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.

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. Publication Authorization Number: E01-0220-005-002-05.
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 Graduate Studies. Individual colleges and departments may have requirements beyond the minimum established by the Graduate Council. A calendar of deadlines, policies and procedures for graduate programs are found on the Graduate Studies Web page (http://web.utk.edu/~gsinfo). A statement of graduate students’ rights and responsibilities is included with the admission notification. Additional copies are available at the Office of Graduate and International Admissions.

Contacts (See Web pages at http://www.utk.edu/ and at http://web.utk.edu/~gsinfo)

**GRADUATE STUDIES**
Anne Mayhew, Vice Chancellor for Academic Affairs and Dean of Graduate Studies
535 Andy Holt Tower
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**GRADUATE STUDENT SERVICES**
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Joan Dolence, Thesis Dissertation Consultant
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**GRADUATE AND INTERNATIONAL ADMISSIONS**
Rose Ann Trantham, Director
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(865) 974-3251; Email: rtrantha@utk.edu

**FINANCIAL ASSISTANCE**
Assistantships—Head of department or program in which you plan to major
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Loans, Work-Study—Jeffrey Gerkin, Assistant Dean and Director, Scholarships and Financial Aid
115 Student Services Building
(865) 974-3131 E-mail: jgerkin@utk.edu

**CENTER FOR INTERNATIONAL EDUCATION**
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**UNIVERSITY HOUSING**
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**DISABILITY SERVICES**
Emily Singer, Director
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(865) 974-6087; E-mail: esinger1@utk.edu

**REGISTRAR**
Monique Anderson, Associate Dean and University Registrar
209 Student Services Building
(865) 974-2101 E-mail: manders3@utk.edu

**GRADUATE STUDENT ASSOCIATION**
GSA President
315E University Center
(865) 974-2377; E-mail: gsa@utk.edu
Academic Calendar for 2005-2006

Fall Semester 2005

Classes Begin Wednesday, August 24
Labor Day (no classes) Monday, September 5
First Session Ends Wednesday, October 12
Fall Break (no classes) Thursday-Friday, October 13-14
Second Session Begins Monday, October 17
Thanksgiving Break Thursday-Friday, November 24-25
Classes End Tuesday, December 6
Study Period Wednesday-Thursday, December 7-8
Final Exams Friday, Monday-Thursday, December 9, 12-15
Graduate Hooding Ceremony Friday, December 16
Commencement Saturday, December 17

Spring Semester 2006

Classes Begin Wednesday, January 11
MLK Holiday (no classes) Monday, January 16
First Session Ends Wednesday, March 1
Second Session Begins Thursday, March 2
Spring Break Monday-Friday, March 20-24
Spring Recess (no classes) Friday, April 14
Classes End Friday, April 28
Study Period Monday-Tuesday, May 1-2
Final Exams Wednesday-Tuesday, May 3-5, 8-9
Graduate Hooding Ceremony Thursday, May 11
Commencement Friday, May 12

Summer Term 2006

Mini Session Begins Wednesday, May 10
Memorial Holiday Monday, May 29
Mini Session Ends Wednesday, May 31
Full and First Sessions Begin Monday, June 5
Independence Day Holiday (no classes) Tuesday, July 4
First Session Ends Friday, July 7
Second Session Begins Monday, July 10
Full and Second Sessions End Thursday, August 10
Summer Graduation Date* Friday, August 18

*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 site of the Office of the University Registrar:
http://registrar.utk.edu/academic_calendar.shtml
The University of Tennessee

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| Lieutenant Colonel Robert S. Walsh, BA, MS, U.S. Army, Professor of Military Science and Leadership, Army Reserve Officers Training Corps |</p>
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| Agricultural and Extension Education (Program) | Agricultural and Extension Education | MS | Agricultural Education  
Agricultural Extension Education |
| Agricultural Economics | Agricultural Economics | MS | Agribusiness  
Agricultural Economics |
| Animal Science | Animal Science | MS | Animal Genetics  
Animal Health and Well-Being  
Animal Management  
Animal Nutrition  
Animal Physiology |
| Biosystems Engineering and Environmental Science | Biosystems Engineering | MS | Agricultural Electrical and Electronic Systems  
Agricultural Power and Machinery  
Agricultural Structures and Environment  
Food and Process Engineering  
Soil and Water Conservation Engineering |
| | Environmental and Soil Sciences | MS | |
| Entomology and Plant Pathology | Entomology and Plant Pathology | MS | Entomology  
Plant Pathology |
| Food Science and Technology | Food Science and Technology | MS | Food Chemistry  
Food Microbiology  
Food Processing  
Sensory Evaluation of Foods |
| Forestry, Wildlife and Fisheries | Forestry | MS | |
| Natural Resources | Natural Resources | PhD | |
| Wildlife and Fisheries Science | | MS | |
| Interdepartmental | Plants, Soils, and Insects | PhD | Bioactive Natural Products  
Crop Sciences  
Entomology  
Environmental and Soil Sciences  
Horticulture  
Integrated Pest Management  
Plant Improvement  
Plant Pathology  
Weed Biology |
| Plant Sciences | Plant Sciences | MS | |

**College of Architecture and Design**

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Graduate Degrees, Majors, and Certificate Programs/The University of Tennessee, Knoxville/2005-2006 Academic Year/Listed by College and Department
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| Political  | Science | Psychology | MA | Experimental Psychology |
|            |         |            | PhD | General Psychology     |
|            |         |            | PhD | Clinical Psychology    |
|            |         |            | PhD | Counseling Psychology  |
|            |         |            | PhD | Experimental Psychology|

| Sociology  | Sociology | MA | Criminology |
|           |           | PhD | Environmental Sociology |
|           |           | PhD | Political Economy      |

| Theatre    | Theatre   | MFA | Costume Design |
|           |           |     | Dramaturgy      |
|           |           |     | Lighting Design |
|           |           |     | Performance     |
|           |           |     | Scene Design    |

## COLLEGE OF BUSINESS ADMINISTRATION

| Accounting and Information Management | Accounting | MAcc | Assurance Services |
|                                      |           |     | Information Management |
|                                      |           |     | Taxation               |
| Economics                            | Economics | MA  |                                                  |
| Management                           | Human Resource Development | MS   |                                                  |
| Interdepartmental                    | Business Administration | MBA  |                                                  |
|                                      |                       | PhD  |                                                  |
|                                      |                       |     | Accounting |
|                                      |                       |     | Finance    |
|                                      |                       |     | Logistics  |
|                                      |                       |     | Marketing  |
|                                      |                       |     | Operations Management |
|                                      |                       |     | Executive MBA Programs: |
|                                      |                       |     | Aerospace Executive MBA |
|                                      |                       |     | Senior Executive MBA  |
|                                      |                       |     | Physician Executive MBA |
|                                      |                       |     | Professional MBA     |

Dual JD-MBA program available (with College of Law)
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<td>Child and Family Studies, Early Childhood Education</td>
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<td>Consumer Services Management</td>
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<td>Hospitality and Tourism Management, Retail and Consumer Sciences</td>
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<td>Educational Psychology and Counseling</td>
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<td>Mental Health Counseling, Rehabilitation Counselor Education, School Counseling</td>
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<td>Community Health Education, Gerontology, Health Planning/Administration, Veterinary Public Health</td>
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<td>Safety</td>
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<td>Applied Epidemiology, Emergency Management, Safety Management</td>
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### DEPARTMENT MAJOR DEGREE CONCENTRATION AVAILABLE

#### COLLEGE OF ENGINEERING

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<td>Advanced Control Systems</td>
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<td>Chemical Bioengineering</td>
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<tr>
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<td>Advanced Control Systems</td>
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**Civil and Environmental Engineering**

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<td>Geotechnical/Materials Engineering</td>
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**Electrical Engineering**

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Graduate Degree Programs

Master of Accountancy  Master of Science in Planning
Master of Architecture  Master of Science in Social Work
Master of Arts  Dual JD-MBA
Master of Business Administration  Dual MS-MBA
Master of Fine Arts  Dual MS-MPH
Master of Mathematics  Specialist in Education
Master of Music  Doctor of Audiology
Master of Public Administration  Doctor of Education
Master of Public Health  Doctor of Jurisprudence
Master of Science  Doctor of Philosophy
Master of Science in Nursing  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. Differs 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 Graduate Studies Administration
Anne Mayhew, BA, PhD, Vice Chancellor for Academic Affairs and Dean of Graduate Studies
Mary E. Papke, BA, MA, PhD, Associate Dean
S. Kay Reed, BS, MS, MA, PhD, Assistant to the Dean
Joan Dolence, BA, MA, Thesis/Dissertation Consultant

