gerontology, or health planning/administration) in either approved organization or research setting under supervision of designated preceptor. Grading Restriction: Satisfactory/No Credit grading only. Comment(s): MPH admission and one semester advance notice required. Available only for approved extended placements. Registration Permission: Consent of major advisor.
590 Research Methods in Health (3) (See Health 590.)
593 Directed Independent Study (1-3)
  Repeatability: May be repeated. Maximum 6 hours.
  Registration Permission: Consent of instructor.
635 Physical Activity and Positive Health (3) (See Exercise Science 635.)
650 Health Aspects of Gerontology (3) (See Health 650.)
655 Seminar in Nation’s Health (3) (See Health 655.)
660 International Health (3) (See Health 660.)

Public Relations (841)
470 Public Relations Campaigns (3) Research, planning and communication, and evaluation of major public relations campaigns. Oral and written presentation of a public relations project from inception to completion. Requires extensive out-of-class work.
  (DE) Prerequisite(s): 320 and 370 or consent of instructor.
490 Special Topics (3) Topics vary.
  Repeatability: May be repeated. Maximum 6 hours.
500 Thesis (1-15)
  Grading Restriction: P/NP only.
  Repeatability: May be repeated.
502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when the student uses university facilities and/or faculty time before degree is completed.
  Grading Restriction: Satisfactory/No Credit grading only.
  Repeatability: May be repeated.
  Credit Restriction: May not be used toward degree requirements.
516 Seminar in Public Relations Issues (3) Topics vary.
  Repeatability: May be repeated. Maximum 6 hours.
525 Public Opinion (3) (See Journalism and Electronic Media 525.)
540 Public Relations Management (3) Theories of leadership and management and organizational structure and functions of public relations agencies and departments in public, private, and non-profit sectors. Analysis and management of problems in communication between organizations and their publics with emphasis on ethics and standards of the profession.
550 Public Relations Strategies (3) Strategic communication planning to achieve overall goals of organizations. Emphasis on decision making, the budgeting process, including cost-benefit analysis of tactics, and managerial execution of public relations plans. Measurement and evaluation of effectiveness of communication programs.
561 Fund Raising and Proposal Writing (3) History, philosophy and practice of philanthropy in U.S. Sources of funds from foundations, corporations and public agencies. Research and preparation of fund-raising proposals.
590 Project (3) Capstone project under guidance of faculty. Application of principles from previous coursework.
  Grading Restriction: Satisfactory/No Credit grading only.
  Repeatability: May be repeated. Maximum 6 hours.
597 Independent Study (3)
  Repeatability: May be repeated. Maximum 6 hours.
  Registration Permission: Consent of instructor.
598 Internship (3) Professional work in public relations supervised by communications manager with faculty approval. No retroactive credit for previous work experience.
  Recommended Background: Completion of core curriculum.

Reading Education (847)
461 Developing Reading Skills in Content Fields (3) Teaching reading and study skills in content areas of school program. Extensive assessment of textbooks. Emphasis on middle school and high school.
479 Transacting with Literature (3) Strategies for integration of language, writing, content, literature, and higher level thinking skills (K-12).
529 Emergent Literacy (3) Theory and practice in emergent literacy. Focus on the development of early reading and writing from preschool through first grade.
530 Teaching Reading in Elementary and Middle Schools (3) Trends in methods, materials, basic approaches, skill development and assessment procedures for teaching reading at elementary school level.
  Recommended Background: Course in teaching of reading or consent of instructor.
533 Reading in Community College: Research and Theory (3) Analysis of components of effective community college reading programs. Attention to research bases.
  Recommended Background: Course in reading education or consent of instructor.
534 Seminar in Reading Education (1-6)
  Repeatability: May be repeated. Maximum 6 hours.
536 Psychology of Reading (3) Reading act, relationship between learning theory and reading, role or reading in child’s overall intellectual development. Affective and cultural factors.
  Recommended Background: 500-level course in reading education or consent of instructor.
537 Diagnosis and Correction of Classroom Reading Problems (3) Procedures, methodologies and materials for diagnosing and correcting classroom reading problems.
  Recommended Background: Course in reading education or equivalent teaching experience or consent of instructor.
538 Practicum in Diagnosis of Reading Problems (3) Application of learning and teaching methodology in working with elementary and/or secondary school students, preparing case study reports, and conducting parent conferences.
  Recommended Background: Course in diagnosis and correction of classroom reading problems or consent of instructor.
539 Practicum in Remediation of Reading Problems (3) Application of learning and teaching methodology in working with elementary and/or secondary school students on one-to-one or small-group basis.
  (DE) Prerequisite(s): 537 or 538.
540 Teaching the Struggling Adolescent Reader (3) Methods of teaching middle and high school students who do not have sufficient reading skill to successfully engage in required reading.
  Recommended Background: Course in reading education, or equivalent teaching experience, or consent of instructor.
543 Literacy and Literature in the Middle Grades (3) Problems and issues particular to teaching reading in the middle grades including teaching reading in an integrated curriculum, dealing with students reading below grade level, and teaching concept vocabulary. The literature base for early adolescents will be explored and analyzed.
554 Developmental Reading Practicum (3) Diagnosing and teaching children having developmental and corrective reading needs in regular classroom.
  Recommended Background: Course in diagnosis and correction of reading problems or consent of instructor.
602 Seminar in Reading Education (1-6)
  Repeatability: May be repeated. Maximum 6 hours.
603 Advanced Studies and Theoretical Models of Reading (3) Research on reading processes. Current theoretical models related to how learners process print.
  Recommended Background: 500-level courses in reading education or consent of instructor.
605 Organizing and Administering Reading Programs (3) Diagnosing and teaching children having developmental and corrective reading needs in the regular classroom.
  Recommended Background: Course in diagnosis and correction of reading problems or consent of instructor.

Recreation and Leisure Studies (853)
415 Development of Recreation, Leisure, and Athletic Facilities (3) Principles of designing, planning, equipping, and operating various facilities. Elements of risk management and safety are incorporated into the design process.
  (DE) Prerequisite(s): 310 and Sport Management 350 or consent of instructor.
430 Organization and Administration of Leisure Services (3) Principles of administration applied to provision of leisure services offered by public, private, non-profit, and/or commercial enterprises. Organizational structures, human resource management, diversity, evaluation, legal authority, introduction to budgeting and fiscal procedures, professional responsibility, and career management.
  (DE) Prerequisite(s): 310 or Sport Management 350.
440 Dimensions of Commercial Recreation and Leisure Enterprises (3) Organizational structures, delivery systems, financing private enterprises and operating selected profit centers in a variety of settings. Special attention is given to market performance and economic impact.
  (DE) Prerequisite(s): 201 or consent of instructor.
450 Special Topics in Recreation and Leisure Studies (1-6) Development of special topics in recreation/therapeutic recreation and leisure.
  Repeatability: May be repeated. Maximum 6 hours.
470 Tourism and Leisure Industries (3) An examination of the symbiotic relationship between tourism and various sectors of the leisure industry. Use of resources, both natural and developed, and the economic impacts of these ventures. Sociocultural impacts upon the venue and how the venue impacts the local population.

500 Thesis (1-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student, not otherwise registered during any semester when student uses university facilities an/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.
Registration Restriction: Recreation and leisure studies major.

511 Perspectives and Trends in Leisure Studies and Services (3) Basic role of leisure delivery systems in today’s society, scope of leisure behavior, developmental features of leisure and recreation. Current trends, problems, laws, and issues affected by and/or affecting delivery of leisure services.
Registration Permission: Consent of instructor.

515 Philosophical and Conceptual Foundations of Leisure (3) Philosophy of leisure and recreation; nature of philosophy, concepts of leisure, recreation, play, work, and other factors, history of field, and relationship of ideas to contemporary society and professional practice.

520 Program Design and Evaluation in Therapeutic Recreation (3) History, philosophy, nature, purpose, special populations served, programming process, professional aspects of therapeutic recreation. Basic overview of aspects of leisure delivery systems.

521 Facilitation Techniques in Therapeutic Recreation (3) Role of therapeutic recreation in clinical, non-clinical, and non-therapeutic settings; application of life-style planning, self-awareness, values clarification and assertiveness training in therapeutic recreation, relationship of leisure education to therapeutic recreation.
(DE) Prerequisite(s): 520 or consent of instructor.

522 Clinical Aspects in Therapeutic Recreation (3) Concepts and techniques utilized by experienced and advanced therapeutic recreation specialist: clinical issues, comprehensive program concerns, administrative funding and trends in practice of therapeutic recreation services.

540 Fiscal Policies for Recreation and Leisure Services Organizations (3) Application of fiscal policies and procedures to operation of recreation, leisure services, and sport related organizations. Organizational fiscal policy, finance, performance based budgeting, revenue generating strategies, cash and inventory control, commercial/public cooperative ventures, development of logic models, fundraising and development, and strategies for seeking grants and contracts.
(DE) Prerequisite(s): 430 or consent of instructor.

541 Management Strategies for Recreation and Leisure Services Organizations (3) A survey of advanced management theory, concepts, and strategies for contemporary recreation, leisure services, and sport organizations. Topics covered in the course include: strategic management and leadership, benefits based management, benchmarking and performance measurement, high performance organizations (HPO), transforming the culture of organizations, the pursuit of excellence, strategic staffing, risk management, development of partnerships and alliances, research and evaluation as strategic functions of managerial leadership.
Registration Permission: Consent of instructor.

590 Graduate Internship (3-6) Required of all graduate students. Application of previous theoretical and applied knowledge and skills in an appropriate recreation/leisure setting. The internship is intended to simulate a full time professional level work experience during the entire semester. Therapeutic recreation internship must meet NGTREC national guidelines.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 6 hours.
Recommended Background: Completion of 24 graduate hours.
Comment(s): 3.00 GPA required.
Registration Permission: Consent of instructor.

591 Directed Study in Leisure and Recreation (1-6) Detailed study of theme, issue, or concern. Designed to meet needs of individual students.
Repeatability: May be repeated. Maximum 6 hours.

592 Special Topics in Recreation and Leisure Studies (1-6)
Repeatability: May be repeated. Maximum 6 hours.

Rehabilitation Counseling (852)

530 Orientation to Rehabilitation (3) History, philosophy, legal and economic bases, current issues, and practices in public and private rehabilitation programs. Qualifications of service providers. Assessment, plan development, and provision of services to people who have disabilities and vocational handicaps. Identification, mobilization, and utilization of rehabilitation resources.

532 Caseload Management in Rehabilitation (3) Techniques and procedures involved in management of caseloads in Federal-State vocational rehabilitation agencies, private rehabilitation companies, and public or private rehabilitation facilities. Analysis of appropriate industrial management models related to rehabilitation programs.

533 Job Analysis, Development, and Placement (3) Determining employment-readiness of people with disabilities, identifying appropriate jobs for selected clients, and assisting clients in seeking, obtaining, and retaining employment. Job analysis, job modification and re-engineering, marketing, and employer-serving techniques; legislation impacting job placement; supported work; and use of occupational information.

537 Vocational Evaluation: Clinical Methods (3) Process, principles, and techniques used to assist individuals in determining and understanding their own work behavior and vocational potential. Selection and use of occupational exploration programs and work samples; application of situational tasks, job tryouts, and simulated work experiences in vocational evaluation. Clinical interpretation of data through formal staff conference, vocational counseling, and report writing.

538 Current Issues in Rehabilitation Counseling (3) An examination of current issues in rehabilitation counseling. Topics will include use of technology, professional issues in the public, private-not-for-profit and proprietary rehabilitation systems, ethical and professional behavior issues, and other topics selected by the instructor.

541 Psychosocial and Multicultural Aspects of Disability (3) Psychological impact of disability on person and family. Reaction to loss, coping with disability, and societal rehabilitation. Disability as a cultural phenomenon. Impact of cultural differences on reaction and adjustment to disability. Cross-cultural effects upon the rehabilitation counseling process and therapeutic relationship.

543 Physical Disabilities, Rehabilitation, and Employment (3) Etiology and clinical symptoms related to physically disabling conditions. Discussion of various body systems and common disorders and diseases. Emphasis on diagnosis, treatment, and functional and employment implications of physical disabilities. Skills necessary to communicate medical information to lay persons and understand the reports of medical professionals.

544 Cognitive Disabilities, Rehabilitation and Employment (3) Study of cognitive disabilities such as brain trauma, developmental disabilities, substance abuse, and mental illness. Disabilities will be discussed in the context of medical and psychiatric and diagnostic characteristics, functional effects, and rehabilitation and employment implications.

545 The Rehabilitation Interview (3) Interview as used in assessment and planning with people who have disabilities and vocational handicaps.

547 Practicum in Rehabilitation (3) Supervised experience in area of rehabilitation; application of concepts, principles, and skills.
Registration Permission: Consent of instructor.

549 Internship in Rehabilitation Counseling (3-6) Supervised practice in rehabilitation and counseling. 600 clock hours required for graduation. Repeatability: May be repeated. Maximum 9 hours.

579 Special Topics (1-3)
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 9 hours.
Comment(s): Admission to graduate program required.

591 Research Project in Rehabilitation Counseling (3) Explore and research rehabilitation counseling issues directly related to employment, counselor functions, and/or treatment variables.

593 Independent Study (1-3)
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 6 hours.
Religious Studies (863)

401 Texts and the Study of Texts (3) Systematic introduction to the nature and function of (primarily, but not exclusively, oral and written) texts and textual traditions in the study of religion. How texts are made and used historically, how they are recovered and created by scholars, and how they are interpreted by religious communities and scholars.