The Graduate Council (Membership August 1, 2004)

Ex Officio Members
Dr. Anne Mayhew, Vice Chancellor for Academic Affairs and Dean of Graduate Studies
Dr. Mary Albrecht, College of Agricultural Sciences and Natural Resources
Dr. William Blass, Chairman of the Research Council
Dr. K.C. Reddy, UT Space Institute
Dr. Edward Caudill, College of Communication and Information
Dr. Barbara Klinkhammer, College of Architecture and Planning
Dr. Barbara Dewey, Dean of Libraries
Dr. Geraldine Faria, College of Social Work
Dr. Sarah Gardsal, College of Business Administration
Dr. Thomas W. George, College of Education, Health, and Human Sciences
Dr. Robert Moore, College of Veterinary Medicine
Dr. William Dunne, College of Arts and Sciences
Dr. Jan Lee, College of Nursing
Dr. John L. Sobieski, Jr., College of Law
Dr. George Hoemann, University Outreach and Continuing Education

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<td>Dr. Warren Jones</td>
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<td>July 31, 2006</td>
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<td>July 31, 2005</td>
<td>Dr. Ben Bates</td>
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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 Graduate Studies, the Chair of the Research Council, the Dean of Libraries, the Dean of Continuing 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 Office of Graduate Student Services, 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. 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 Office of Graduate Student Services, 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. The Board of Trustees created a graduate department with authority to confer the Master of Arts, the Doctor of Philosophy, Civil
Engineer, and Mining Engineer degrees. The Graduate Department was renamed The Graduate School in 1912. 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. More than 9,300 doctoral degrees and 55,000 master’s degrees have been awarded to date.

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 2.7 out of a possible 4.0, or a 3.0 during the senior year of undergraduate study. Applicants with previous graduate work must have a grade point average of 3.0 on a 4.0 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 2.5 and 2.7 may be admitted on probation, upon recommendation of an academic unit. The probationary status will be removed after completion of nine or more hours of graduate credit with a minimum GPA of 3.0. Failure to maintain a 3.0 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 Graduate Studies 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 make 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 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 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).

Application forms for the GRE, GMAT and TOEFL can be obtained by contacting Educational Testing Service Princeton, New Jersey 08450 http://www.ets.org

Examination results reach the university in approximately six 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. To be considered are such criteria as 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 3.0 grade point average to continue enrollment in a degree program (see Academic Standards).

An applicant may not be admitted simultaneously to more than one degree program. Two or more applications cannot be considered concurrently. For admission to dual programs, applications are processed consecutively.

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 area must be declared if the intent is to seek an advanced degree. If no degree is desired, a major area 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 Graduate Studies, or designee, is the advisor.

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 Admissions.

**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 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 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 may 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 on the financial statement form supplied to the applicant. This form is available at the Graduate and International Admissions Website: [http://admissions.utk.edu/admissions/graduate.shtml](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 issuance 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
The university will not enroll any student who has not been approved initially, or for transfer, by the Department of Homeland Security (DHS) to attend the University of Tennessee, Knoxville.
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 or 550 on the paper test 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.

**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 an EdD or PhD degree program at UT Knoxville. Exceptions may be granted on an individual basis upon petition to the Dean of Graduate Studies. 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 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 Graduate Studies 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 taken 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 are enrolled 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 Graduate Studies, 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 (3.0) may enroll in graduate courses for graduate credit, provided the combined total of undergraduate and graduate coursework...
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 Office of Graduate Student Services. 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 Graduate Studies 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 at the Office of Graduate Student Services.

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 are subject to guidelines approved by the law faculty.

Law Courses

A graduate student may take up to six semester 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 2.0 or better, an S will be recorded on the transcript. Below 2.0, 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 eight 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 3.0 grade point average) the minimum requirements for 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 an application endorsed by the academic department to the Office of the University Registrar. Only those certificate 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 intermediate class 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 two 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 nine additional hours of course work 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 Graduate Student Services. 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 Graduate Studies. 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 using university facilities and/or faculty time. 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 term. Registration is accomplished via Web. During priority registration, a bill is mailed to the registrant. Payment is due by the deadline noted on the bill. A graduated late fee is assessed to any student who fails to register during priority registration. Additional information can be obtained from the Office of the University Registrar, (865) 974-2101.

Failure to pay tuition and fees before the deadline, as noted each semester on the bill (VolXpress statement), will result in cancellation of the schedule. Retroactive registration is not allowed.

Non-degree students in unrestricted programs may obtain permission to register from the Office of Graduate Student Services. Non-degree students with no declared major must obtain permission from the department/program head to register for courses in restricted fields.
Conditional Registration

Applicants who appear to meet the admission requirements for graduate study may be allowed to register for an initial term after submitting the Graduate Application for Admission form and application fee. Time is allowed to obtain transcripts and additional requirements for admission. Students who fail to gain admission within seven weeks after registration will not be permitted to register again until all admission requirements are met.

International students may not register conditionally.

Registration for Use of Facilities

Students using university facilities, services or faculty time, including summer term, must be registered. Normally, students are registered for coursework or thesis/dissertation credit. Students who are not taking coursework and are not yet eligible to register for thesis or dissertation hours, must register for course 502 (Use of Facilities) if they wish to have borrowing privileges in the University Library or to use computer labs, other labs, or other university resources.

Change in Registration

The permanent record will show all courses for which the student has registered except those audited and those from which the student has withdrawn on or before the “Drop Course without W” deadline.

Students who fail to attend the first class meeting without prior arrangement with the department may be dropped from the course to make space available to other students. Students have the responsibility to assure that they have been dropped. Otherwise they may receive a grade of F in the course.

Type of Change for Full Term Classes Fall/Spring Deadline
Add or Drop a Course without a W or Change credit/grading ..............................10 days
Drop Course with W .........................................................................................84 days

The periods for add, drop, change of credit/grading for sessions within the full term, summer, and mini term are determined based on a percentage of the equivalent deadline within the full term. See Timetable of Classes each term for exact dates on the Circle Park Web site at http://cpo.utk.edu. Deadline dates will be moved to the next business day if the deadline falls on a holiday, weekend day, or fall/spring recess. Within the change of registration period, a student may change registration at Circle Park Online (http://cpo.utk.edu/). If additional permission is necessary, a student must execute a change of registration at the Office of the University Registrar, with approval of the instructor, advisor, and Office of Graduate Student Services. Total withdrawal from registration for a semester must be processed through the Office of the University Registrar.

Course Loads

The maximum load for a graduate student is 15 hours, and 9 to 12 hours are considered a full load. For the summer term, graduate students may register for a maximum of 12 semester hours in an entire summer term or for a maximum of six semester hours in a five-week summer session. Students may enroll in only one course during a mini-term session.

Students holding a one-half time assistantship normally should enroll for 6-11 semester hours. A one-fourth time graduate assistant normally should take 9-13 semester hours. A student on a one-half time assistantship who takes six semester 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 3.6 or better in at least nine 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 3.0 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. Courses in which NC is received may be repeated for a grade of S. 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.
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, except where the graduate catalog indicates Satisfactory/No Credit only or optional Satisfactory/No Credit or letter grade. Veterinary Medicine courses are letter grade only except where noted Satisfactory/No Credit only. Law courses are numeric except where noted otherwise. There are restrictions regarding the use of Satisfactory/No Credit graded courses, including the number of hours that may be used toward any degree program.

No graduate student may repeat a course for the purpose of raising a grade already received, with the exception of No Credit. A graduate student may not do additional work nor repeat an examination to raise a final grade. A change of grade may occur only in cases of arithmetic or clerical error. An instructor may not initiate a change of grade as a result of a reevaluation of the quality of the student’s performance nor as a result of additional work performed by the student.

Refer to law courses under Registration and Enrollment Requirements and in the College of Law section of this catalog.

**Academic Standards**

Graduate education requires continuous evaluation of the student. This includes not only periodic objective evaluation, such as the cumulative grade point average, performance on comprehensive examinations and acceptance of the thesis or dissertation, but also judgments by the faculty of the student’s progress and potential. Continuation in a program is determined by consideration of all these elements by the faculty and the head of the academic unit.

The academic records of all graduate students are reviewed at the end of each semester, including the summer term. Graduate students must maintain a cumulative grade point average (GPA) of at least 3.0 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 nine hours of graduate coursework, a graduate student will be placed on academic probation when his/her cumulative GPA falls below 3.0. A student will be allowed to continue graduate study in subsequent semesters if each semester’s grade point average is 3.0 or greater. Upon achieving a cumulative GPA of 3.0, 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 Graduate Studies if the student’s semester GPA falls below 3.0 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 Graduate Studies, a student on probation whose semester GPA is below 3.0 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 Graduate Student Services. In those cases where the department’s requirements for continuation are more stringent than university requirements for graduate programs, the Dean of Graduate Studies 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 that:

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 Graduate Studies 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 Office of Graduate Student Services. Normally, grievances should be handled at the departmental level through the student’s academic advisor or the department or program head. Further appeal may be made to the dean of the respective college, the Dean of Graduate Studies, the Graduate Council, and ultimately to the Chancellor.

The Graduate Council hears appeals concerning the interpretation of and adherence to university, college and departmental policies and procedures as they apply to graduate education. The Council does not review grievances concerning grades, which are reviewed at the department or college level. Grades are appealed first to the faculty member and then, if necessary, to the department head and dean of the college.

Appeal procedures in regard to allegations of misconduct or academic dishonesty are presented in Hilltops under Student Rights and Responsibilities. 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. Departmental 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.

Three interdisciplinary minors are available: 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 Graduate Studies. 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

- 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 Graduate Studies 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 minimum of one-half 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 six semester (nine 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 paper or electronic format to the Thesis/Dissertation Consultant in the Office of Graduate Student Services for examination. (Refer to Dissemination of Final Copies regarding different submission processes.) The consultant will review the material and assure that it is appropriately presented, free of technical errors in format, suitable for binding or for electronic submission, 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 Studies 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 Studies 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 Graduate Studies. A request to write in a language other than English should be submitted to the Dean of Graduate Studies 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 Graduate Studies. 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

Paper copies approved for final submission will be sent to the University Libraries bindery one month after conferral of the graduate degree. One of the bound copies will be placed on the shelf in Hodges Library for circulation, the second bound copy will be placed in Library Archives. The circulation copy will appear in the library catalog and on the shelf approximately one year 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. Electronic copies approved for final submission will be catalogued and placed on the ETD Web site (http://etd.utk.edu) approximately four weeks after the conferral of the graduate degree. 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 Studies 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 Degrees

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 culminating (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 Business Administration and the 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, six 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 six, 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 six 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 nine hours of graduate coursework with a 3.0 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 three hours the semester in which the thesis is accepted by Graduate Student Services. 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. Paper or electronic submission will be approved by the student’s committee prior to final preparation of the thesis. Two paper copies or an electronic copy of the thesis must be accompanied by two approval sheets, signed by the members of the master’s committee. The approval sheets reflect the final format for submission. The approval sheets certify 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 Graduate Studies, 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 Office of Graduate Student Services 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 Graduate Studies, 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 Graduate Studies. 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 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 six 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, nor in the minimum six 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 six 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 list all courses to be used for the degree, 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, six 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 Office of Graduate Student Services.

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 Graduate Student Services 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 Degrees**

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 six 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 six semester 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. This committee is nominated by the department head or college dean and approved by the Dean of Graduate Studies.

The committee should be formed during the student’s first year of doctoral 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 Graduate Student Services.
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 administered 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 Graduate Student Services. 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 Studies 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 three 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. Paper or electronic submission will be approved by the student’s committee prior to final preparation of the dissertation. Two paper copies or 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 Office of Graduate Student Services on behalf of the Graduate Council. Each dissertation must be accompanied by two approval sheets, signed by all members of the doctoral committee. The approval sheets reflect the final format for submission. The approval sheets certify to the Office of Graduate Student Services that the committee members have examined the final copy and found that its form and content demonstrate scholarly excellence. Microfilm 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 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**

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. Final registration fees are applicable to students who register during final 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, drop/add activity, 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 nine or more hours are assessed the full-time University Programs and Services Fee. Students enrolled for less than nine 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 three hours) may elect to pay the health portion of the UPSF in addition to the standard pro-rated assessment. Part-time students enrolled in six 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

There are no additional charges for diploma, binding, or microfilming. The graduation fee is non-refundable and is valid for two semesters after the semester in which it is paid.

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 one-hour courses.

Final Registration Fee

Assessed to students who register during Final 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 Final Registration payment due date. This due date will be published on the Bursar’s Office Web site. The Final Registration Fee is non-refundable.

See the Bursar’s Office Web site for the dates and fees to be assessed during Final 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 $20 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,
Refunds and repayment to the Title IV programs are determined according to the formula published in the current Federal Student Financial Aid Handbook. The Financial Aid Office 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 12-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.

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 other outstanding fees/fines owed to the university at the time the refund is issued, including outstanding fees due on the Deferred Payment Plan. Any remaining refund balance will be refunded to the credit card charged or mailed to the student’s billing address.

Refund/Change 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.

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.
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 including meals, vending machines, computers, laundry machines, check cashing, sporting events, cultural attractions, residence halls access, library, recreational facilities and equipment, University Bookstore, and much more. 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. There is a minimum charge of $10.00 for replacement of a VolCard.

**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.

**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. See section on Federal, State and University Policies.

**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.

Students must be fully admitted to the appropriate degree program, and the letter of certification must be received by the University of Tennessee, Knoxville, no later than the first day of classes for the effective semester. 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 Office of Graduate Student Services administers the Hilton A. Smith 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 Hilton A. Smith Fellowships. Candidates for graduate study in the humanities may be nominated by the academic program for the Herman E. Spivey Fellowships. The Hilton A. Smith and the Herman E. Spivey Fellowships include monthly stipends, tuition, and maintenance fees. Information is available from November through January on the Graduate Studies 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 Association and the Dean of Graduate Studies. 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 GSA Web site at http://web.utk.edu/~gss. Applications must be submitted to the Office of the Dean of Students by the following deadlines:

- Summer Term: April 22
- Fall Semester: September 2
- Spring Semester: November 11

**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 six 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)
- 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 nine or more graduate hours each semester.

Special Federal and State Laws and University Policies

Family Educational Rights and Privacy Act

The Family Educational Rights and Privacy Act provides for confidentiality of student records. However, it also provides for basic identification of persons at the University of Tennessee, Knoxville, without the consent of the individual. Release of information to third parties includes directory information such as is contained in the campus telephone book and sports brochures. Such information may include name, address, telephone number, date and place of birth, major, dates of attendance, degrees and awards, the most recent previous educational agency or institution attended, participation in school activities and sports, and weight and height (for special activities).

Notice of the categories to be contained in a publication will be given in advance. A period of one week is provided during which a student may request that such information not be released.

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. Prior to January 1, 1975, students’ Social Security Numbers were used as student identification numbers; therefore, Federal law allows the continued use of the SSN as the unique student identifier. In December 2004, the university began assigning individual student identification numbers to newly admitted students; new students will no longer use their Social Security Numbers to conduct business or access their records.

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 or to their Social Security Numbers should contact Student Data Resources at (865) 974-2108.

EEO/Title IX/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 Melrose 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.

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, the University of Tennessee, Knoxville, 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/. 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, Knoxville, is notifying all students, faculty, and staff of the following university policy approved by the University of Tennessee, Knoxville, Board of Trustees on 21 June 1990.

It is the policy of the University of Tennessee, Knoxville, 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, Knoxville, 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 call 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 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 Graduate Studies, 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 Graduate Studies. 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 inservice 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 Office of Graduate Student Services, 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 Office of Graduate Student Services. 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 Graduate Studies should be contacted. Established procedures outlined in the Graduate Council Appeals Procedure and/or Hilltopics 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 and twelve month or other. Students on 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 being dismissed. This letter should be written 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 Graduate Studies.

Orientation/Training of Graduate Assistants and Graduate Research Associates

There must be a thorough, systematic plan of orientation and training of all Graduate Teaching Assistants and Graduate Research Assistants. 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 Office of Graduate Student Services 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 the 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 new 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.

Career Services

http://career.utk.edu

The mission of Career Services is to help students identify and pursue career goals by providing quality information and services reflecting attention to individuals’ needs, use of technology, adaptability, and a positive attitude.
Career Services, located in Dunford Hall, 974-5435, is a university-wide department providing career-related assistance to University of Tennessee students through a wide range of programs and services. Included in the services offered are:

- individual career counseling, career interest inventories, and information on majors and careers
- several annual career fairs providing opportunity to speak informally with representatives from over 100 different companies about their entry-level jobs, part-time positions, and internships
- an online resume database that allows students to submit resumes for hundreds of on-campus interviews, view job postings, and participate in a Web resume book
- a Web site including valuable links to hundreds of other career-related Internet resources
- a part-time employment service for students seeking such positions
- resources that help students identify and locate internships and summer employment
- workshops providing instruction in skills and tactics for successful interviewing, resume preparation, business and dining etiquette, and other topics

Students can contact Career Services for more information or to schedule an appointment.