405 Modern Jewish Thought (3) History, culture, and geography of the now Israeli portion of the Levant from 1850 to present. The founding of the modern state of Israel in 1948 and the political complexities of the Middle East. Israeli culture and literature. (Same as Judaic Studies 405.)

411 Modern Religious Philosophies (3) Religious implications of major Western thinkers and movements from Nicolas of Cusa to the 19th-century German Idealists. (Same as Philosophy 411.)

415 Psychology of Religion (3) (See Psychology 415.)

425 Seminar in Western Religions (3) Selected figures, themes, movements, and problems. Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of instructor.

430 Seminar in American Religion (3) Selected figures, themes, movements, and problems. Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of instructor.

440 Seminar in Comparative Religion (3) Selected figures, themes, movements, and problems. Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of instructor.

490 Readings and Research in Religious Studies (3) Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of instructor.

499 Proseminar in Religious Studies (3) For advanced students in religious studies, required for majors. Selected topics, e.g., nature and function of myth in religion, problem of evil, transcendence, theories of religion, hermeneutics, integrating various disciplines involved in study of religion. Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of instructor.


505 Religious Texts and Contexts (3) Critical study of texts and their interpretations: sacred texts, canons, commentaries, religious autobiographies, and religious themes in literature. Repeatability: May be repeated. Maximum 6 hours.

506 Historical Study of Religions (3) Description and analysis of religious traditions, phenomena, and themes. Repeatability: May be repeated. Maximum 6 hours.

507 Religion, Power and Society (3) Studies of religions in relation to social structure and political institutions: issues of gender, race, class, ethnicity, caste, slavery, religion and the state, globalization and human rights. Repeatability: May be repeated. Maximum 6 hours.

510 Introduction to Pedagogy of Religious Studies (3) Conceptualization, methodology, and practice of teaching about religion and religions in the public university context. (DE) Prerequisite(s): 503. Registration Permission: Consent of instructor.

513 Religion, the Arts, and the Media (3) Material and expressive culture, religion and journalism, mass communication technologies, popular culture, issues of representation, cultural studies methodologies. Repeatability: May be repeated. Maximum 6 hours.

514 Religion and Healing (3) Ecology of religion, nature, shamanism, healing of body and mind, spirituality, religious dimensions of medical ethics. Repeatability: May be repeated. Maximum 6 hours.


520 Readings in the Study of Religion (1-6) Repeatability: May be repeated. Maximum 12 hours.

532 Topics in the History of Religions (3) Registration Permission: Consent of instructor.

533 Topics in Religious Thought (3) Registration Permission: Consent of instructor.

550 Critical Explorations in Religious Studies (3) Critical examination of selected phenomena of religion from contemporary theoretical or thematic perspectives. Required for MA students in philosophy major/religious studies concentration. Repeatability: May be repeated. Maximum 6 hours. (DE) Prerequisite(s): 503.

551 Comparative Historical Explorations in Religious Studies (3) Critical examination of parallel or contrasting historical phenomena from two or more religious traditions. Required for MA students in philosophy major/religious studies concentration. Repeatability: May be repeated. Maximum 6 hours. (DE) Prerequisite(s): 503.

591 Foreign Study (1-15) Repeatability: May be repeated. Maximum 15 hours.

592 Off-Campus Study (1-15) Repeatability: May be repeated. Maximum 15 hours.

593 Independent Study (1-15) Repeatability: May be repeated. Maximum 15 hours.

Retail and Consumer Sciences (865)

412 e-Retailing (3) Issues concerning the use of the Internet and related technologies to improve and/or transform retail businesses. Emphasizes analysis of consumer and product/service types in online retailing and the effective management of online catalogs. Also direct retailing methods that involve technology such as interactive TV and m-commerce (mobile). (DE) Prerequisite(s): 210, 341, and Marketing 300.

415 Retail Promotion (3) In-store promotional activities. Development of retail promotion strategies. Evaluation of retail promotions. Supplementary focus on advertising and other methods to communicate in-store promotions. (DE) Prerequisite(s): 210, and Marketing 300.

500 Thesis (1-15) Grading Restriction: P/NP only. Repeatability: May be repeated.

501 Professional Project (3-6) Application-oriented, capstone project to show competence in major academic area. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 6 hours. Comment(s): Enrollment limited to students in retail and consumer sciences concentration/non-thesis option. Registration Permission: Consent of instructor.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Credit Restriction: May not be used toward degree requirements.

510 Retail Strategy and Decision Making (3) Strategy, strategic management and strategic process in retail sector. Analytical decision-making skills in retailing. Retail industry structure. International differences in retail systems. Recommended Background: Retail management course.


538 Consumer Product and Service Development (3) Critical analysis of consumer product and service development process in services industry. Strategies for developing consumer products, services, programs, and service processes from conception to implementation and evaluation.

541 Consumer Analysis in Services Management (3) Analysis of consumer behavior in consumer products and services industry. Development of knowledge to positively impact services marketing organizations through marketing, environmental and product/services strategies based upon consumer behavior knowledge. Investigations of qualitative and quantitative methodologies to conduct elementary consumer research.

562 Research Methods (3) Fundamentals of science method, advancement of science, methodology and method of research. Issues and concepts of basic and applied research. (DE) Prerequisite(s): Statistics 531 or equivalent.

590 Research Seminar (1) Research topics in retail and consumer sciences. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 2 hours.
593 Directed Study (1-3) Individual problems in retailing and consumer sciences.
   Repeatability: May be repeated. Maximum 9 hours.
   Recommended Background: 9 hours of graduate coursework in retail and consumer sciences.

595 Special Topics in Retail and Consumer Sciences (1-3) Lecture, group discussion on specialized topics: retail industry structure, international trade, international retailing, consumer affairs, entrepreneurship, small business management, issues in retail management, issues in retail strategy, quality perception by consumers, product and service value, retailing to children, retailing and special populations, special research methods.
   Repeatability: May be repeated. Maximum 9 hours.
   Recommended Background: 9 hours of graduate coursework.

600 Doctoral Research and Dissertation (3-15)
   Grading Restriction: P/NP only.
   Repeatability: May be repeated.

614 Theory in Retail Environment (3) Analysis and evaluation of theory in retail environment and its application to research in retailing.
   (DE) Prerequisite(s): 562 or equivalent.

615 Retail and Consumer Sciences Literature and Thought (3) Evaluation of retail and consumer sciences literature with emphasis upon research literature, development of scholarly thought, and identification of potential areas of further study.
   (DE) Prerequisite(s): 562 or equivalent.

616 Research Methods, Models and Measurement in Retail and Consumer Sciences (3) Quantitative and qualitative methods and analytical concepts in the research process. Formulation of models and measurement of consumer sciences constructs.
   (DE) Prerequisite(s): 562 and Statistics 538.

625 Strategic Managerial Retailing (3) Decision-making orientation that integrates strategic framework components with preparation and analysis of specific retail case situations.
   (DE) Prerequisite(s): 510 or equivalent.

641 Retail Consumer Behavior (3) Theories and concepts from social science in relation to ultimate consumer’s behavior.

695 Advanced Topics in Retail and Consumer Sciences (3) Lecture, group discussion, individual research on advanced topics and research areas of current significance to retail and consumer sciences.
   Repeatability: May be repeated. Maximum 9 hours.
   Recommended Background: 9 graduate hours in consumer sciences.

Russian (886)

401 Advanced Grammar, Conversation, and Composition (3)
   (DE) Prerequisite(s): 312 or equivalent.

402 Advanced Grammar, Conversation, and Composition (3)
   (DE) Prerequisite(s): 312 or equivalent.

425 Introduction to Descriptive Linguistics (3) (See French 425.)

426 Methods of Historical Linguistics (3) (See German 426.)

430 Selected Topics in Russian Literature (3)
   Repeatability: May be repeated if topic differs. Maximum 9 hours.

451 Senior Seminar (3) Intensive study of language, literary style, and literary criticism based on selected major novels.
   Comment(s): For majors in Russian; minors admitted at discretion of instructor.

452 Senior Seminar (3) Intensive study of language, literary style, and literary criticism based on selected major novels.
   Comment(s): For majors in Russian; minors admitted at discretion of instructor.

550 Studies in Russian Literature (3) Content varies.
   Repeatability: May be repeated. Maximum 9 hours.

591 Foreign Study (1-15)
   Repeatability: May be repeated. Maximum 15 hours.

592 Off-Campus Study (1-15)
   Repeatability: May be repeated. Maximum 15 hours.

593 Independent Study (1-15)
   Repeatability: May be repeated. Maximum 15 hours.

Safety (890)

406 Death, Dying and Bereavement (3) (See Health 406.)

   Contact Hour Distribution: 3 hours and 2 labs.

452 Safety Principles and Practices (3) An introduction to the general principles, practices, and procedures in occupational and community safety. A survey of historical and present safety issues, problems, and practices addressing safety of individuals and groups in work-site, school, community, transportation, and industrial settings.

500 Thesis (1-15)
   Grading Restriction: P/NP only.
   Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
   Grading Restriction: Satisfactory/No Credit grading only.
   Repeatability: May be repeated.
   Credit Restriction: May not be used toward degree requirements.

532 Behavioral Problems in Safety Education and Accident Prevention (3) Problems of behavior, causes of accidents, and application of principles of psychology in development of safe behavior in all segments of environment.

533 Problems and Research in Accident Prevention (3) Safety problems found in wide variety of accidents that occur in community; findings of current research in behavioral sciences as related to variation incidence of accidents.

534 Organization, Administration and Supervision of Safety Programs (3) National, state and local level programs; administrative, institutional, and supervisory aspects. Implementation of relevant programs.

535 Emergency Management (3) Civil and defense problems: tornadoes, floods, fires, mass civil disorders, and nuclear and personnel attack by alien countries.

536 Safety Instrumentation (3) Selection, calibration, maintenance, and use of sampling instruments available to safety practitioner for evaluating exposures of workers to physical stresses and airborne contaminants.

537 Advanced Emergency Management (3) Advanced study in emergency and hazard mitigation, planning, response and recovery. Theory and practice in identification of appropriate emergency warning systems, hazard assessment, facility inspection, plan development and implementation.
   (DE) Prerequisite(s): 535.

560 Fire Risk Management (3) Development, implementation, and management of comprehensive fire safety program. Basic fire risk management concepts, interpretation of codes and exposure to basic fire analysis techniques.

564 Personnel Policies in Safety Management (3) Contemporary practices in the organization and operation of safety and health programs.

572 Graduate Workshop in Safety (3) Special safety education problems. For advanced graduate students, teachers, supervisors, and administrators.
   Repeatability: May be repeated. Maximum 12 hours.

590 Special Topics (1-3) Advanced study in selected disciplinary or professional area of safety education/management.
   Repeatability: May be repeated. Maximum 12 hours.

592 Research Methods in Health (3) (See Health 590.)

593 Directed Independent Study (1-3) Individual identification and study of problem/issue in safety. Extensive reading and critical analysis of safety literature. Requires specific proposal to instructor before registration.
   Repeatability: May be repeated. Maximum 12 hours.

601 Internship/Research in Safety and Health (3-6) Field experience. Significant problem identified, researched, and reported in acceptable form. (Same as Health 601.)
   Repeatability: May be repeated. Maximum 6 hours.
School Psychology (901)

540 Seminar in School Psychology (3) Essentials of theory and practice of school psychology as professional specialty. Consideration of history and current issues in school psychology.

541 Psychoeducational Assessment (3) Direct, psychometric and naturalistic assessment methods in learning environments. 

Grading Restriction: Satisfactory/No Credit grading only. 
Repeatability: May be repeated. Maximum 6 hours. 
(DE) Prerequisite(s): Counselor Education 525 or equivalent. Comment(s): Requires admission to school psychology major or consent of instructor.

542 Practicum in Psychoeducational Assessment (3) Application of assessment skills to clients in learning environments. 

Grading Restriction: Satisfactory/No Credit grading only. 
Repeatability: May be repeated. Maximum 6 hours. 
(DE) Corequisite(s): 541. Comment(s): Requires admission to school psychology major or consent of instructor.

545 Psychoeducational Consultation (3) Use of two and three-person models of consultation in educational and therapeutic settings based on behavioral, ecological, social learning and cognitive-behavioral theories.

546 Practicum in Consultation and Intervention (3) Application of consulting and intervention skills to educational settings. 

Grading Restriction: Satisfactory/No Credit grading only. 
Repeatability: May be repeated. Maximum 12 hours. Comment(s): Requires admission to school psychology major. 
Registration Permission: Consent of instructor.

549 Internship in School Psychology (1-6) Supervised employment in unit-approved school psychology internship sites. 

Grading Restriction: Satisfactory/No Credit grading only. 
Repeatability: May be repeated. Maximum 9 hours. Comment(s): Requires admission to school psychology major or consent of instructor. 
Registration Permission: Consent of instructor.

649 Advanced Internship in School Psychology (1-9) Supervised experience as school psychologist in unit-approved internship site for doctoral level students. 

Grading Restriction: Satisfactory/No Credit grading only. 
Repeatability: May be repeated. Maximum 9 hours. Comment(s): Admission to doctoral level psychology concentration required. 
Registration Permission: Consent of instructor.

650 Professional Practice in School Psychology (1) Field setting to facilitate academic, social and interpersonal development of children and adults. School and mental health settings for intervention, consultation, prevention, and assessment services. 

Grading Restriction: Satisfactory/No Credit grading only. 
Repeatability: May be repeated. Maximum 9 hours.

Psychopathology of Childhood (3) Descriptive and critical study of psychopathology of childhood and of systems of nomenclature applied to individuals with mental disorders: nomenclature provided in State Department of Education’s Student Evaluation Manual and Diagnostic and Statistical Manual of Mental Disorders of American Psychiatric Association.