Center for International Education
http://www.UTinternational.org
http://web.utk.edu/~globe/

The Center for International Education (CIE), located at 1620 Melrose Avenue, promotes and supports all aspects of international education and international exchanges at the University of Tennessee, Knoxville, both for American students and faculty and for students and faculty from other countries. CIE coordinates the administration of official linkage agreements between the University of Tennessee, Knoxville, and institutions of higher education in other countries.

Programs Abroad. The University of Tennessee, Knoxville, strongly encourages students to undertake a semester, summer, or academic year of study outside of the United States. Significant time spent abroad increases students’ ability to appreciate other cultures, helps them better understand their own country and its place in the world, and can bolster their resumes. In addition, students gain confidence as they successfully face the unique challenges of living abroad.

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 attend the University of Tennessee, Knoxville. 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 cine@utk.edu, phone (865) 974-3177, Web site: http://www.UTinternational.org. The I-House Web address is http://web.utk.edu/~globe and the phone (865) 974-4453.

Dining Services
www.utdining.com

The University of Tennessee, Knoxville, Dining Services recognizes that campus dining is a large part of the college experience. Students have the choice of a variety of meal membership options depending on the type of dining desired. Meal memberships are available to all students living on or off campus. Additional information may be obtained from the University of Tennessee, Knoxville, Dining Services, 1017 Francis Street #108, Knoxville, Tennessee 37996; (865) 974-4111; or at the above Web site.

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

The University of Tennessee is committed to ensuring equal access to all programs for people with disabilities.

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 191 Hoskins Library, Knoxville, TN 37996-4007. Phone (865) 974-6087 V/T. Fax (865) 974-9552. Email 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, email: gss@utk.edu, or check the Web site.

**Hearing and Speech Services**

The Hearing and Speech Center, located at the corner of Peyton Manning Pass and Phillip Fulmer Way, 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 clinical observation and education facility for students majoring in speech-language pathology or audiology. It also serves as a community hearing and speech center providing diagnostic and treatment services for persons of all ages exhibiting communication disorders/differences.

**Housing**

http://uthousing.utk.edu

The university strives to maintain convenient and comfortable residence hall facilities, which are available to all single students at a reasonable cost. Many residence halls provide excellent study facilities, including computer rooms, and are all within easy walking distance of classrooms and other university facilities.

A limited number of Assistant Hall Director and Assistant Resident Manager positions are available for graduate students. This position assists the Hall Director and Resident Manager in coordinating and supervising all aspects of the hall or apartment operation. This is a live-in position with part-time responsibilities for a nine-and-a-half month period.

The university has provided excellent apartment facilities in several locations for married students with or without families. Apartments not needed to house married students are made available to single graduate and professional students and undergraduate students who are 21 years of age or older.

Additional information may be obtained from the Department of University Housing, 405 Student Services Building, the University of Tennessee, Knoxville, Tennessee 37996-0241; (865) 974-2571.

**Parking Services**

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

The University of Tennessee, Knoxville, endeavors to provide adequate facilities for vehicles operated by students and staff. However, areas available for parking are necessarily limited. To reduce traffic congestion within the campus area, large parking areas are located on the perimeter of the campus. A comprehensive campus transportation system, called “The T,” connects the Agricultural Campus, residence halls, The Hill and parking facilities. This service provides direct access to and from the heart of campus. Transportation service is also available to university apartments.

A parking permit is required for parking on all university lots, streets, parking structures, or leased lots. Persons who operate a motor vehicle in connection with attendance or employment at the university must register the vehicle with the Parking Services Office.

A University Traffic and Parking authority determines the parking policy, traffic regulations, and fees. Complete information is published each year in University Traffic and Parking Regulations and is available on the Parking Web site and at the following Parking Services locations: 24 University Center (8:30 a.m.-4:30 p.m., Monday-Friday); 2121 Stephenson Drive (7:30 a.m. - 4:30 p.m., Monday-Friday); or at the Parking Information Center at Circle Park. Phone (865) 974-6031, TDD (865) 974-6483 (for the hearing impaired).

**Student Counseling Services Center**

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

The Student Counseling Services 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.

**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 nine but at least three 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.utk.edu/veterans_affairs.shtml](http://registrar.utk.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 governmentally funded educational 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 14 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 email wcc@utk.edu.
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

Professors
Waters, R.G. PhD .................................................................Penn State
Fritz, C.A., PhD .............................................................................Iowa State

Assistant Professors
Waters, R.G. PhD .........................................................................Penn State

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

MAJOR DEGREE

Agricultural and Extension Education ..................................................MS

The Agricultural and Extension Education program offers a Master of Science degree with a major in agricultural and extension education. The 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 with a concentration in either agricultural education or agricultural extension education. Candidates for the master’s degree must meet the general requirements of the Graduate Council and those stipulated by the department.

MAJOR 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

- 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 three 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

- 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
Brooker, J.R., PhD ...........................................................................Florida
Cross, T.L. (Assistant Dean), PhD .................................................Oregon State
Eastwood, D.B., PhD .....................................................................Texas A&M
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
Klinadt, T.H. (Interim Dean), PhD ..................................................Kentucky
McLemore, D.L., PhD ..................................................................Kalamazoo
Mundy, S.D., PhD ...........................................................................Tennessee
Orr, R.M., PhD ...............................................................................Illinois
Park, W.M., PhD ...........................................................................Virginia Tech
Rawls, E.L., PhD ...........................................................................Virginia Tech
Ray, D.E., PhD ...............................................................................Oklahoma State
Riley, J.B., PhD ...........................................................................Virginia Tech
Roberts, R.K., PhD .........................................................................Iowa State
Smith, G.F., PhD ...........................................................................Tennessee

Associate Professors
De La Torre Ugarte, D.G., PhD ....................................................Oklahoma State
Jensen, K.L., PhD .................................................................Oklahoma State
Yen, S.T., PhD ...........................................................................Minnesota

Assistant Professors
Bazemore, F.E., PhD .......................................................................Kentucky
Cho, S.H., PhD ...........................................................................Oregon State
Clark, C.D., PhD ...........................................................................Vanderbilt
Tiller, K.H., PhD ...........................................................................Tennessee

Emeriti Faculty
Leuthold, F.O., PhD ........................................................................Wisconsin

MAJOR DEGREE

Agricultural Economics .................................................................Master of Science
MASTER OF SCIENCE

Agricultural Economics Major

REQUIREMENTS

The Department of Agricultural Economics offers a program of graduate study leading to the Master of Science. The MS program may be completed under a thesis option with a concentration in agricultural economics. A non-thesis option is available with concentrations in agricultural economics or agribusiness. For specific information, contact the department head.

Agribusiness Concentration

The MS 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 6 hours of internship are required. Each student must pass both written and oral comprehensive examinations.

Agricultural Economics Concentration • Thesis Option

The MS 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 this 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.

Agricultural Economics Concentration • Non-Thesis Option

The MS 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 this non-thesis option, 30 hours of agricultural economics courses and 6 hours of directed electives are required. Each student must pass both written and oral comprehensive examinations.

Agricultural Economics Minor

A minor will include six hours of coursework in the department, with at least three 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 Economics 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 course work 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
K.R. Robbins, Graduate Liaison

Professors
Conatser, G.E., MS ..............................................Kentucky
Gill, W.W., PhD .............................................Kentucky
Godkin, J.D., PhD ...........................................Massachusetts
Hopkins, F.M., DVM ..........................................Tennessee
Katteshi, H.G., PhD ..........................................Virginia Tech
Kirkpatrick, F.D., PhD ......................................Tennessee
Lane, C.D., PhD ...............................................Tennessee
Matthew, 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
Rogers, G.W., PhD ..........................................North Carolina State
Saxton, A., PhD .............................................North Carolina State
Smith, M.O. PhD ............................................Oklahoma State

Associate Professors
Grizzle, J.M., PhD ...........................................Florida
Harper, F., PhD ............................................Rutgers
Heitmann, R.N., PhD ......................................Maine
Schrick, F.N., PhD ..........................................Clemson
Wallr, J.C., PhD ...........................................Nebraska

Assistant Professors
Edwards, J.L., PhD ..........................................Florida
Kojima, C.J., PhD .........................................Missouri
Lin, J., PhD ................................................Ohio State
Pighetti, G.P., PhD ........................................Penn State
Richards, C.J., PhD .......................................Kentucky

Instructor
Fisher, A.E., MS ............................................Tennessee

MAJOR
Animal Science ..............................................MS, PhD

DEGREES
The Department of Animal Science offers graduate programs leading to the Master of Science and Doctor of Philosophy with a major in animal science. At the Master of Science level, areas of concentration are animal genetics, animal health and well-being, animal management, animal nutrition, and animal physiology with orientation towards beef cattle, dairy cattle, swine, and poultry. The Doctor of Philosophy program offers areas of emphasis in animal genetics, animal health and well-being, animal nutrition, and animal physiology. For specific information, contact the department head.

All first- and second-year Master of Science students are required to enroll in 596 each spring term and all first- and second-year Doctor of Philosophy students are required to enroll in 696 each spring term.

**MASTER OF SCIENCE**

**Animal Science Major**

**ADMISSION**

For admission to the Master of Science program, a student must have obtained a 3.0 grade point average on a 4.0 scale (or a 3.0 each term during the junior and senior years) in a completed undergraduate degree program in one of the animal sciences or in a related area. The student must submit evidence (letters of recommendation, personal interview, etc.) that indicates ability to complete requirements for the Master of Science. 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 nine hours of graduate coursework must be completed the first term with a minimum grade point average of 3.0 for admission to the Master of Science program.

**REQUIREMENTS**

The program requires the writing of a thesis based on original research; the completion of a minimum of 24 hours of graduate coursework, of which at least 14 hours must be in courses numbered at or above the 500 level; and six hours of thesis. Included in the course requirement are one hour of Agriculture 512 and a minimum of three hours in statistics courses approved for the ICGSP. 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 nine hours of graduate coursework must be completed the first term with a minimum grade point average of 3.0 for admission to the Master of Science program.

**DOCTOR OF PHILOSOPHY**

**Animal Science Major**

**REQUIREMENTS**

The doctoral program requires a minimum of 48 hours of coursework beyond the Bachelor of Science and a minimum of 24 hours of doctoral research and dissertation. The 48 hours of coursework must include:

- A minimum of 16 hours in related fields outside of animal science.
- At least 24 hours credit at the 500- and 600-level, exclusive of doctoral research and dissertation, of which a minimum of six hours must be in the 600-level. Students in the nutrition, breeding, physiology, or anatomy concentration must complete at least 12 hours at the 500- and 600-level in the respective concentration or closely related area. Students in the management concentration must complete 12 hours at the 500- or 600-level in two non-management concentrations.
- A minimum of 1 hour of Agriculture 512 in addition to that required at the Master of Science level.
- A minimum of 6 hours in 400-, 500-, or 600-level statistics courses approved for the ICGSP.

A minimum of five faculty members will constitute the student’s advisory committee, of which at least one must be outside animal science. The major professor will be the chairperson. The student and the major professor select a program of study depending on the student’s area of concentration and professional goal. The advisory committee approves the coursework and the dissertation research proposal and determines if there is to be a foreign language requirement. The advisory committee conducts the comprehensive written and oral examination and the final dissertation defense examination.

**Department of BIOSYSTEMS ENGINEERING AND ENVIRONMENTAL SCIENCE**

http://bioengr.ag.utk.edu

D. Raj Raman, 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 ..............................................Clemson
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
Tompkins, F.D. (Vice President for Research, UTK), 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 ......................................................Purdue

**Associate Professors**

Eash, N.S., PhD ......................................................Iowa State
Grandle, G.F., Ph.D .....................................................Tennessee
Hart, W.E., PhD ........................................................Purdue
Hayes, D.G., PhD ......................................................Michigan
Logan, J., PhD ..........................................................Nebraska
Graduate programs leading to the Master of Science and Doctor of Philosophy with a major in biosystems engineering are available to graduates of a recognized curriculum in engineering, mathematics, or one of the physical or biological sciences. A graduate program leading to the Master of Science in biosystems engineering technology is available to graduates in a recognized curriculum in agriculture or other related fields. These programs emphasize the application of engineering and engineering technology to agricultural and other biological systems. Major focus areas of the program are machinery systems; environmental quality and resource conservation; instrumentation, sensor, and control systems; and bioprocessing. Prerequisite courses may be required depending upon the applicant’s academic background and interest area within the program.

A graduate program leading to a Master of Science with a major in environmental and soil sciences is offered to graduates of recognized curricula in physical or biological sciences. The department also participates in the plants, soils, and insects Doctor of Philosophy program which is administered jointly by the departments of Biosystems Engineering and Environmental Science, Plant Sciences, and Entomology and Plant Pathology. For concentrations offered by these other departments, please see their sections in this catalog. Faculty in the Biosystems Engineering and Environmental Science Department administer the environmental and soil sciences master’s program and the environmental and soil sciences concentration in the plant, soils, and insects Doctor of Philosophy 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.

A significant aspect of graduate education beyond formal courses and thesis projects is active participation in the professional community which exists within academic departments at universities. Student/faculty seminars are one of the professionally rewarding activities of the community. Accordingly, all graduate students are encouraged to participate in Biosystems Engineering 503 and other departmental seminars regardless of whether they are registered for seminar credit.

### ADMISSION

A completed departmental data sheet and three completed Graduate Rating Forms are required in addition to the Application for Graduate Admission. Students must submit scores from the Graduate Record Examination. Each applicant will be advised about any prerequisite courses before entering a program. The student’s program of study must be approved by his/her advisory committee and must comply with the requirements of the Graduate Council.

### MASTER OF SCIENCE

#### Biosystems Engineering Major

**REQUIREMENTS**

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 greater (six hours of thesis plus 14 hours of other courses). Biosystems Engineering 503 Seminar (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. Other specific requirements for the 30 hours are:

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biosystems Engineering 503 (3 times 1 hour), 519, 543, and other major subject coursework</td>
<td>12</td>
</tr>
<tr>
<td>Coursework in computational methods</td>
<td>6</td>
</tr>
<tr>
<td>Program Electives</td>
<td>6</td>
</tr>
<tr>
<td>Thesis 500</td>
<td>6</td>
</tr>
</tbody>
</table>

Total 30

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

In addition to completing the 30 hours, master’s students must pass a final oral examination covering the thesis, related areas, and graduate coursework.

#### Biosystems Engineering Technology Major

**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 greater (six hours of thesis plus 14 hours of other courses). Biosystems Engineering Technology 503 Seminar (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. Other specific requirements for the 30 hours are:

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biosystems Engineering Technology</td>
<td>12</td>
</tr>
<tr>
<td>Coursework in computational methods</td>
<td>6</td>
</tr>
<tr>
<td>Program Electives</td>
<td>6</td>
</tr>
<tr>
<td>Thesis 500</td>
<td>6</td>
</tr>
</tbody>
</table>

Total 30

1. Mathematics, computer science, statistics, or any course containing appropriate computational components that may be approved by the department.
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 Technology is available to qualified students. Applicants accepted into the program must complete at least 33 hours to earn a degree. Of these 33 hours, 20 must be in courses numbered greater than 500. Biosystems Engineering Technology 503 Seminar (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. Other specific requirements for the 33 hours are:

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biosystems Engineering Technology 503 (3 times 1 hour), 506, and other major subject coursework</td>
</tr>
<tr>
<td>1Coursework in computational methods</td>
</tr>
<tr>
<td>Program electives</td>
</tr>
<tr>
<td>Coursework in special emphasis area</td>
</tr>
<tr>
<td>Capstone Experience (project and report, typically 508)</td>
</tr>
</tbody>
</table>

Total 33

1Mathematics, 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.

**MASTER OF SCIENCE**

**Environmental and Soil Sciences Major**

Students seeking a 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. Please see the environmental and soil sciences master’s concentration homepage for additional information: http://bioengr.ag.utk.edu/graduate/, or contact the environmental and soil sciences program’s graduate liaison.

**ADMISSION**

Applicants having bachelor’s degrees in fields that are related or unrelated to environmental and soil sciences may apply, although acceptance may be contingent upon the completion of prerequisite course work. Submit application, official transcripts, scores from the general portion of the Graduate Record Examination, and fee to the Graduate Admissions Office. In your application, indicate that you are applying to the environmental and soil sciences Master of Science program. 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 Environmental Science Department, The University of Tennessee, 2506 E.J. Chapman Drive, Knoxville, Tennessee 37996-4531.

**REQUIREMENTS**

**Thesis Option**

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).