Science Education (899)

496 Teaching Science Grades 7-12 (3) Methods, materials, recent trends in science and environmental education programs for secondary schools. 

Comment(s): Admission to teacher education required.


Repeatability: May be repeated. Maximum 9 hours.

509 Education for Sustainable Development: Making Connections (3) Holistic and interdisciplinary approach that encourages educators and learners to engage in dialogue in order to acquire through experiences and creativity skills and knowledge needed to maintain a balance between socio-economic, political and environmental goals.

510 Theoretical Foundations of Environmental Education (3) Study of history and philosophy of environmental education, pedagogical approaches, and current status, including model programs and standards for environmental education. Addresses implementation of environmental education in formal and non-formal educational settings. A technology-enhanced course with both online and fieldwork components.

531 Teaching Science to Young Children: K-4 (3) Recent trends in methods, materials and content in teaching science to students in grades K-4.

543 Teaching Science in the Middle Grades (3) Activities in this class are intended to promote the professional growth of pre-service and in-service science teachers by studying science curriculum and instructional strategies. In particular, methods of teaching contemporary science content in grades 4-8 will be explored.

565 Instructional Trends and Issues in Science Education (3) Analysis of current trends in science instruction, instructional issues facing elementary, secondary, and community college level science teachers, and application of learning theory to teaching biological, physical, and environmental sciences. 

(DE) Prerequisite(s): 496.

572 Nature of Mathematics and Science Education (3) Teaching and assessment of mathematics and science based upon student conceptions of nature of mathematics and science.


628 Advanced Studies in Science Education (3) Analysis of current research in science education and implications of research for classroom practice. 

Repeatability: May be repeated. Maximum 6 hours.

696 Research Trends in Science Education (3) Analysis of current research trends in science education and relationship of such trends within broader educational community.

Social Science Education (900)


Comment(s): Admission to teacher education required.


Recommended Background: Course in teaching of social studies or consent of instructor.

525 Strategies, Programs and Materials for Teaching Elementary Social Studies (3) Analysis of new and innovative social studies program materials and techniques. Exploration of current trends in social studies education. 

Recommended Background: Course in teaching of social studies or consent of instructor.

543 Teaching Social Studies in the Middle Grades (3) Activities in this class are intended to promote the professional growth of pre-service and in-service social studies teachers through study, design, and implementation of social studies curriculum and instructional strategies. In particular, methods of teaching contemporary social science content in grades 4-8 will be explored.

585 Teaching Secondary School Social Studies (3) Strategies, projects, materials, and programs in social studies. 

Recommended Background: Undergraduate course in teaching of social studies or consent of instructor.

599 Seminar in Social Studies Education (3) Research, trends, and issues in secondary social studies.

621 Seminar in Social Studies Research and Theory (3) Status of research and theory. Needed research, related research from other fields, and application of research. 

Recommended Background: Recent course in teaching of social studies or consent of instructor.

Social Work (905)

Graduate students majoring in fields other than social work are admitted to certain social work courses with the approval of the College of Social Work and the student's major professor.

500 Thesis (1-15) 

Repeatability: May be repeated.

501 Foundations of Social Work Practice I (3) Survey of history, mission, and identity of profession. Basic theory, professional values and ethics, and methods generic to social work practice at various systems levels. Assessment, planning, communication, intervention, and evaluation skills.
502 Registration for Use of Facilities (1-15) Required for the student who has not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. 
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

503 Foundations of Social Work Practice II (3) Generalist practice with family and small group systems. Ecological theory to frame understanding of systems and their adaptation to environments. Various social work roles and intervention strategies pertaining to client systems.

504 Foundations of Social Work Practice III (3) Basic theory, methods, problems, and strategies in implementing planned change within and among larger social systems: task groups, human service organizations, and community systems. Various practice roles: planner, program developer, supervisor, administrator, advocate and task group leader.

506 Social Work Research (3) Research methodologies with respect to evolution and application to social work theory and practice. History and philosophies of science; problem formulation; research design; ethics; instrument use and construction; data collection; analysis and reporting; and evaluation and utilization of research.

509 Graduate Seminar in Public Health (1) (See Public Health 509.)

510 Social Work and Social Welfare Policies and Programs (2) Historical and contemporary contexts of social welfare. The profession’s distinctive mission, history, values and ethical standards, and multiple roles with individuals, families, groups, organizations, and communities are examined using local to international comparisons. Key professional competencies, diversity, justice, critical thinking, and evidence-based practice are emphasized. Organizational, community, and legislated policies related to social issues, problems, and client systems using local to international contexts. Use of justice, power, social construction, and social work values and ethics in analyzing, influencing, developing, implementing, and advocating for policies and programs.

512 Social, Economic, and Political Environments (2) Examines the profound influences on and critical interfaces of client systems with the world in which we live. Incorporates local to international information about social, economic, and political trends and innovations, and about effects on social, political, economic, and cultural systems from ecological perspective. Therapeutic process and intervention strategies, incorporating content from psychodynamic and cognitive practice models, and specific client problems.

517 Diversity, Social and Economic Justice, and Oppression (2) In context of the cultural, ecological, developmental, and transnational theories, social work values and ethics, and a human rights perspective, critically assesses theory and research about sources, forms, and outcomes of oppression for at-risk client systems. Integrates local to international information about our global, diverse, multicultural society with evidence-based knowledge and skills that address oppression, are culturally affirming, and promote social and economic justice and human dignity.

518 Social Work and Oppression (3) Sources, dynamics, and impact of oppression in U.S. society as manifested in both social/ecological/economic systems and personal experience. Connections among various forms of oppression: racism, sexism, classism, and heterosexism, and forces that perpetuate such conditions.

519 Foundation Research (3) Social work practice-focused qualitative and quantitative research knowledge and skills. Includes critical evaluation of theoretical literature and basic research methodology including construct operationalization; study design; selection, development, implementation, and evaluation of measures and instruments; and data management and analysis using statistical software.

520 Foundations of Evidence-Based Practice (1) Examines how to (1) convert information needs related to practice decisions into well-structured answerable questions; (2) efficiently locate the best evidence with which to answer such questions; (3) critically appraise such evidence; (4) apply results to practice and policy decisions; and (5) evaluate the effectiveness and efficiency of the application of such results to practice and policy decisions.

521 Clinical Social Work Practice with Individuals (3) Theories, knowledge, and skills for clinical practice with individuals from ecological perspective. Therapeutic process and intervention strategies, incorporating content from psychodynamic and cognitive practice models, and specific client problems.

522 Introduction to Social Work Practice (4) Historic and contemporary contexts of social welfare. The profession’s distinctive mission, history, values and ethical standards, and multiple roles with individuals, families, groups, organizations, and communities are examined using local to international comparisons. Theories are examined in the context of critical thinking and evidence-based practice. Defines generalist practice philosophy, methods, roles. Emphasizes skills (i.e., interpersonal communication, relationship building, power analyses, assertiveness, conflict management) that are essential to problem identification, assessment, and intervention with all client systems (individuals, groups, organizations, communities), and with other professionals and decision-makers. Uses local to international examples to translate theory and evidence-based knowledge into practice that is competent, ethical, cultural-affirming, and empowere
537 Introduction to Psychopathology and Social Work Practice (2) Examines psychopathology and mental disorders from an ecological perspective. Emphasis on understanding biopsychosocial influences on the incidence, course and treatment of the most commonly presented mental disorders and the differential effect of these factors on diverse populations. Emphasizes the acquisition of diagnostic skills as they relate to comprehensive social work assessment and the development of social work interventions. Stresses ethical issues, collaboration with families, knowledge of psychopharmacology and the varied roles social workers play in mental health settings.

(Pre prerequisite(s): 510, 512, 513, 517, 519, 520, 522.
Registration Restriction(s): Master of Science in Social Work.)

538 Advanced Social Work Practice w/At-Risk Populations (2) In-depth study of evidence-informed and evidenced-based practice models with at-risk populations. Assessment and interventions focus on individuals, groups, families, and communities.

(Pre prerequisite(s): 510, 512, 513, 517, 519, 520, 522.
Registration Restriction(s): Master of Science in Social Work.)

539 Leadership Skills and Knowledge for Advanced Social Work Practice (2) Organizational management knowledge, leadership skills and supervision required in development and management of structure, resources and cultures of human services delivery systems. Administrative financial knowledge and skills in budgeting, resource allocation, marketing and expenditure control. Issues regarding organizational management change in organizations, communities and national global contexts.

(Pre prerequisite(s): 510, 512, 513, 517, 519, 520, 522.
Registration Restriction(s): Master of Science in Social Work.)

540 General Topics in Social Work (3) Current topics in advanced social work.

Repeatability: May be repeated. Maximum 6 hours.

541 Leadership and Management in Human Services (3) Management practices and leadership skills required in development and management of human services delivery systems. Issues regarding human resources management, resource allocation, strategic planning, and organizational dynamics.

542 Foundation Field Practice I (3) Instruction and supervision in generalist social work practice. This course includes a seminar and agency-based internship.

Grading Restriction: Satisfactory/No Credit grading only.
Registration Restriction(s): Master of Science in Social Work.

543 Financial Management and Resource Development (3) Administrative decision making related to financial planning and resource allocation in human service organizations. Knowledge and skills in budgeting, allocating, expenditure control, fundraising, grant writing, marketing, and evaluation.

544 Foundation Field Practice II (2-3) Instruction and supervision in generalist social work practice. This course includes a seminar and agency-based internship.

Grading Restriction: Satisfactory/No Credit grading only.
Registration Restriction(s): Master of Science in Social Work.

547 Evaluation Research (3) History and philosophies, conceptual approaches, techniques and methods, and issues in practice and utilization of evaluation research as applied to development and evaluation of social work programs and policies. Issues pertaining to strengths and limitations of various evaluation methods, microcomputer application of data analysis and measurement of program goals and objectives.

550 Seminar in Management and Community Practice (2-3) Topics in theory and practice of management and community practice.

Repeatability: May be repeated. Maximum 6 hours.


Repeatability: May be repeated. Maximum 6 hours.

552 Community Organization (3) Locality development, social planning and social action as practice models for development of resources to meet human needs.

564 Substance Abuse (3) Survey and analysis of social, cultural, medical and psychological factors underlying alcoholism and drug abuse and addiction; recent research and practice innovations.

566 Social Gerontology (3) Physical, psychological and social aspects of aging, and major social policies and programs.

580 Field Practice (3) Instruction and supervision in social work practice.

Grading Restriction: Satisfactory/No Credit grading only.

581 Field Practice (3) Instruction and supervision in social work practice.

Grading Restriction: Satisfactory/No Credit grading only.

582 Field Practice (2-6) Advanced field practice in clinical social work or management and community practice. Full-time students must enroll for six credit hours.

Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 6 hours.

583 Field Practice (2-6) Advanced field practice in clinical social work or management and community practice. Full-time students must enroll for six credit hours.

Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 6 hours.

584 Field Practice (3) Field practice for summer session advanced standing students only.

Grading Restriction: Satisfactory/No Credit grading only.

585 Seminar in Gerontology (1) (See Health 585.)

593 Independent Study (1-6) Individualized study, student selects, designs, and completes examination of special issue or problem.

Repeatability: May be repeated. Maximum 6 hours.

600 Doctoral Research and Dissertation (3-15)

Grading Restriction: PrN only.
Repeatability: May be repeated.

601 Research for Social Work Practice I (3) Epistemological and methodological considerations for both quantitative and qualitative research for social work practice.

602 Research for Social Work Practice II (3) Epistemological and methodological considerations for both quantitative and qualitative research for social work practice.

605 Analysis of Social Work Data I (3) Techniques for quantitative analysis of social work data: unique data analysis problems encountered in social work research.

606 Analysis of Social Work Data II (3) Techniques for quantitative analysis of social work data: unique data analysis problems encountered in social work research.


640 History of American Social Work (3) Social, cultural, economic and political contexts for development of social work profession, development of education for profession, and modern welfare system.

650 Programs and Legislation for Children and Families (3) Background, purposes, and current issues surrounding major social welfare and health programs serving disadvantaged children and their families: Social Security Act (Title IV, Child Welfare and AFDC; Title V, the Maternal and Child Health Block Grant; Title XIX, Medicaid), Head Start, WIC and other nutrition programs, and Healthy Start. Current issues and controversies; legislative changes.

670 Critical Literature Reviews (3) Techniques and methods for conducting critical reviews of literature: conceptual and methodological critiques of existing research.

Grading Restriction: Satisfactory/No Credit grading only.

693 Directed Study in Social Work Research (3) Advanced individual study, under faculty guidance, of social work practice issues.

Repeatability: May be repeated. Maximum 9 hours.
Recommended Background: First-year required PhD courses or consent of instructor.

Sociology (915)

446 The Modern World System (3) Critical examination of the capitalist world-system as a social system, its coherence, boundaries, regions, member groups, cleavages, and patterns of conflict. Analysis of who gets what, why, and how in global political economy.

451 Criminal Justice (3) A critical assessment of the criminal justice apparatus and its components. Brief examination of the police, with most of the emphasis on the criminal courts and institutions and programs such as the prison, probation, and parole. Analysis of their operation and impacts. (Same as Legal Studies 451.)
Recommended Background: 350.

452 Minorities, Crime and Criminal Justice (3) Examines racial/ethic disparities in criminal offending and victimization, as well as different experiences with law enforcement, judicial and correctional agencies. Emphasis on social justice.
453 Gender and Crime (3) Probes the gendered nature of offending, victimization and criminal justice. Examines the different experiences of males and females, and theories that attempt to explain these differences.