- 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.
- Develop and submit an approved program of study 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 six 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.

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>503 Seminar</td>
</tr>
<tr>
<td>Courses numbered above 503</td>
</tr>
<tr>
<td>1Courses within the major (excluding courses numbered 503 and below)</td>
</tr>
<tr>
<td>500 Thesis</td>
</tr>
</tbody>
</table>

Total 30

1Courses that are in the major include those in environmental and soil sciences. In addition, Geology 510 and Environmental Engineering 535 are in the major. The student’s committee may require additional coursework beyond the 24 hours if the student’s progress or background indicates a need or deficiency.

- Develop a research problem and presentation by means of a written proposal to the student’s committee. This must be completed during the first two semesters of graduate study and before enrollment in 500.
- Pass a final oral exam that integrates the student’s thesis and coursework, administered by the advisory committee. The student is expected to be conversant in the soil and environmental sciences, particularly in the thesis and allied areas.
- Environmental and Soil Sciences 503 Seminar (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.

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 Degrees 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.

• Develop and submit an approved program of study by the end of the second semester of graduate study. A minimum of 33 hours of graduate coursework is required in the program of study. The program of study is subject to the approval of the student’s advisory committee, and must meet the following requirements.

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>503 Seminar</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>

Courses that are in the major include those in environmental and soil sciences. In addition, Geology 510 and Environmental Engineering 535 are in the major. 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 three hours of 593 by participating in a single research program for a period of 12 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.

• Pass a comprehensive written examination that integrates the student’s course work and research problem. The exam is developed and administered by the advisory committee.

• Environmental and Soil Sciences 503 Seminar (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.

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, with 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 Environmental Sciences. Other concentrations within the Plants, Soils, and Insects doctoral program include horticulture, crop sciences, weed biology, plant improvement, entomology, plant pathology, integrated pest management and plant bioactive compounds. 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. Please 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 Graduate Admissions Office. In your application, indicate that you are applying to the plants, soils, and insects doctoral program. 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: Environmental and Soil Sciences Doctor of Philosophy Program Coordinator, Biosystems Engineering and Environmental Sciences Department, The University of Tennessee, Knoxville, 2506 E.J. Chapman Drive, Knoxville, Tennessee 37996-4531. In your statement letter and application, please indicate your interest in the environmental and soil sciences concentration.

REQUIREMENTS

To obtain the doctorate, the student must meet the following 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, and at least half of the committee must hold teaching appointments. 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. 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 nine hours of the student’s coursework must be from outside the Plants, Soils, and Insects major, and a minimum of six hours must be taken in University of Tennessee, Knoxville, courses numbered 601 or higher. In addition, 24 hours of course 600 Doctoral Research and Dissertation are required.

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

• Passing both written and oral sections of the comprehensive examination. 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 Seminar (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.

• Satisfactory preparation of a written dissertation and its oral defense to the student’s doctoral committee.

Please see the Degree Program Requirements/Doctoral Degrees section at the front of this catalog for additional information.
DOCTOR OF PHILOSOPHY
Biosystems Engineering

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 six hours of courses at the University of Tennessee, Knoxville, numbered greater than 600. Other specific requirements for the minimum 75 hours are

<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>Biosystems Engineering 603 Seminar (1)</td>
</tr>
<tr>
<td>600 Dissertation</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

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

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.

Department of

ENTOMOLOGY AND PLANT PATHOLOGY

http://eppserver.ag.utk.edu

Carl J. Jones, Head
Reid R. Gerhardt, Graduate Liaison

Professors
Bernard, E.C., PhD ..................................................Georgia
Bost, S.C., PhD ..................................................North Carolina State
Burgess, E.E., PhD ........................................................Tennessee
Gerhardt, R.R., PhD ..................................................North Carolina State
Grant, J.F., PhD ............................................................Clemson
Hale, F.A., PhD ............................................................Ohio State
Jones, C.J., PhD ............................................................Wyoming
Lambdin, P.L., PhD ..................................................Virginia Tech
Newman, M.A., PhD ..................................................Texas A&M
Patrick, C.R., PhD ..................................................Mississippi State
Skinner, J.A., PhD ..................................................California (Davis)
Trigiano, R.N., PhD ..................................................North Carolina State
Windham, A.S., PhD ..................................................North Carolina State
Windham, M.T., PhD ..................................................North Carolina State

Associate Professors
Canaday, C.H., PhD ..................................................Ohio State
Gwinn, K.D., PhD ..................................................North Carolina State
Lentz, G., PhD ............................................................Iowa State
Ownley, B.H., PhD ..................................................North Carolina State

Stewart, S.D., PhD ..................................................Auburn
Vail, K.M., PhD ..................................................Florida

Assistant Professors
Hajimorad, M., PhD ..................................................Adelaide (Australia)
Lamour, K., PhD ......................................................Michigan State
Moulton, J.K., PhD ..................................................Arizona

MAJOR DEGREES
Entomology and Plant Pathology ..................................MS
Plants, Soils, and Insects ........................................PhD

The Department of Entomology and Plant Pathology offers a graduate program leading to the Master of Science with a major in entomology and plant pathology, and the Doctor of Philosophy through the interdisciplinary plants, soils and insects program. Students in the entomology concentration may specialize in crop entomology, medical and veterinary entomology, insect biology, insect pest management, or biological control. Students in the plant pathology concentration may specialize in foliar and stem fungus diseases, soilborne pathogens, disease physiology, biocontrol, plant nematology, or virology. For specific information, contact the department head.

MASTER OF SCIENCE
Entomology and Plant Pathology Major

ADMISSION

For admission to the Master of Science program, a student must meet all requirements of the University of Tennessee, Knoxville, Graduate Council and must have completed (1) general botany or biology, eight hours; (2) advanced biological sciences, eight hours; (3) general inorganic chemistry, six to eight hours; (4) organic chemistry, three hours. In addition, three completed rating forms and a written statement of career goals and interest in entomology or plant pathology should be submitted to the department. Submit application, fee, official transcripts, and scores from the general portion of the Graduate Record Examination to the Graduate Admissions Office.

REQUIREMENTS

The program requires a written thesis based on original research and the completion of a minimum of 24 hours of coursework for graduate credit, approved by the student’s advisory committee. Included in the course requirements are two acceptable seminar presentations for one hour each. An oral final exam must be passed to the satisfaction of the advisory committee after the thesis has been completed. A minor is not required but may be selected at the option of the student. The minor will include at least six hours and not more than 10 hours of graduate-level credit in the minor department. The student’s committee shall include a member of the faculty from the minor department to assist in designating courses required for the minor.

DOCTOR OF PHILOSOPHY
Plants, Soils, and Insects Major - Entomology, Plant Pathology, Integrated Pest Management, Bioactive Natural Products Concentrations

A Doctor of Philosophy degree with a major in plants, soils and insects, with concentrations in entomology, plant pathology, integrated pest management, and bioactive natural products, 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 Environmental Sciences. Other concentrations within the PSI major include horticulture, crop sciences, weed biology, plant improvement, and environmental and soil sciences. 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 Graduate Admissions Office. In your application, indicate that you are applying to the plants, soils and insects doctoral program. 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 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 your statement letter and application, please indicate your concentration of interest and intended major professor.

REQUIREMENTS

To obtain the doctorate, the student must meet the following 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, and at least half of the committee must hold teaching appointments. 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. 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 nine hours of the student's coursework must be from outside the Plants, Soils, and Insects major, and a minimum of six hours must be taken in University of Tennessee courses numbered 601 or higher. In addition, 24 hours of course 600 Doctoral Research and Dissertation are required.
- Satisfactory preparation of a written dissertation proposal and its oral defense to the student's committee. This must be completed during the first two semesters of graduate study and before enrollment in 600.
- Passing both written and oral sections of the comprehensive examination. The candidate will be tested on his/her knowledge of the proposed dissertation and related fields.
- Presentation of at least two departmental seminars (two hours of Entomology and Plant Pathology 640), in addition to an exit seminar (no credit).
- Satisfactory preparation of a written dissertation and its oral defense to the student's doctoral committee.