455 Society and Law (3) How laws and legal processes are affected by social change, the social impact of legal sanctions, and relations between law and social justice. (Same as Legal Studies 455.)

459 White-Collar Crime (3) The distinctive nature and dynamics of white-collar crime, victims and costs of white-collar crime, organizations as white-collar offenders, causal theories, and the dynamics of responses to white-collar crime by private and public parties.


464 Urban Ecology (3) The relation of humans to their urban environment with emphasis on conservation and use of appropriate technology.

465 Social Values and the Environment (3) Human dimensions of ecosystem management and public policy. An applied focus on how social values are activated within specific biophysical and social settings.

( DE) Prerequisite(s): 110 or 120 or consent of instructor.

500 Thesis (1-15)
Graduation Restriction: P/NP only.
Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Graduation Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

504 Sociological Foundations of Political Economy (3) Survey of contemporary sociological theories of political economy, sources of political and economic power and conflict.

505 Foundations of Criminology (3) Critical overview of contemporary developments in criminology, theories of crime causation and theories of responses to crime.

506 Social Justice and Public Policy (3) Examines the formulation and consequences of public policy, analyzing the general public policy process model; the model’s specific applications to criminal justice policy, environmental policy, and economic and political policies; and techniques of policy evaluation research.

507 Foundations of Social Psychology (3) Current and classical theoretical perspectives in social psychology.

510 Professional Preparation (1) A variety of one-credit seminars that offer training in specific aspects of professional socialization.
Graduation Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 6 hours.

521 Sociological Theory I (3) Assessment of what sociological theory is; its major figures and their approaches to understanding society.

531 Research Methods in Sociology (3) Research design, measurement, sampling, quantitative and qualitative data collection techniques, data, reduction, and analysis.

534 Advanced Sociological Analysis (3) Underlying assumptions and logical procedures used by sociologists in formulating explanations; foundations of sociological research strategies and techniques.

541 Collective Behavior, Social Movements, Social Change (3) Basic theory and research on conditions of social unrest in human collectivities and efforts of collectives to change existing society.

543 Sociology of Development (3) Sociological theories and studies of development: modernization, colonialism, dependency; comparative impact of various development paths upon selected aspects of social structure and change.

551 Juvenile Delinquency and the Social Structure (3) This course examines how juvenile delinquency policies are shaped by social structures and changes in social perceptions of childhood, crime, and punishment.

560 Environmental Sociology (3) Systematic treatment of current research in environmental sociology. Social impact analysis and conflicts over environmental issues.

562 Sociology of Environmental Policy (3) Examines the history of environmental use and environmental protection; the policy process; the institutional and cultural barriers to improved environmental policies; and potential policies for sustainability.

585 Seminar in Gerontology (1) (See Health 585.)
Repeatability: May be repeated. Maximum 6 hours.

591 Foreign Study (1-15)
Repeatability: May be repeated. Maximum 15 hours.

592 Off-Campus Study (1-15)
Repeatability: May be repeated. Maximum 15 hours.

593 Independent Study (1-15)
Repeatability: May be repeated. Maximum 15 hours.

599 Readings (3) Selected topics.
Repeatability: May be repeated. Maximum 6 hours.

600 Doctoral Research and Dissertation (3-15)
Graduation Restriction: P/NP only.
Repeatability: May be repeated.

622 Sociological Theory II (3) Distinct schools of sociological theory and contributions of their principal exponents.
( DE) Prerequisite(s): 521 or consent of instructor.

629 Supplementary Readings in Sociological Theory (3) Individual guidance. Preparation for comprehensive examination.
Graduation Restriction: Satisfactory/No Credit grading only.
Registration Permission: Consent of instructor.

633 Survey Design and Analysis (3) Systematic exploration of survey problems through student participation in design and analysis of survey.
( Same as Child and Family Studies 633.)
( DE) Prerequisite(s): 531 or consent of instructor.

636 Field Research (3) Research experience in selected field sites using techniques of interviewing, participant observation, and other methods of field research.
( DE) Prerequisite(s): 531 or consent of instructor.

639 Supplementary Readings in Methodology (3) Individual guidance. Preparation for comprehensive examination.
Graduation Restriction: Satisfactory/No Credit grading only.
Registration Permission: Consent of department.

644 Political Sociology (3) Critical examination of theories of state and political processes.

645 Advanced Studies in Political Economy (3) Topical seminar.
Repeatability: May be repeated. Maximum 6 hours.
( DE) Prerequisite(s): 504 or consent of instructor.

649 Supplementary Readings (3)
Graduation Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

653 Sociology of Law (3) Intensive examination of selected topics in sociology of law.
( DE) Prerequisite(s): 505 or consent of instructor.

655 Advanced Studies in Criminology (3) Intensive examination of selected topics in criminology.
( DE) Prerequisite(s): 505 or consent of instructor.

661 Environmental Theory (3) Historical and contemporary studies of interaction between humans and their environment.
Registration Permission: Consent of instructor.

665 Advanced Topics in Environmental Sociology (3) Topical seminar covering particular lines of research and theory within area.
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

675 Advanced Studies in Social Psychology (3) Selected contemporary research issues related to social psychological theories.
Repeatability: May be repeated. Maximum 6 hours.
( DE) Prerequisite(s): 541 or consent of instructor.

695 Advanced Special Topics (3) Topic of special interest or student-initiated courses that will not be regularly offered.
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

699 Tutorials in Advanced Topics (3) Individual instruction.
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of department.
Spanish (924)

421 Phonetics (3)
(DE) Prerequisite(s): 323 or consent of instructor.

422 Advanced Grammar and Translation (3) Structure of the grammatical system of Spanish. In-depth analysis of selected syntactic phenomena with practical illustration/application and exercise in Spanish-English and English-Spanish translation. Emphasis on finer points of grammatical structures.
(DE) Prerequisite(s): 323. Comment(s): Not available to native or bilingual students of Spanish without consent of department.

423 Advanced Composition and Conversation (3) Develops writing and speaking skills to the advanced level, covering a wide range of topics and situations and including a variety of in-class and extra-class activities.
(DE) Prerequisite(s): 323 or consent of department.

425 Introduction to Descriptive Linguistics (3) (See French 425.)

426 Methods of Historical Linguistics (3) (See German 426.)

429 Romance Linguistics (3) (See French 429.)

430 Topics in Hispanic Linguistics (3) Introduction to the study of the Spanish language through different areas of linguistics such as phonology, morphology, syntax, semantics, sociolinguistics, dialectology, and second language acquisition. (Same as Linguistics 431.)
Repeatability: May be repeated with consent of department. Maximum 6 hours.

433 Images of Woman in Hispanic Literature (3) Examines major Hispanic texts (and/or women authors) in light of the relation of female individuality to a particular social context, the role of women in society, patriarchal tradition, woman as cultural and aesthetic value (the feminine symbolic), and feminist theoretical issues.
(DE) Prerequisite(s): 323, 330, and completion of 9 additional hours of upper-division Spanish.

434 Hispanic Culture through Film (3) Analysis of selected films on subjects concerning life, culture, and artistic traditions in the Hispanic world; exploration of ideological, philosophical, social, and political implications of films and a comparison of them with treatments of related subjects in other types of artistic production. Taught in Spanish. (Same as Cinema Studies 434.)
Repeatability: May be repeated with consent of department. Maximum 6 hours.

461 Special Topics (3) Focus on aspects of Hispanic literature, culture, linguistics, or foreign language pedagogy. Topics vary.
Repeatability: May be repeated with consent of department. Maximum 6 hours.

465 Latin American Film and Culture (3) Explores Latin American and Latino/a films and videos from 1900s to present as works of art and in light of political, cultural, and social contexts. Taught in English. (Same as Cinema Studies 465; Latin American Studies 465.)
Contact Hour Distribution: 1 hour lecture, 2 hours screening, and 1 hour discussion.

479 Disenchedted Texts in Hispanic Literature (3) Texts representing trends and periods of renewal in Spain and Latin American countries. Selected topics on traditions in crisis. Content will vary. (Same as Latin American Studies 479.)
Repeatability: May be repeated with consent of department. Maximum 6 hours.

480 Social Forces in Hispanic Literary Expression (3) Analysis of major Hispanic texts that address factors and events that influenced and/or continue to influence social and cultural evolution of the Hispanic world, including literature itself.
Repeatability: May be repeated with consent of department. Maximum 6 hours.

482 Trends in Hispanic Thought (3) Intellectual/philosophical currents represented in literary works, selected thinkers, or movements from historical periods of Spain and Latin American countries.
Repeatability: May be repeated with consent of department. Maximum 6 hours.

484 Race, Ethnicity, and Nation in Hispanic Literature (3) Close reading and analysis of literary texts that deal with issues of race and ethnicity in the Hispanic world, especially with regard to identity and concepts of nationhood. Among possible course topics – mestizaje; conceptual distinctions between race and ethnicity in Latin America; indigenismo; afrocentrism; issues of modernity and empire; and relationship between Jews, Christians, and Moors in Spain.
Repeatability: May be repeated with consent of department. Maximum 6 hours.

486 Literary and Artistic Movements in the Hispanic World (3) Examination of relationships (thematic, cultural, socio-political, aesthetic, philosophical, etc.) between specific trends in literature and other artistic media, in light of historical contexts in which those relationships emerged.
Repeatability: May be repeated with consent of department. Maximum 6 hours.

489 Topics in Hispanic Civilization (3) Analysis of major trends, issues and/or movements in the civilizations of Spain and Spanish America. Political, literary, and cultural perspectives dealing with topics from the Middle Ages to present day may be explored.
Repeatability: May be repeated with consent of department. Maximum 6 hours.

500 Thesis (1-15) Grading Restriction: P/NP only. Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Credit Restriction: May not be used toward degree requirements.

512 Teaching a Foreign Language (3) Practical application of methods for teaching and evaluating basic language skills and cultural aspects through seminars, demonstrations, peer teaching, and observation of foreign language classes. Required of all MA and PhD students holding Graduate Teaching Assistantships, except those whose previous training or experience warrants their being excused by the department.

531 Old Spanish (3) Evolution of Spanish language from its origins through the 15th century.

532 Medieval Spanish Literature (3) Literary works of the 11th through 15th century. Application of literary theories to understanding of literature, nature and evolution of major literary genres during Spanish Middle Ages, and socio-historical contexts of medieval works.
Repeatability: May be repeated with consent of department. Maximum 6 hours.

533 Golden Age Prose (3) Wide range of prose fiction in Spain during the 16th and 17th centuries: Moorish, picaresque, sentimental, pastoral and exemplary novels, and dialogues.

534 Don Quijote (3) Cervantes’ masterpiece in socio-cultural and literary context of its times: study of thematic, structural, and stylistic issues: crisis of aristocracy, Quixotic madness, discrepant cognitive and ethical perspectives, satiric irony, culture of sentiment, and Cervantes’ legacy to subsequent literary periods. Content varies.
Repeatability: May be repeated with consent of department. Maximum 6 hours.

535 Golden Age Poetry (3) Garcilaso, Fray Luis de León, San Juan de la Cruz, Lope de Vega, Quevedo, and Góngora.

537 Golden Age Drama (3) Major dramatists of period: Lope de Vega, Tirso de Molina, Ruiz de Alarcón, Guillén de Castro, Calderón de la Barca, Moreto, and Rojas Zorrilla.

Repeatability: May be repeated with consent of department. Maximum 6 hours.

541 19th-Century Spanish Prose (3) Costumbrismo, realism, and nativism in the novel, short story, and essay as represented in major authors: Larra, Mesonero Romanos, Fernán Caballero, Alarcón, Valera, Palacio Valdés, Pereda, Galdós, Pardo Bazán. Content varies.
Repeatability: May be repeated with consent of department. Maximum 6 hours.

542 20th-Century Spanish Literature: Generation of ‘98 through Civil War (3) Principal achievements and representative directions in literature of Spain through Civil War years.

543 20th-Century Spanish Literature: Post-Civil War through Present (3) Principal achievements and representative directions in literature of Spain from Post-Civil War period to present.
550 Techniques of Literary Analysis and Research Methods (3) Theoretical and critical essays on various techniques of literary analysis. Exploration of bibliographical and research materials.

551 Special Topics in Hispanic Literature or Linguistics (3)
Repeatability: May be repeated. Maximum 6 hours.

552 Directed Readings (3)

561 Spanish American Colonial Literature (3) From the pre-Columbian era through the 18th century. Reading and analysis of selected works from the Colonial Spanish American period and their Continental sources. Indigenous texts and authors. Content varies.
Repeatability: May be repeated with consent of department. Maximum 6 hours.

Repeatability: May be repeated with consent of department. Maximum 6 hours.

571 Spanish American Narrative: Criollismo to 1950 (3) Critical study of major trends and movements that shaped Spanish American narrative during the first half of 20th century. Content varies.
Repeatability: May be repeated with consent of department. Maximum 6 hours.

572 Spanish American Narrative: Boom to Present (3) Critical study of major trends and movements that established Spanish American narrative as influential force in world literature during the second half of the 20th century. Content varies.
Repeatability: May be repeated with consent of department. Maximum 6 hours.

573 Regional Approaches to Interpreting Spanish American Literature (3) Interpretation of Spanish-American literature taking into consideration regional differences attributable to such factors as race, geography, immigration, and economic development. Key regions include Mexico and Central America, Caribbean, Andean countries, and the Southern Cone. Course readings vary between specific regional perspective and transregional one. Content varies.
Repeatability: May be repeated with consent of department. Maximum 6 hours.