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

Department of
FOOD SCIENCE AND TECHNOLOGY

http://foodscience.utk.edu

H.C. Goan, Head
David A. Golden, Graduate Liaison

Professors
Brekke, C.J., PhD .................................................................Wisconsin
Davidson, F.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

Assistant Professors
Harte, F., PhD .................................................................Washington State
Zivanovic, S., PhD .................................................................Arkansas

Emeritus Faculty
Penfield, M. P., PhD .................................................................Tennessee

MAJOR DEGREES

Food Science and Technology ...............................................MS, PhD

The Department of Food Science and Technology offers the Master of Science and Doctor of Philosophy degrees with a major in food science and technology. Students in the doctoral program may choose research in the concentration areas of 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, rating 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 six 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 two 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.
• 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 six hours of 503.
• In addition to the requirement for six 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 two 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 are required exclusive of doctoral research and dissertation. At least six of the 24 hours must be courses numbered above 600.
• A minimum of six hours of courses for graduate crédito must be taken outside the Department of Food Science and Technology.
• All candidates must complete 601 (two hours) and are expected to attend 601 during their Doctor of Philosophy 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/

George M. Hopper, Head and Graduate Liaison

Professors
Bucher, D.A., PhD ............................................................... Virginia Tech
Dearden, B.L., PhD .............................................................. Colorado State
Fly, J.M., PhD ................................................................. Michigan
Hodges, D.G., PhD .............................................................. Georgia
Hopper, G.M., PhD ............................................................. Virginia Tech
Houston, A.E., 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
Clutterbuck, W.W., PhD ................................................. Mississippi State
Harper, C.A., PhD .............................................................. Clemson
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
Muller, L.L., PhD ............................................................. Georgia
Taylor, M.M., PhD .............................................................. Oregon State
Wang, S., PhD ............................................................... Nanjing Forestry (China)

Instructors
Minser, W.G, MS ............................................................ Tennessee
Moschler, W., MS ........................................................... Virginia Tech

Adjunct Faculty
Albright, R., PhD .................................................. Southern Illinois
Clark, J.D., PhD ............................................................. Arkansas
Franzreb, K., PhD .......................................................... Arizona State
Reams, G.A., PhD ............................................................. Maine
Van Manen, F., PhD .......................................................... Tennessee

Emeriti Faculty
Buckner, E.R., PhD .......................................................... North Carolina State
Dimmick, R.W., PhD ........................................................ Texas
Hay, R.L., PhD .............................................................. Duke
MAJORS                           DEGREES
Forestry..............................................................................MS
Wildlife and Fisheries Science..............................................MS
Natural Resources.................................................................PhD

Graduate study leading to the Master of Science with majors in forestry and in wildlife and fisheries science and the Doctor of Philosophy with a major in natural resources is offered by the Department of Forestry, Wildlife and Fisheries.

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 other 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 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 six 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 shall 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 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 Doctor of Philosophy program normally should have completed a master’s degree prior to beginning the doctoral program. Specific admission requirements include

- a minimum grade point average of 3.0 on a 4.0 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 six hours must be in university courses at the 600 level, exclusive of dissertation hours. Specific requirements are:

Research Methods and Analysis (nine credits in at least two of the subject areas)

- Research/Experimental Design
- Statistics/Econometrics/Biometrics
- GIS/Remote Sensing

Core Subject areas (33 credits to be determined by doctoral committee)
Professional Development (six credits)

- 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 Communications—All students will be required to complete Forestry, Wildlife and Fisheries 612 as part of their program of study. Part of the seminar requirement will consist of assisting in the development and conduct of Forestry, Wildlife and Fisheries 512.

Forestry, Wildlife and Fisheries 600 Doctoral Research and Dissertations (24 credits)

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 Doctor of Philosophy committee will determine the content, nature, and schedule of the comprehensive exam and 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 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 Economics 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
McDaniel, G.L., PhD .......................................................................... Iowa State
Miller, R.D., PhD ................................................................................. Kentucky
Mueller, T.C., PhD ............................................................................... Georgia
Rhodes, G.N., PhD ................................................................................. North Carolina State
Samples, T.J., PhD ................................................................................ Oklahoma State
Sams, C.E., PhD ..................................................................................... Michigan State
Stewart, C.N., PhD (Raccheff Chair) .................................................... Virginia Tech
West, D.R., PhD .................................................................................... Nebraska

Associate Professors
Cheng, Z.M., PhD .................................................................................. Cornell
Gwathmey, C.O., PhD ........................................................................... California (Davis)
Hamilton, S.L., EdD ................................................................................ Louisiana State
Klingeman, W.E., PhD ........................................................................... Georgia
Menendez, G.L., MS ............................................................................... Tennessee
Pantalone, V.R., PhD ............................................................................. North Carolina State
Robinson, D.K., PhD ............................................................................. North Carolina State
Rogers, S.M., MLA ................................................................................... Georgia
Stewart, C.E., MLA .................................................................................. Georgia

Assistant Professors
Chen, Feng, PhD ................................................................................... California (Davis)
Craig, C.C., PhD ................................................................................... Louisiana State
Garton, S., PhD ....................................................................................... Minnesota
Kopsell, D.A., PhD ................................................................................... Georgia
McElroy, S., PhD ..................................................................................... North Carolina State
Sorochan, J.C., PhD ............................................................................... Michigan State
Steckel, L.E., PhD ................................................................................... Illinois
Straw, R.A., PhD ..................................................................................... Tennessee
Thompson, M.A., PhD ............................................................................. Tennessee
Zale, J.M., PhD ...................................................................................... Saskatchewan

Instructor
Flanagan, P.C., MS ................................................................................... Tennessee

Adjunct Faculty
Arelî, Prakash Ph.D. ................................................................................... Georgia
Brown-Faust, James E., PhD ................................................................. Michigan
Bunick, Gerald J., PhD ........................................................................... Pennsylvania
Conway, William S., PhD ..................................................................... New Hampshire
Karpinski, Tatiana V., PhD ................................................................... Russia
Ott, R.J., MBA ......................................................................................... Georgia
Rivero, Raúl E., ED.D .......................................................................... Tennessee
Sobek, Edward A., PhD ......................................................................... Texas
Tchaplinisky, Timothy J., PhD ................................................................. Toronto
Wuillschlegler, Stan, PhD ...................................................................... Arkansas

Emeriti Faculty
Ashburn, E.L., PhD ................................................................................ Tennessee
Callahan, Lloyd, Ph.D. .......................................................................... Rutgers
Coffey, D.L., Ph.D .................................................................................. Purdue
Conger, Bob V., Ph.D. ............................................................................ Washington State
Flinchum, Wayne, PhD .......................................................................... Louisiana
Fribourg, H.A., PhD ............................................................................... Iowa State
Graham, Effin, PhD ................................................................................ Pennsylvania
Jared, John R., PhD ................................................................................ Tennessee
Reich, Vernon H., Ph.D. ......................................................................... Iowa State
Reynolds, John H., Ph.D. ....................................................................... Wisconsin
Sams, D.W., PhD ..................................................................................... Minnesota
Wyatt, J.E., PhD ..................................................................................... Florida

MAJORS

DEGREES

Plant Sciences ......................................................................................... MS
Plants, Soils, and Insects ........................................................................ PhD
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 our departmental homepage. Inquiries may be directed to the Chair, Graduate Committee, Department of Plant Sciences, The University of Tennessee, Knoxville, Tennessee 37996-4561, or uthort@utk.edu.

MASTER OF SCIENCE PROGRAM

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, weeds, cereals, 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 2.7 on a 4.0 scale.

Application must be made to both the Office of Graduate 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, résumé, 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 Admissions (please send photocopy to department). Successful applicants will usually have a composite score on the verbal, mathematical and analytical sections of the Graduate Record Examination of at least 400. Prior undergraduate course work in mathematics, biology and chemistry is recommended.

REQUIREMENTS

- Approval of the academic program by the master’s committee.
- Successful completion of 12 hours of course work in the major at the graduate level (400 or above), exclusive of Plant Sciences 500, 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, 521, 522, Animal Science 571, Environmental and Soil Sciences 434, 444, 516, Ecology and Evolutionary Biology 414, 431, 520, 560, Information Sciences 560, Art 481, or Geography 439.
- Presentation of at least two departmental seminars.

Please see the Degree Program Requirements/Master’s Degrees 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 six 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 course work.

DOCTOR OF PHILOSOPHY

Plants, Soils, and Insects Major · Horticulture, Crop Sciences, Weed Biology, Plant Improvement

Concentrations

The Doctor of Philosophy with a major in plants, soils and insects, with concentrations in horticulture, crop sciences, weed biology, and plant improvement, 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 Environmental Sciences. Other concentrations within the Plants, Soils, and Insects major include environmental and soil sciences, entomology, plant pathology, integrated pest management and bioactive natural products. 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 Graduate Admissions Office. In your application, indicate that you are applying to the Plants, Soils and Insects doctoral program. 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 your statement letter and application, please indicate your concentration of interest and intended major professor.
REQUIREMENTS

To obtain the doctorate, the student must meet the following 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, and at least half of the committee must hold teaching appointments. 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. 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 nine hours of the student’s coursework must be from outside the plants, soils, and insects major, and a minimum of six hours must be taken in University of Tennessee courses numbered 601 or higher. In addition, 24 hours of course 600 Doctoral Research and Dissertation are required.