575 Spanish American Modernismo and Vanguardismo (3) Critical study of principal writers and literary works associated with Spanish American modernismo and vanguardismo published between 1880 and 1950. Concepts and expressions of modernity as reflected in literature of period. Content varies.
Repeatability: May be repeated with consent of department. Maximum 6 hours.

576 Contemporary Spanish American Poetry (3) Critical study of major poets in Spanish America from 1950 to present. Content varies.
Repeatability: May be repeated with consent of department. Maximum 6 hours.

577 Contemporary Spanish American Theater (3) Reading and analysis of Spanish America’s major dramatic works published and performed since 1950. Content varies.
Repeatability: May be repeated with consent of department. Maximum 6 hours.

Repeatability: May be repeated with consent of department. Maximum 6 hours.

579 Spanish American Literary Criticism (3) Major works in which Spanish Americans have developed strategies to define, organize, and catalog literature published throughout continent. Critical approaches that surpass European and other non-Spanish American critical perspectives. Content varies.
Repeatability: May be repeated with consent of department. Maximum 6 hours.

591 Foreign Study (1-15)
Repeatability: May be repeated. Maximum 15 hours.

592 Off-Campus Study (1-15)
Repeatability: May be repeated. Maximum 15 hours.

593 Independent Study (1-15)
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 15 hours.

600 Doctoral Research and Dissertation (3-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

621 Seminar in Spanish Literature or Linguistics (3) Topics vary in field of Peninsular literature.
Repeatability: May be repeated with consent of department. Maximum 9 hours.

631 Seminar in Spanish American Literature or Linguistics (3) Topics vary.
Repeatability: May be repeated with consent of department. Maximum 9 hours.

Special Education (932)

410 Early Childhood Special Education Foundations (3) Introduction to the field of early childhood special education, including the nature of disabling conditions; theoretical perspectives in the field; legislation; policies and procedures used in the field.

419 Psychology and Education of Students with Mild Disabilities (6) Nature and characteristics of persons with mild handicaps and educational strategies appropriate for these persons.
(DE) Prerequisite(s): 402.
(DE) Corequisite(s): 420.
Comment(s): Admission to teacher education required.

420 Field Experience in Special Education Programs (3) Practicum in teaching special education programs. Planning, developing, implementing, and evaluating instruction.
Grading Restriction: Satisfactory/No Credit grading only.
(DE) Prerequisite(s): 402.
(DE) Corequisite(s): 419 and/or 471.
Comment(s): Admission to teacher education required.

431 Field Experience in Comprehensive Programs (3) On-site teaching experience with moderately and severely handicapped children and youth.
Grading Restriction: Satisfactory/No Credit grading only.
(DE) Prerequisite(s): 463.
(DE) Corequisite(s): 432.
Comment(s): Admission to teacher education required.

432 Psychology and Education of Students with Moderate/Severe Disabilities (6) Nature and characteristics of persons with moderate/severe disabilities and the educational strategies appropriate for those persons.
(DE) Prerequisite(s): 402.
(DE) Corequisite(s): 431.
Comment(s): Admission to teacher education required.

456 Speech and Language Basis of Learning Disabilities in the Classroom (3) Normal communication development. Understanding of speech and language impairments in school-age students. Integration of oral/written communication skills into existing curriculum, especially for high incidence special education students.

470 Psychology of the Exceptional Child (3) General characteristics and educational needs of exceptional children. Implications of developmental variations for functioning as adults.
Comment(s): Enrollment limited to non-special education majors.

471 Early Childhood Special Education (6) Assessment, curriculum planning and development and teaching approaches used in early childhood special education.
Comment(s): Admission to teacher education required.

504 Clinical Experience in Teaching and Supervision of Exceptional Children (3-9) (See Education of the Deaf and Hard of Hearing 504.)

506 Internships in Teaching in Special Education and Rehabilitation (3-15) Placement in professional settings in public schools or agencies under supervision of master practitioners.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 15 hours.
Comment(s): Enrollment limited to those in the fifth-year program.

553 Assessment of Exceptional Students (3) Current issues related to assessment; advanced study of evaluation models for special education; dynamic and other innovative assessment approaches; advanced study of application to educational programming; basic statistics and application in assessment.

554 Assessment in Early Childhood Special Education (3) Development of knowledge and skills in appropriate formal and informal assessments of handicapped infants and young children: screening, identification, diagnosis, placement and programming assessment issues.

555 Characteristics of Affective/Motivational Functioning in Children with Disabilities (3) Definition, methods, identification and symptoms of children with affective/motivational development in disabled youngsters. Comparison to normal development and that of children labeled disturbed or behavior disordered.

556 Instructional Systems for Affective/Motivational Education for Children with Disabilities (3) Educational strategies and models of instruction; simulation, demonstration, and media. Teaching techniques, materials, and teacher/pupil/family interactions. Therapeutic forms of education through art, music, role play, puppetry, bibliotherapy, and group interactions.
(DE) Prerequisite or (DE) Corequisite: 555 or consent of instructor.
557 Positive Preventive Discipline (3) Instructional, classroom and preventive/proactive strategies for use in classroom which positively effects efficiency of classroom. Research on how curriculum can encourage appropriate interactions of children and youth.  
Comment(s): Admission to graduate program required.

558 Neuromuscular and Health Disorders: Educational Implications (3) Neurological impairments, physical disabilities and special health conditions, autism. Investigation of instructional techniques and adaptations.

568 Early Childhood Special Education: Theories and Interventions (3) Theoretical perspectives of early childhood special education; exploration of workable models, family-focused concepts and curriculum development.

575 Creative Problem-Solving Strategies for Special Educators (3) Techniques for solving problems encountered by special educators in any setting.

586 Seminar in Research Techniques in Special Education (3) Evaluation of appropriate research methodologies with handicapped populations.


590 Application of Microcomputer Technology in Special Education and Vocational Rehabilitation (3) Application of microcomputer technology with all categories of exceptionalities and across all chronological and functioning age ranges. Microcomputer adaptive software, special switch access, authoring systems, telecommunication, and strategies for cognitive development.

620 Internship in Research in Special Education and Rehabilitation (3-9) Placement with professional engaged in theoretically-based research: public school, institutions, agencies or university settings.  
Grading Restriction: Satisfactory/No Credit grading only.  
Repeatability: May be repeated. Maximum 9 hours.  
Recommended Background: 9 hours in statistical research methods.

630 Internship in Institutional Leadership in Special Education and Rehabilitation (3-9) Advanced level field experiences under supervision of practitioner.  
Grading Restriction: Satisfactory/No Credit grading only.  
Repeatability: May be repeated. Maximum 9 hours.  
Registration Permission: Consent of instructor.

Sport Management (957)

460 Development and Revenue Generation in Sport (3) Designed to provide overview of theories, strategies, and techniques used in the production of revenue for sport organizations and through sporting events. Emphasis on developing balanced, multifaceted programs that target a variety of constituencies in the sport industry.

500 Thesis (1-15)  
Grading Restriction: P/NP only.  
Repeatability: May be repeated.  
Registration Restriction(s): Master of Science – sport management major.

501 Special Project (3) Culminating experience for non-thesis major. Research study suitable for publication, or practicum requiring special written work.  
(DE) Prerequisite(s): 532.  
Registration Restriction(s): Master of Science – sport management major.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.  
Grading Restriction: Satisfactory/No Credit grading only.  
Repeatability: May be repeated.  
Credit Restriction: May not be used toward degree requirements.  
Registration Restriction(s): Master of Science – sport management major.

511 Administration/Supervision in Sport (3) Development of knowledge and analytic skills desirable for managers/administrators in sport business/organization: organizational, administrative, and supervisory strategies related to sport in profit and non-profit settings.  
Registration Restriction(s): Master of Science – sport management major.

512 Application of Legal Concepts to Sport Settings (3) Application of contract law, breach of contract, and monetary damages within sport settings: risk assessment and development of effective risk management strategies; development of contracts in sports; and analysis of cases involving discrimination based upon gender, race, and age as well as protection of rights at amateur and professional levels of sport.  
Registration Restriction(s): Master of Science – sport management major.

530 Sport and Media Issues (3) Gender and race issues within context of media and sport. Development of sport media and media influence on sport.  
Registration Restriction(s): Master of Science – sport management major.

532 Research Techniques in Sport (3) Evaluate, compare, and contrast research techniques in sport with consideration for and experiences in appropriate review, design, analysis procedures, and proposal development.  
Grading Restriction: Satisfactory/No Credit grading only.  
Repeatability: May be repeated. Maximum 9 hours.  
Registration Restriction(s): Master of Science – sport management major.

533 Research Methods in Sport (3) Advanced study in research methods for sport management. Development of research study.  
Grading Restriction: Satisfactory/No Credit grading only.  
Repeatability: May be repeated. Maximum 9 hours.  
Registration Restriction(s): Master of Science – sport management major.

535 Ethics in Sport Management (3) Development of analytical skills and knowledge desirable of middle and upper level managers in sport business/organizations. Social issues and ethics in sport administration.  
Registration Restriction(s): Master of Science – sport management major.

540 Sport Economics and Finance (3) Principles of economics and finance as applied to sport organizations. Market structures of sport finance and political economics that form those structures.

544 Theories of Leadership and Leader Behavior in Sport (3) Integration of various theoretical approaches to leadership styles in sport administration within cultural contexts, research, and field experiences.  
Registration Restriction(s): Master of Science – sport management major.

553 Case Studies in Sport Management (3) Current issues and problems in sport administration at all levels of amateur and professional sport.  
Repeatability: May be repeated if topic differs. Maximum 9 hours.

554 Readings in Sport Management (3) Survey of pertinent literature in refereed and applied journals and texts.  
Registration Restriction(s): Master of Science – sport management major.

555 Evaluation Techniques for Sport Managers (3) Review and application of techniques of evaluation appropriate for sport programs, facilities, and personnel.  
Registration Restriction(s): Master of Science – sport management major.

560 Sport Governance (3) Principles of organizational governance theories as applied to sport organizations. Review of history, mission, and structure, administrative and legislative processes of amateur and professional governing bodies in sport.  
Registration Restriction(s): Master of Science – sport management major.

570 Event Management (3) Review of current research related to theory and practice in event management and involvement in management capacity with one or more special events.  
Registration Restriction(s): Master of Science – sport management major.

580 Special Topics (1-3) Advanced study in selected disciplinary or professional areas of physical education and/or sport.  
Repeatability: May be repeated. Maximum 6 hours.  
Registration Restriction(s): Master of Science – sport management major.

590 Practicum (3) Practical experience in areas of major interest.  
Grading Restriction: Satisfactory/No Credit grading only.  
Repeatability: May be repeated. Maximum 6 hours.  
Registration Restriction(s): Master of Science – sport management major.

593 Independent Study (1-3)  
Repeatability: May be repeated. Maximum 6 hours.  
Registration Restriction(s): Master of Science – sport management major.

595 Internship (3) Full-time application of previous theoretical and applied knowledge and skills in appropriate sport setting.  
Grading Restriction: Satisfactory/No Credit grading only.  
Registration Restriction(s): Master of Science – sport management major.

Sport Studies (959)

490 Psychology of Coaching (3) Major topics and theories dealing with the social-psychological factors affecting the performance of athletes and teams, with practical suggestions for enhancing the effectiveness of teachers and coaches.

500 Thesis (1-15)  
Grading Restriction: P/NP only.  
Repeatability: May be repeated.  
Registration Restriction(s): Master of Science – sport management major.

501 Special Project (3) Research study suitable for publication, or practicum requiring special written work.  
Registration Restriction(s): Master of Science – sport management major.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.  
Grading Restriction: P/NP only.  
Repeatability: May be repeated.  
Registration Restriction(s): Master of Science – sport management major.
505 History of Olympics: Ancient and Modern (3) Examination of various aspects of ancient and modern Games. Ancient Olympics 776 BC to 393 AD: Panhellenic Games. Modern Olympics, 1896 to date: political, social class, gender, and economic issues that influence Games.
Comment(s): Requires admission to the sport studies major or consent of instructor.


514 Advanced Philosophy of Sport (3) Major philosophical theories of sport. Various conceptual, moral, aesthetic, and social-political issues.
Comment(s): Requires admission to the sport studies major or consent of instructor.

515 Social Theories of Sport (3) Liberal, democratic and Marxist social theories of sport.
Comment(s): Requires admission to the sport studies major or consent of instructor.

533 Psychology of Sport (3) Social psychological factors influencing human behavior in a sport context; discussion of contemporary theory, research, and methodology.
(DE) Prerequisite(s): General psychology course or consent of instructor.
Recommended Background: Requires admission to the sport studies major or consent of instructor.

534 Motor Behavior and Skill Acquisition (3) Topical explanation and application of principles of human movement behavior to acquisition and performance of skills; discussion of current research and methodology.
Comment(s): Requires admission to the sport studies major or consent of instructor.

535 Health and Exercise Psychology (3) Study and cultural critique of various aspects of health and exercise psychology.
Comment(s): Requires admission to the sport studies major or consent of instructor.

536 Expert Performance in Sports (3) Examines expertise in athletic performance with a primary focus on the development and maintenance of expertise. Special emphasis is placed on theoretical and practical perspectives on the study of sport expertise as they intersect with issues regarding sport psychology, race, aging, gender, or other socio-cultural factors.
Comment(s): Requires admission to the sport studies major or consent of instructor.

538 Professional Practice Issues in Sport Studies (3) Study and cultural critique of various aspects of professional practice in sport studies.
Comment(s): Requires admission to the sport studies major or consent of instructor.

539 Research Development in Sport Psychology: Idea Formation to Data Collection (3) First of a two-semester sequence designed to familiarize students with research process in applied sport psychology. Includes idea formation, critical review of related literature, development of a research question and methodology, and data collection.
Comment(s): Requires admission to the sport studies major or consent of instructor.

540 Research Development in Sport Psychology: Data Analysis to Manuscript Submission (3) Second of a two-semester sequence designed to familiarize students with research process in applied sport psychology. Includes data analysis, manuscript preparation and manuscript submission.
Comment(s): Requires admission to the sport studies major or consent of instructor.

542 Sociological Aspects of Sport (3) Social and cultural factors influencing sport and physical education. Pertinent issues and research applications.
Comment(s): Requires admission to the sport studies major or consent of instructor.
Registration Permission: Consent of instructor.

543 Women, Sport, and Culture (3) Critical examination of experiences of girls/women in American sports from a socio-cultural perspective with particular emphasis on the constructs of gender, race, class, and sexuality. Explores theories from sport, feminist, race, and cultural studies. (Same as Women’s Studies 543.)

593 Independent Study (1-3) Grading: Satisfactory/No Credit or letter grade. Repeatability: May be repeated. Maximum 9 hours.

594 Supervised Readings (1-3) Grading: Satisfactory/No Credit or letter grade. Repeatability: May be repeated. Maximum 6 hours.

595 Special Topics (1-3) Advanced study in selected aspects of sport studies.
Grading: Satisfactory/No Credit or letter grade. Repeatability: May be repeated. Maximum 9 hours.
Comment(s): Requires admission to the sport studies major or consent of instructor.

600 Doctoral Research and Dissertation (3-15) Grading Restriction: P/NP only. Repeatability: May be repeated.

601 Research Seminar (1) (See Exercise Science 601.)

633 Advanced Sport Psychology (3) Analysis, synthesis, and discussion of contemporary theory and topics; research development and production in sport psychology.
Repeatability: May be repeated. Maximum 9 hours.
Comment(s): Requires admission to the sport studies major or consent of instructor.

681 Practicum (1-3) Intern experience in areas of major interest.
Repeatability: May be repeated. Maximum 6 hours.
Comment(s): Requires admission to the sport studies major or consent of instructor.

693 Independent Study (1-3) Grading: Satisfactory/No Credit or letter grade. Repeatability: May be repeated. Maximum 6 hours.

694 Supervised Reading (1-3) Grading: Satisfactory/No Credit or letter grade. Repeatability: May be repeated. Maximum 6 hours.

695 Special Topics (1-3) Study for doctoral students in selected aspects of sport studies.
Grading: Satisfactory/No Credit or letter grade. Repeatability: May be repeated. Maximum 9 hours.

Statistics (962)

(DE) Prerequisite(s): 320.

(DE) Prerequisite(s): 330.

500 Thesis (1-15) Grading Restriction: P/NP only. Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated.

531 Survey of Statistical Methods I (3) Univariate and bivariate data collection and organization, statistical estimation and hypothesis testing; analysis of relationships for categorical and numerical data, including Chi-square tests and simple linear and quadratic regression. Use of computing facilities required.
Credit Restriction(s): Students may not receive credit for both 531 and 532.
Recommended Background: 1 year of college mathematics.

532 Survey of Statistical Methods II (3) Multiple linear regression, including use of dummy variables; single and multiple factor analysis of variance and covariance; issues in experimental design and analysis. Use of computing facilities required.
(DE) Prerequisite(s): 531.

537 Statistics for Research I (3) Principles and application of statistical methodology, integrated with considerable use of major statistical computing system. Probability and probability distributions, forming and testing hypotheses using parametric and nonparametric inference methods. Matrix-based simple linear regression and correlation.
Credit Restriction(s): Students may not receive credit for both 537 and 531.
Recommended Background: 1 year of undergraduate mathematics and 1 undergraduate statistics course.
538 Statistics for Research II (3) General linear model as applied to multiple regression and analysis of variance. Diagnostic and influence techniques. One-way, factorial, blocking, and nested designs, preplanned versus post-hoc contrasts. Random factors and repeated measures.
(DE) Prerequisite(s): 537 or 532.

560 Introduction to Mathematical Statistics (3) Probability, probability distributions, simulation of random variables, sampling distributions, central limit theorem, testing of hypotheses, confidence intervals, maximum likelihood methods, Bayesian methods.
Credit Restriction: Not for credit for MS with a major in statistics or management science.
(DE) Prerequisite(s): Mathematics 241.
Comment(s): A course equivalent to Mathematics 241 also is acceptable.

561 Introduction to Computing for Data Management and Analysis (1) The University of Tennessee, Knoxville, computing environment for beginning statistics graduate students. Use of operating system commands, system editor, utility programs and SAS statistical package for data entry and editing, file management and statistical analysis. Use of UTCC computing facilities required.
(DE) Prerequisite(s): 531 and 537 or 571 or consent of instructor.

563 Statistical Inference I (3) Basic probability and probability models; random variables and distributional models; kernel density estimation; cubic splines; likelihood inference and maximum likelihood estimation and model fitting with information criteria; moment and moment generating functions; functions of random variables; goodness of fit tests and quantile modeling of distributions.
(DE) Prerequisite(s): Mathematics 241.
Registration Permission: Prerequisite(s) or consent of instructor required.

564 Statistical Inference II (3) Sampling distributions; point and interval estimation; fixed width entropy confidence intervals; likelihood theory; Fisher information and its inverse; large sample, deviance, and bootstrap confidence intervals; Bayesian estimation and hypothesis testing; informative approach to hypothesis testing; uniformly most powerful and likelihood ratio tests, theory of linear models, estimation, model building and inference.
(DE) Prerequisite(s): 563.

566 Statistical Techniques in Industrial Processes (3) Applications of control charts and other statistical techniques in industrial setting. Attributes and variables control charts, process capability analysis, aspects of sampling, statistical tolerancing, estimation of variance components, problems of measurement, special industrial applications.
(DE) Prerequisite(s): 571 or equivalent.

(DE) Prerequisite(s): 563 or Mathematics 425.

571 Statistical Methods (3) Data collection strategies. Descriptive statistics. Probability distributions, simulation of random variables, sampling distributions. Estimation and hypothesis testing, regression, Chi-Square test for categorical data, simple design of experiments, nonparametric methods. Use of statistical software.
Recommended Background: 1 year of calculus and a statistics course.

(DE) Prerequisite(s): 571 and matrix algebra.

(DE) Corequisite: 572.

574 Data Mining Methods and Applications (3) Understanding and application of data mining methods. Data preparation; exploratory data analysis and visualization; cluster analysis; logistic regression; decision trees; neural networks; association rules; model assessment; and other topics. Applications to real world data. Use of standard computer packages.
(DE) Prerequisite(s): 532 or 538 or 571 or consent of instructor.

575 Applied Time Series (3) Fundamental concepts of time series analysis: Box-Jenkins approach, stationary and nonstationary models, forecasting model identification, seasonal models, transfer function models, and spectral theory.
(DE) Prerequisite(s): 538 or 572 or consent of instructor.

Recommended Background: 1 year of graduate-level statistics and regression analysis and analysis of variance or consent of instructor.

(DE) Prerequisite(s): 538 or knowledge of regression and analysis of variance.

583 Special Topics in Applied Statistics (1-3) Repeatability: May be repeated. Maximum 9 hours.

585 Principles of Statistical Process Management (1-3) Statistical and other techniques applied to management of organizational processes.
Repeatability: Not Repeatable. May be taken once for 1-3 hours.
Registration Permission: Consent of department head.

587 Graduate Seminar (1) Directed readings and active participation in colloquium program of Department of Statistics and of student’s minor program.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 2 hours.
Registration Permission: Consent of departmental director of graduate studies.

592 Internship (1-6) Supervised off-campus experience in application of statistical principles and methods in business, industry, or government.
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 6 hours.
Recommended Background: 4 courses in graduate-level statistics or consent of departmental director of graduate studies.

593 Independent Study (2-6) Faculty directed readings and investigation of specified topic in probability or statistics. Written report and oral presentation required.
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 6 hours.
Recommended Background: 2 courses in statistics.
Registration Permission: Consent of the departmental director of graduate studies.

595 Statistical Consulting Practicum (1-6) Supervised experience helping on-campus researchers plan, manage data, and develop and perform analyses specific to designs and hypotheses. Discussion of activities in regular seminar meetings. Final written reports and/or detailed diaries required.
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): 572 or 538.

600 Doctoral Research and Dissertation (3-15) Supervised research experience for doctoral students.
Grading Restriction: P/NP only.
Repeatability: May be repeated.

606 Computational Methods in Statistics (3) Up-to-date computational methods in statistics: open architecture interactive computational languages supplemented by other statistical packages with graphical capabilities. Statistical computing, numerical methods for linear models and generalized linear models, nonlinear statistical methods, matrix computations and special matrices, essentials of Monte Carlo simulation, and re-sampling techniques.
Recommended Background: Knowledge of programming language and 572 or consent of instructor.

(DE) Prerequisite(s): 564 and Mathematics 445.

664 Advanced Statistics Theory II (3) Testing statistical hypotheses, Bayesian methods and estimation, linear model theory and model selection.
(DE) Prerequisite(s): 663.

(DE) Prerequisite(s): 564 and 566.
673 Advanced Topics in Design of Experiments and Linear Models (3) Experimentation for product and process improvement: response surface methodology and robust design methods; mixture experiments; optimal design topics; distribution theory and inference for linear models. (DE) Prerequisite(s): 573 or consent of instructor.


677 Statistical Modeling (3) Modern techniques of statistical modeling: predictive, likelihood, Bayesian, and information-based model selection and evaluation paradigms. Application of techniques in various types of models for both continuous and discrete data modeling problems. Interactive computational tools. (DE) Prerequisite(s): 564 and 572 or 538 or consent of instructor.

679 Multivariate Statistical Modeling (3) Modern information based techniques and model selection in multivariate analysis, informational tests of significance with multivariate data, multivariate analysis of variance, multivariate regression and variable selection, multisample cluster analysis, common principal component model, factor analysis model, covariance structural models with latent variables, mixture-model cluster analysis. Recommended Background: Matrix algebra and 564 or matrix-based linear models with experience in interactive computing or consent of instructor.

683 Special Topics in Statistics (1-3) Presentation of specialized topics in statistics. Repeatability: May be repeated. Maximum 6 hours.

691 Graduate Seminar in Applied Statistics (3) Reading of literature and discussion of open problems of importance to industry: design of experiments, modeling, process control, regression, and reliability. Grading: Satisfactory/No Credit or letter grade. Registration Permission: Consent of instructor.

693 Independent Study (1-6) Directed research on subject of mutual interest to student and faculty member. Repeatability: May be repeated. Maximum 6 hours.

Theatre (976)

420 Special Studies in Acting (3) Exercises in selected concentrated areas such as styles, techniques, approaches, e.g., Shakespeare, movement, humor. Content varies. Repeatability: May be repeated. Maximum 9 hours. (DE) Prerequisite(s): 320. Registration Permission: Consent of instructor.

425 Advanced Musical Theatre (3) Study and practice of musical theatre material, including dance and vocal work. (DE) Prerequisite(s): 325.

430 Principles of Play Directing (3) Problems in composition, picturization, rhythm, and movement. (DE) Prerequisite(s): 220. Comment(s): 430 and 431 must be taken in sequence.

431 Principles of Play Directing (3) Problems in composition, picturization, rhythm, and movement. (DE) Prerequisite(s): 220. Comment(s): 430 and 431 must be taken in sequence.

446 Costume Patternning (3) Draping patterns for period costumes. Includes corsery and the study of historic patterns 1500-1900. (DE) Prerequisite(s): 345 or consent of instructor.

450 Special Studies in Entertainment Technology (1-3) Content varies. Repeatability: May be repeated. Maximum 9 hours. Registration Permission: Consent of instructor.

452 Entertainment Technology II (3) Automation systems in live entertainment, including advanced rigging and flying for stage and film. (DE) Prerequisite(s): 352 or consent of instructor.

454 Scenery Painting (2) Introduction to materials, techniques, and principles of the craft. Emphasis on gaining skill and understanding through studio experience. Registration Permission: Consent of instructor.

456 Scenic Design II (3) Advanced studies in set design. (DE) Prerequisite(s): 355 or consent of instructor.

462 Lighting Design II (3) Advanced lighting design theory and practice. Lab and project intensive. (DE) Prerequisite(s): 362 or consent of instructor.

464 Computer Aided Drafting for the Theatre (3) Introduction to entertainment drafting. Emphasis on 2-D graphical standards, drafting techniques, and drawing layout and presentation.

470 Playwriting (3) Advanced instruction in writing of plays. Registration Permission: Consent of instructor.

491 Foreign Study (1-15) Repeatability: May be repeated. Maximum 15 hours.

492 Off-Campus Study (1-15) Repeatability: May be repeated. Maximum 15 hours.

493 Independent Study (1-15) Repeatability: May be repeated. Maximum 15 hours.

501 Introduction to Graduate Research in Theatre (3) Research tools and methods for theatre artist and scholar.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Credit Restriction: May not be used toward degree requirements.

503 Elements of Design for the Theatre (3) Analysis of the principles of design through visual, structural, and emotional relationships.

510 Studies in Theatre History (3) Intensive study of selected topics in theatre history. Repeatability: May be repeated. Maximum 9 hours.

512 Dramatic Literature Analysis (3) Dramaturgical strategies of major playwrights, using variety of analytical approaches from Aristotelian to deconstruction.

520 Master Class in Performance: Acting (3) Master class in acting techniques. Repeatability: May be repeated. Maximum 18 hours. Comment(s): Theatre MFA students only.

523 Master Class in Performance: Movement (3) Master class in movement techniques. Repeatability: May be repeated. Maximum 18 hours. Comment(s): Theatre MFA students only.

525 Master Class in Performance: Voice (3) Master class in voice and speech techniques. Repeatability: May be repeated. Maximum 18 hours. Comment(s): Theatre MFA students only.

536 Projects in Play Directing (3) Practical work in play direction involving various lengths and kinds of scripts. Repeatability: May be repeated. Maximum 9 hours.

542 The Social History of Costume (3) Study and analysis of costume as related to society’s manners and mores, architecture and furniture.


545 Millinery for the Stage (2) Pattern making and construction techniques for hats from antiquity to present. Registration Permission: Consent of instructor.

547 Painting and Dyeing for the Theatre (3) Fibers, dyes and dye processes; color matching and distressing.

549 Projects in Costume Technology (1-3) Individualized studies in costume technology in theatre production. Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of instructor.

550 Special Studies in Entertainment Technology (1-3) Content varies. Repeatability: May be repeated. Maximum 9 hours. Registration Permission: Consent of instructor.

555 Model Building (3) Techniques of model building for scenic designer. (DE) Prerequisite(s): 401 and 1 semester of 580. Comment(s): Theatre MFA students only.
556 Drafting (3) Drafting techniques for scenic designer.
Comment(s): Theatre MFA students only.

560 Lab Analysis of Realized Lighting Design (3) Realized lighting design projects from concept meeting through opening night.
Repeatability: May be repeated. Maximum 18 hours.
Registration Permission: Consent of instructor.

564 Advanced Computer Aided Drafting for the Theatre (3) Advanced drafting techniques. Emphasis on 3-D solid modeling, rendering, and publication.
(DE) Prerequisite(s): 464 or consent of instructor.

580 Design Seminar (1-6) Analysis, research, interpretation, and design of plays in a cross-disciplinary environment.
Repeatability: May be repeated. Maximum 18 hours.

584 Photography for the Theatre (3) Photographic techniques for shooting live performance events under challenging lighting environments.
Registration Permission: Consent of instructor.

585 Production Workshops (1-6) Directed experience in production collaborations.
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of instructor.

587 Computer Aided Rendering for the Theatre (3) Computer rendering programs and their use by theatrical designers.
Registration Permission: Consent of instructor.

593 Independent Study (1-3) Individual or group projects.
Repeatability: May be repeated. Maximum 15 hours.
Comment(s): Theatre MFA students only.
Registration Permission: Consent of instructor.

599 Project in Lieu of Thesis (1-6)
Repeatability: May be repeated. Maximum 9 hours.
Recommended Background: Minimum of 30 hours toward the MFA.
Registration Permission: Consent of instructor.

Theory and Practice in Teacher Education (978)

500 Thesis (1-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Credit Restriction: May not be used toward degree requirements.

503 Problems in Lieu of Thesis (2-3)
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 9 hours.

517 Trends and Issues in Education (3) Examination of contemporary trends and issues in education.

518 Educational Specialist Research and Thesis (3)
Grading Restriction: P/NP only.
Repeatability: May be repeated. Maximum 15 hours.

519 Curriculum for School Leaders (3) This course is designed to equip aspiring school leaders with practical and theoretical knowledge of various curriculum models that might be used to foster instructional leadership and enhance school improvement initiatives. Seminars, lectures, and inquiry-based approaches will be used.

526 Drama and Story Telling in Teaching (3) Use of techniques of drama and storytelling to improve impact of teaching and to teach more effectively.
Recommended Background: Classroom experience or admission to teacher education.

535 Inquiry Teaching and Learning (3) Use of children's and adolescent literature. Exploration of ways to create setting that invite learners to engage in inquiry learning and teaching.

540 Topics in Improvement of Instruction (3) Special conferences, workshops, and in-service programs.
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 6 hours.

542 Integrated Middle Grades Methods (6) Activities in this class are intended to promote the professional growth of pre-service and in-service middle grades teachers through study, design, and implementation of curriculum, instruction, and assessment strategies. In particular, methods of integrating language arts, mathematics, science, and social science content in grades 4-8 will be explored. The use of technology in supporting learning of middle grades content will also be an emphasis throughout.

543 Middle Grades: Concepts and Practices (3) Designed as the introductory course for students pursuing middle-level teacher licensure. Attention is focused on the decline of the junior high and rise of the middle school (typically grades 6-8), the programmatic components that characterize exemplary middle schools, and the philosophy that forms the foundation for this movement. Looks at the theories, research, and exemplary practice concerning the components of middle schools. Helps to prepare middle school professionals who understand the rationale for and the role of teachers in interdisciplinary teams, teacher-based advisory, flexible scheduling and grouping, and working with colleagues, families, resource persons, and community groups.

549 Secondary School Curriculum (3) Focus of this course is curriculum and instructional design for secondary school. Characteristics of students, curriculum designs, instructional patterns, and organization and structure of secondary schools will be studied.

550 Action Research and Practical Inquiry in Education (3) Principles of action research and practical inquiry for practitioners in early childhood and school settings and methods for conducting such inquiries in professional role.
Comment(s): Admission to graduate program required.

555 Curriculum Planning and Development (3) Focuses on foundations and principles of curriculum planning and development, historical analysis of curriculum theory, principles of planning and development, and classroom applications for improved learning.

558 Instructional Theory and Design (3) Focuses on the relationship of curriculum to instruction; examination of instructional and related learning theories; instructional models and teaching styles.

593 Independent Study (1-3)
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 12 hours.

594 Supervised Readings (1-3)
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 12 hours.

595 Special Topics (1-3)
Grading: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 24 hours.
Credit Restriction: Only 12 hours can be used to meet degree requirements.

596 Clinical Experience in Assessment and Instruction (3) Academic remediation applied in lab/field setting; tasks related to teaching: assessment, preparation of lessons, and delivery of instruction.
Grading: Satisfactory/No Credit or letter grade.
(DE) Corequisite(s): 553.

600 Doctoral Research and Dissertation (3-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.
Comment(s): Admission to candidacy required.

604 Trans-Departmental Seminar I (1) Introduction to doctoral programs in education: research requirements, academic integrity, the meaning of scholarship in academe and issues/problems in education.
Grading Restriction: Satisfactory/No Credit grading only.
Credit Restriction: May not be used to meet 600-level requirement.
Comment(s): Admission to a doctoral program or consent of the doctoral program coordinator required.

605 Trans-Departmental Seminar II (1) Seminar to prepare doctoral students for the final steps in completing a terminal degree including preparing for and completing qualifying exams, preparing a prospectus, and completing a dissertation.
Credit Restriction: May not be used to meet 600-level requirement.
(DE) Prerequisite(s): 604.

610 Internship in College Teaching and Supervision (3-9) Supervised practice in college teaching and supervision.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 9 hours.
Comment(s): Admission to doctoral program or consent of instructor required.

617 Advanced Studies in Education – An Interdisciplinary Perspective (3) Educational trends, issues, and policies related to curriculum and instruction, assessment, the organization and administration of schools, and preparation of educators for both K-12 and higher education settings.
Comment(s): Admission to doctoral program or consent of instructor required.
620 Research in Literacy, Language, and ESL Education (3) Recent trends and historical traditions in language and literacy research; analysis of nature of research methods used, questions asked and topics studied. Comment(s): Admission to doctoral program or consent of instructor required.


676 Curriculum Theory (3) The focus is on influential curriculum theories and approaches, implications for structure and design of educational programs, the nature and function of theory, and theory building activities. (RE) Prerequisite(s) 558.

689 Internship (1-3) Experiences in application of principles and practices of curriculum development and instructional improvement. Grading Restriction: Satisfactory/No Credit or letter grade. Repeatability: May be repeated. Maximum 9 hours. Recommended Background: Program prerequisites. Registration Permission: Consent of instructor.

693 Independent Study (1-3) Grading: Satisfactory/No Credit or letter grade. Maximum 12 hours.

694 Supervised Reading (1-3) Grading: Satisfactory/No Credit or letter grade. Repeatability: May be repeated. Maximum 12 hours.

695 Special Topics (1-3) Grading: Satisfactory/No Credit or letter grade. Repeatability: May be repeated. Maximum 12 hours.

Veterinary Medicine (987)

801 Application Based Learning Exercise (ABLE) I (1) Small group, student-centered learning sessions with faculty facilitator for self discovery of new information. Week-long sessions based on specific clinical case or problem, and integration of basic science and clinical material. Grading Restriction: Satisfactory/No Credit grading only.

802 Application Based Learning Exercise (ABLE) II (2) Small group, student-centered learning sessions with faculty facilitator for self discovery of new information. Week-long sessions based on specific clinical case or problem, and integration of basic science and clinical material. Grading Restriction: Satisfactory/No Credit grading only.

804 Application Based Learning Exercise (ABLE) and Clinical Exposure I (2) Week-long small group, student-centered learning sessions with faculty facilitator for self discovery of new information; based on specific clinical case or problem; integration of basic science and clinical material. One week of clinical experience through participation in specific clinical rotations in Veterinary Teaching Hospital. Grading Restriction: Satisfactory/No Credit grading only.

805 Application Based Learning Exercise (ABLE) and Clinical Exposure II (2) Week-long small group, student-centered learning sessions with faculty facilitator for self discovery of new information; based on specific clinical case or problem; integration of basic science and clinical material. One week of clinical experience through participation in specific clinical rotations in Veterinary Teaching Hospital. Grading Restriction: Satisfactory/No Credit grading only.

806 Application Based Learning Exercise (ABLE) and Clinical Exposure III (2) Week-long small group, student-centered learning sessions with faculty facilitator for self discovery of new information; based on specific clinical case or problem; integration of basic science and clinical material. One week of clinical experience through participation in specific clinical rotations in Veterinary Teaching Hospital. Grading Restriction: Satisfactory/No Credit grading only.

811 Infection and Immunity II – Bacteriology and Mycology (3) Fundamental aspects of microbiology and cell biology relevant to pathogenesis of bacterial and fungal diseases of animals; antimicrobial actions and mechanisms of bacterial resistance. General approaches to diagnosis, treatment and prevention.

813 Infection and Immunity I – Immunology (2) Basic biology and practical aspects of immunology: cells of immune system, immune function and dysfunction, immunophrophaxisis, diagnostic testing and specific diseases involving immune system.

814 Clinical Correlations and Ethics I (1) Correlations between basic science material from concurrent courses and practice of veterinary medicine. Thoughts on wide spectrum of current veterinary ethical issues.


816 Clinical Correlations and Ethics II (2) Correlations between basic science material from concurrent courses and practice of veterinary medicine. Thoughts on wide spectrum of current veterinary ethical issues. Student-led discussions follow faculty presentations.

821 Veterinary Anatomy I (4) Lectures, laboratories, and demonstrations are used in an integrated approach to the study of macroscopic (gross) clinically relevant anatomy, including neuroanatomy, and embryology of common domestic animals. Dissections of embalmed specimens, sections, plastinated specimens, and radiographs of common domestic species are examined for comparative purposes.

822 Veterinary Anatomy II (4) Lectures, laboratories, and demonstrations are used in an integrated approach to the study of macroscopic (gross) clinically relevant anatomy, including neuroanatomy, and embryology of common domestic animals. Dissections of embalmed specimens, sections, plastinated specimens, and radiographs of common domestic species are examined for comparative purposes.

823 Physiology I (4) Introduction to concepts and problems in physiology which form basis for clinical applications and for formal training in pharmacology, medicine, pathology, and surgery. Cellular, neural, cardiovascular, renal, respiratory, digestive, endocrine, and reproductive physiology.

824 Physiology II (4) Introduction to concepts and problems in physiology which form basis for clinical applications and for formal training in pharmacology, medicine, pathology, and surgery. Cellular, neural, cardiovascular, renal, respiratory, digestive, endocrine, and reproductive physiology.

825 Veterinary Microscopic Anatomy I (2) Lectures, laboratories, and demonstrations are used in the study of the cell, embryology, and macroscopic anatomy of organ systems in common domestic animals to relate structure with function.

826 Veterinary Microscopic Anatomy II (2) Lectures, laboratories, and demonstrations are used in the study of the cell, embryology, and macroscopic anatomy of organ systems in common domestic animals to relate structure with function.

831 Physical Diagnosis (1) Basic care, feeding, restraint, and handling of domestic animals. Introduction to physical examination and diagnostic techniques used by veterinarian.

832 Anesthesiology (2) Principles of anesthesiology; pharmacology of anesthetic agents, and introduction to anesthetic techniques in veterinary medicine.

833 Epidemiology and Evidence Based Medicine (2) Study of distribution, termination of disease and animal populations. Use of knowledge (evidence) gained from management of clinical patients in past to improve future clinical decision-making processes.

834 Hematopoietic System (2) Pathophysiology and diagnosis of disorders involving bone marrow and blood cells, platelets, and blood coagulation in domestic animals; interpretation of laboratory test results using illustrative clinical cases.

835 Principles and Practice of Surgery (2) Principles of veterinary surgery; aseptic technique, patient and surgeon preparation, control of surgical hemorrhage and infection, and general operating room procedures. Proper methods of tissue handling, surgical instrumentation, and selection of suture materials and suturing patterns. Pathophysiology of surgical and accidental wounds: wound healing and management.

836 Toxicology (2) Principles of toxicology, molecular mechanisms, pathologic processes and clinical features of animal diseases caused by common toxic agents.

837 Food Hygiene and Zoonoses (2) Host-agent relationships, public health aspects of veterinary medicine and role of veterinarians in ecology and food hygiene.

838 Clinical Rotation in Pathology I (2) Clinical training and interpretation in post-mortem examination and laboratory diagnostics: clinical pathology and introductory histopathology of biopsy specimens.

839 Clinical Rotation in Pathology II (2) Clinical training and interpretation in post-mortem examination and laboratory diagnostics: clinical pathology and introductory histopathology of biopsy specimens.

840 Integumentary System (3) Pathophysiology, special pathology, medicine and surgery of diseases of integumentary system. Laboritory examination, pathology, diagnosis and treatment.
841 Reproductive System (3) Pathophysiology, special pathology, medicine and surgery of diseases of male and female reproductive systems and mammary glands.

842 Alimentary System (4) Pathophysiology, special pathology, medicine and surgery of diseases of alimentary systems.

843 Musculoskeletal System I (3) Pathophysiology, clinical description and basic treatment modalities of common diseases and conditions of skeletal system of small animals: development of basic diagnostic and treatment skills.

844 Musculoskeletal System II (3) Pathophysiology, special pathology, medicine and surgery of diseases of muscular and skeletal systems. Advanced principles, radiographic interpretation and surgical procedures.

845 Veterinary Nutrition (2) Principles of nutrition, and nutrition of animals in health and disease. Applied nutrition relating to individual small or large animal patient or to herd situations.

846 Multispecies Medicine (3) Anatomy, pathophysiology, medicine, and surgery of avian species, laboratory and zoo animals and reptiles. Species and diseases seen by practicing veterinarian. Current topics on foreign animal diseases.

847 Clinical Rotation in Radiology I (2) Clinical training in radiographic techniques and interpretation, including ultrasonography.

849 Clinical Rotation in Radiology II (2) Clinical training in radiographic techniques and interpretation, including ultrasonography.

851 Urinary System (3) Pathophysiology, special pathology, medicine and surgery of diseases of urinary system. Urinary system in health and disease.

852 Cardiovascular System (2) Pathophysiology, special pathology, medicine and surgery of diseases of cardiovascular system. Anatomic, physiologic and pharmacologic principles which provide basis for treatment.


854 Respiratory System (3) Pathophysiology, special pathology, medicine and surgery of diseases of respiratory system. Upper and lower respiratory systems: infectious and noninfectious diseases.

855 Radiology (3) Basic, advanced and special techniques in radiology with interpretation and use of radiologic and related techniques in diagnosis and treatment of animal diseases.

856 Special Senses (2) Pathophysiology, special pathology, medicine and surgery of diseases of visual and auditory systems.

857 Nervous System (3) Pathophysiology, special pathology, medicine and surgery of diseases of nervous system: clinical neurology and neuropathology.

858 Neurology/Ophthalmology (4) Clinical training in specialty services: ophthalmology and neurology. Direct responsibility for diagnosis, patient care, and treatment of patients in both Large Animal and Small Animal Clinical Sciences.

861 Pharmacology I (2) Principles of pharmacokinetics and pharmacodynamic properties of veterinary drugs; mode of action and pharmacologic effects including important metabolic aspects, chemical and physical properties, side effects (toxicities) and clinical application.

862 Pharmacology II (2) Continuation of 861: modes of action, pharmacologic effects, and clinical application of drugs to control specific disease conditions.

864 Infectious Diseases (2) Pathogenesis and clinical findings of major viral, bacterial, and fungal infectious diseases of domestic animals; cattle, horses, swine, sheep, goats, dogs and cats; relevant case-based presentations.

865 Clinical Rotation in Comparative Medicine (2) Clinical training in avian medicine, laboratory animal and zoo animal medicine, epidemiology, public health, and other related disciplines.

867 Special Problems in Comparative Medicine (1-8) Extramural and specially designed study for students interested in select topics in avian medicine, laboratory animal medicine, zoo animal medicine, epidemiology, public health, pharmacology or toxicology.

868 Introduction to Animal Behavior (2) Basic principles of normal and abnormal animal behavior in domestic animals; clinical case discussions to illustrate common behavioral problems and current approaches to therapy.

870 Anesthesiology (4) Clinical training in sedation and anesthesia of companion animals, food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

871 General Pathology (3) Principles of pathology: causes of disease, disturbances of cell growth and inflammation.

873 Infection and Immunity IV – Parasitology (3) Principles of parasitology: protozoology, helminthology, and entomology and relationship to diseases in animals.

874 Oncology (2) Fundamental aspects of cell biology and pathology relative to etiology and natural behavior of various neoplasms; general approaches to diagnosis, treatment and prevention of neoplasia.

877 Special Problems in Pathology (1-8) Extramural and specially designed study for students interested in select topics in morphologic pathology, clinical pathology, clinical microbiology and parasitology.

878 Elective Clinical Rotation I (2) Special rotations in applied clinical education in Small Animal Clinical Sciences, Large Animal Clinical Sciences, Comparative Medicine and Pathology. Novel experience not associated with required clinical rotations may be arranged.

879 Elective Clinical Rotation II (2) Special rotations in applied clinical education in Small Animal Clinical Sciences, Large Animal Clinical Sciences, Comparative Medicine and Pathology. Novel experience not associated with required clinical rotations may be arranged.

881 Clinical Rotations in Small Animal Clinical Sciences I (4) Clinical training in medicine, surgery and specialty disciplines for companion animals. Direct responsibility for diagnosis, care, and treatment of clinical patients.

882 Clinical Rotations in Small Animal Clinical Sciences II (4) Clinical training in medicine, surgery and specialty disciplines for companion animals. Direct responsibility for diagnosis, care, and treatment of clinical patients.

883 Clinical Rotations in Small Animal Clinical Sciences III (4) Clinical training in medicine, surgery and specialty disciplines for companion animals. Direct responsibility for diagnosis, care, and treatment of clinical patients.

887 Special Problems in Small Animal Clinical Sciences (1-8) Extramural and specially designed study for students interested in select topics in medicine, surgery, anesthesiology, radiology and medical specialties of small (companion) animals.

890 Transition and Accreditation Seminars (2) Discussion of USDA, state, and local animal laws and regulations; preparation of animal movement forms, veterinary ethics, jurisprudence, basic practice management, and other topics involved in practice of veterinary medicine.

891 Clinical Rotations in Large Animal Clinical Sciences I (4) Clinical training in medicine, surgery, specialty disciplines and herd health of food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

892 Clinical Rotations in Large Animal Clinical Sciences II (4) Clinical training in medicine, surgery, specialty disciplines and herd health of food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

893 Clinical Rotations in Large Animal Clinical Sciences III (4) Clinical training in medicine, surgery, specialty disciplines and herd health of food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

897 Special Problems in Large Animal Clinical Sciences (1-8) Extramural and specially designed study for students interested in select topics in medicine, surgery, herd health, reproduction, radiology and medical specialties of large animals.

898 Externship I (2) Educational experiences in private practice, research facility, zoological preserve, aquarium, or other veterinary-related facility outside Veterinary Teaching Hospital; to provide experiences not frequently available in large referral veterinary teaching hospitals.

899 Externship II (2) Educational experiences in private practice, research facility, zoological preserve, aquarium, or other veterinary-related facility outside Veterinary Teaching Hospital; to provide experiences not frequently available in large referral veterinary teaching hospitals.
Wildlife and Fisheries Science (993)

440 Wildlife Techniques (3) Methods in wildlife damage control, forest, farmland, wetland wildlife habitat management, identification of wildlife field signs, wildlife capturing techniques, and management plan preparation. Weekend field trips (2) required.
Contact Hour Distribution: 1 hour and 1 lab or field.
Recommended Background: Undergraduate course in wildlife and fisheries.

442 Fisheries Techniques (3) Active and passive sampling techniques for fish and aquatic organisms. Population estimation methods; fish handling and transport; food habits analysis; marking and tagging techniques. Age determination and incremental growth analysis. Stream assessment. Equipment and instrumentation usage and maintenance. Safety in sampling methods. Weekend field trip may be required.
Contact Hour Distribution: 1 hour and 1 lab or field.
Recommended Background: Undergraduate course in wildlife and fisheries.

443 Fisheries Science (3) Quantification and management of freshwater fisheries including population estimation, age and growth, biological assessment, and stocking.
Contact Hour Distribution: 2 hours and 1 lab.
Recommended Background: Undergraduate course in wildlife and fisheries.

444 Ecology and Management of Wild Mammals (3) Biological and ecological characteristics of game mammals and endangered mammals. Current principles and practices of wild mammal management. Weekend field trip required.
Contact Hour Distribution: 2 hours and 1 lab.
Recommended Background: Undergraduate course in wildlife and fisheries.

445 Ecology and Management of Wild Birds (3) Biological and ecological characteristics of game birds, endangered birds, and bird pests. Current principles and practices of wild bird management. Weekend field trip required.
Contact Hour Distribution: 2 hours and 1 lab.
Recommended Background: Undergraduate course in wildlife and fisheries.

500 Thesis (1-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

512 Seminar in Wildlife and Fisheries Science (1) Current developments in wildlife and fisheries science. Required of all graduate students in residence in the fall.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 2 hours.

515 Seminar in Avian Ecology and Management (1-2) Readings and discussion based on current literature on contemporary topics in avian ecology and management. Additional credit awarded for writing review paper on contemporary topic of interest to student.
Repeatability: Not repeatable. May be taken once for 1-2 hours.
Registration Permission: Consent of instructor.

Comment(s): Requires graduate standing or consent of instructor.

530 Wildlife Diseases (2) Necropsy of birds and mammals. Recognition of various diseases and methods of preparing pathological materials in field and lab. Investigative procedures concerning wildlife diseases. (Same as Comparative and Experimental Medicine – Veterinary Medicine 530.)
Recommended Background: Upper-division undergraduate course in wildlife sciences.

531 Wildlife Physiology and Nutrition (2) Introduction and overview of endocrine and physiological mechanisms regulating wild animal populations (primarily wild birds and mammals): the importance of wildlife physiology and nutrition in monitoring and managing wildlife.
Comment(s): Requires senior or graduate standing in the life sciences.

533 Amphibian Ecology and Conservation (3) An in-depth examination of amphibian life-history strategies, community interactions, and hypothesized mechanisms of amphibian declines. Amphibian monitoring, conservation and management techniques also are covered.
Credit Restriction: Student cannot receive credit for both 433 and 533.
(DE) Prerequisite(s): Forestry 215 or Biology 250.
Registration Restriction: Minimum student level – graduate.

535 Floodplain Ecosystems (3) Ecology, restoration and management of floodplain ecosystems: biotic and abiotic processes, social considerations, and wildlife and forest management; Lower Mississippi River Alluvial Valley.
Registration Permission: Consent of instructor.

536 Advanced Wetland Ecology (3) A comprehensive examination of wetland delineation and classification, wetland communities and hydrogeomorphologic processes, wetland values, human impacts on wetlands, and the management and conservation of wetland communities.
Comments: Day or overnight field trips may be required.

545 Advanced Population Analysis (2) Detail characteristics, assumptions, goals, methods, and current technologies for fish and wildlife population analysis. Use of computers.
(Re) Prerequisite(s): Animal Science 571 or Statistics 538.

546 Advanced Habitat Analysis (2) Habitat analysis as tool to evaluate habitat use and predict occurrences of animal and plant species: principles and goals of modeling, habitat analysis theory, GIS and statistical techniques. Use of computer programs.
Recommended Background: Undergraduate course in GIS.

550 Fish Physiology (3) Mechanisms of gas transfer, circulation, excretion, osmoregulation, locomotion, and neural/hormonal control of these systems in fishes. Comparisons and contrasts with physiology of terrestrial animals. Practical applications of fish physiology to aquaculture, pollution assessment, and fisheries management.
Comment(s): Requires senior or graduate standing in the life sciences.

555 Fish Culture (3) Principles, concepts and techniques of culturing economically important fish and shellfish species.
Contact Hour Distribution: 2 hours and 1 lab.
(De) Prerequisite(s): 443 or consent of instructor.

556 Recirculating Aquaculture (3) Growing fish in intensive, indoor systems with reconditioned water. Techniques of solids removal, nitrification, and gas balance. Practical experience with operating system.
Recommended Background: Upper-division undergraduate course in fisheries science.

560 Advanced Topics in Wildlife and Fisheries Science (1-3) Recent advances and concepts, research techniques and analysis of current problems.
Repeatability: May be repeated. Maximum 6 hours.
(De) Prerequisite(s): 443, 444, and 445 or consent of instructor.

593 Independent Study in Wildlife and Fisheries Science (1-4)
Repeatability: May be repeated. Maximum 6 hours.

Women’s Studies (994)

400 Topics in Women’s Studies (3) Content varies.
Repeatability: May be repeated. Maximum 6 hours.

410 Sex Role Development: Implications for Education and Counseling (3) (See Counselor Education 410.)

422 Women Writers in Britain (3) (See English 422.)

425 Women’s Health (3) (See Health 425.)

434 Psychology of Gender (3) (See Psychology 434.)

469 Sexuality and Cinema (3) Explores issues surrounding sexuality, gender and cinema from points of view of feminist film criticism. (Same as Cinema Studies 469.)

484 African-American Women in American Society (3) (See Africana Studies 484.)

510 Special Topics (3)
Repeatability: May be repeated. Maximum 6 hours.

512 History of Women’s Education (3) (See Cultural Studies in Education 512.)

543 Women, Sport, and Culture (3) (See Sport Studies 543.)

548 Transforming Critical Thinking: Constructive Thinking and Educational Implications (3) (See Cultural Studies in Education 548.)

593 Independent Study (1-6)
Repeatability: May be repeated. Maximum 8 hours.
Registration Permission: Consent of Chair of Women’s Studies.

609 Feminist Theories and Education (3) (See Cultural Studies in Education 609.)
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