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

• Passing both written and oral sections of the comprehensive examination. The candidate will be tested on his/her knowledge of the proposed dissertation and related fields.

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

• Satisfactory preparation of a written dissertation and its oral defense to the student’s doctoral committee.
The University of Tennessee Master of Architecture program received a full six-year accreditation as a result of its last NAAB accreditation review in 2002. 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.

As a professional program, the college is committed to help 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.

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

The graduate program in architecture is relatively new, with its first class entering in 1993. However, the School of Architecture, with its professional Bachelor of Architecture program, celebrated its thirty-fifth birthday in 2000. In addition to the undergraduate and graduate programs in architecture, the college also offers an undergraduate degree in interior design. All professional programs in the college are fully accredited, enabling graduates to pursue licensure throughout the United States.

The graduate program in architecture is a first professional degree program. It is 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 the field of architecture but have discovered a deep and abiding interest in the subject. The program also accommodates students who have received an architectural education but have not completed the requirements for a professional degree. These students may receive some advanced standing in the program.

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 two types of degrees: the Bachelor of Architecture and the Master of Architecture. A program may be granted a six-year, three-year, or two-year term of accreditation, depending on its degree of conformance with established educational standards.

Master's degree programs may consist of a pre-professional undergraduate degree and a professional graduate degree, which, when earned sequentially, comprise an accredited professional education. However, the pre-professional degree is not, by itself, recognized as an accredited degree.
School of
ARCHITECTURE

Professors
Davis, M.K., MArch .................................................................Harvard
Kelso, R.M., PhD .................................................................Loughborough
Kinzy, S.A., PhD ..............................................................State University of New York (Buffalo)
Rabun, J.S., PhD ......................................................................York
Robinson, M.A., MArch ....................................................Pennsylvania
Shell, W.S., MArch ...........................................................Columbia

Associate Professors
Davis, T.K., MArch .................................................................Cornell
DeKay, M., MArch ...............................................................Oregon
Debelius, C.A., MArch ........................................................Harvard
Fox, D., MArch ........................................................................Cranbrook Academy of Art
Martella, W.E., BArch .........................................................California (Berkeley)
Moir-McClean, T., MArch .........................................................Michigan
Schimmenti, M., MArch ........................................................Florida

Assistant Professors
Ambroziak, B., MArch ............................................................Princeton
Dodds, G., PhD ........................................................................Pennsylvania
Klinkhammer, B., Dip-Ing ......................................................RWTH (Aachen)
Stach, E., Dipl-Ing .................................................................RWTH (Aachen)

MAJOR DEGREE
Architecture ........................................................................ MArch

MASTER OF ARCHITECTURE PROGRAM

Architecture Major

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 2 applicants, a Bachelor of Architecture degree from an NAAB accredited program, or foreign equivalent is required. Candidates with a GPA less than 3.0 may be considered for conditional admission when evidence of exceptional promise is identified. Submission of a portfolio to Architecture to include an essay and three letters of recommendation are also required. A personal on-site 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 four 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 six 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.

For further information, contact the School of Architecture.
College of Arts and Sciences

Bruce E. Bursten, Dean
Don Richard Cox, Associate Dean for Academic Programs
Carolyn Hodges, Associate Dean for Personnel Affairs and Affirmative Action
William M. Dunne, Associate Dean for Research and Resource Development

http://www.artsci.utk.edu

Departments

Anthropology
Audiology and Speech Pathology
Biochemistry and Cellular and Molecular Biology
Chemistry
Classics
Computer Science
Earth and Planetary Sciences
Ecology and Evolutionary Biology
English
Geography
History
Life Sciences
Mathematics
Microbiology
Modern Foreign Languages and Literatures
Philosophy
Physics and Astronomy
Political Science
Psychology
Religious Studies
Sociology
Theatre

Schools

Art
Music

Facilities for Research and Service

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

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.

General Information

Foreign Study Courses

Foreign study courses offered in some departments of the college provide an opportunity to undertake independent study outside the United States. Prior to departure the student must have a plan of study approved by the department head and a supervising faculty member of the department concerned. Credit will be given only upon fulfilling all requirements set by the department and may vary from 1-15 hours. The maximum credit that may be applied toward a degree in the college is established in each individual case by the department in which the student is working.

Off-Campus Study

Recognizing that learning is not restricted to formal classroom situations, the college allows students to earn credit toward graduation for approved off-campus study. Such study may be undertaken only with prior approval of the faculty member and the department concerned. It may include certain kinds of work experiences, community involvement, or political campaigns. Credit per semester will vary from 1-15 hours. The maximum credit that may be applied toward a degree in the college is established in each individual case by the department in which the student is working.

Independent Study

Certain educational goals may best be met through independent study by an individual under the direction of a faculty member. Students who wish to do such independent work should obtain the approval of the faculty members and the departments concerned prior to embarking upon their study. Credit per semester will vary from 1-15 hours. The maximum credit that may be applied toward a degree in the college is established in each individual case by the department in which the student is working.

Department of ANTHROPOLOGY

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

Andrew Kramer, Head and Graduate Liaison

Associate Professors

Anderson, D.G., PhD ................................................................. Michigan
Kramer, A., PhD ............................................................... Michigan
Marks, M., PhD ................................................................. Tennessee

Assistant Professor

Harper, J.L., PhD ................................................................. Michigan

Research Director

Driskell, B.N., PhD ............................................................... Kentucky

Associate Director

Sherwood, S., PhD ................................................................. Tennessee

Research Associate Professor

Chapman, J. (Director, F.H. McClung Museum), PhD ........ North Carolina

Research Assistant Professor and Curator

Frankenberg, S., PhD ............................................................... Northwestern

Research Assistant Professors

Ahlman, T.M., PhD ................................................................. Tennessee
Elam, M., PhD ................................................................. Missouri
Herrmann, N.P., PhD ............................................................. Tennessee
Sicher, J.A., PhD ................................................................. Tennessee
Vass, A.A., PhD ................................................................. Tennessee

Lecturer and Coordinator, Forensic Center

Jantz, L.M., PhD ................................................................. Tennessee

Lecturers

Develin, J.L., PhD ................................................................. Tennessee
Pendry, D.A., PhD ................................................................. Texas
Qirkko, H.N., PhD ................................................................. Tennessee

Adjunct Professors

Bogard, J.S., PhD ................................................................. Texas (Austin)
Dunnell, R., PhD ................................................................. Yale
Harrison, F.V., PhD ............................................................... Stanford
McCormick, W.F., MD .......................................................... Tennessee
Smith, F.H., PhD ................................................................. Michigan
Stein, J.K., PhD ................................................................. Minnesota

Adjunct Associate Professors

Goldberg, P., PhD ................................................................. Michigan
Sullivan, L.P., PhD ................................................................. Wisconsin (Milwaukee)

Adjunct Assistant Professors

Crites, G.D., PhD ................................................................. Tennessee
Dessel, J.P., PhD ................................................................. Arizona
Douglas, J.C., PhD ................................................................. Houston
Klenk, R.M., PhD ................................................................. Washington
Lev-Tov, J., PhD ................................................................. Tennessee
Polhemus, R.R., PhD .......................................................... Tennessee
Riggs, B.H., PhD ................................................................. Tennessee
Van de Moortel, A., PhD ......................................................... Bryn Mawr

MAJOR

DEGREES

Anthropology ................................................................. MA, PhD

The Department of Anthropology offers both the Master of Arts and Doctor of Philosophy with a major in anthropology and concentrations in archaeology, biological anthropology, cultural anthropology, and zooarchaeology. A concentration in Mediterranean archaeology is available on the master’s level. Additional information on the anthropology graduate program may be obtained from the departmental brochure (see the department’s Web site) or by contacting the department.
MASTER OF ARTS
Anthropology Major

ADMISSION

Students wishing to enter the Master of Arts program with a major in anthropology should have an undergraduate GPA of 3.5 in the major, 3.3 overall, and hold a bachelor’s degree from an accredited university with a major in anthropology. Students with a major in a related field (biology, sociology, geology, classics or geography) will be considered only if they have a formal minor in anthropology or its equivalent (at least five upper-division anthropology courses).

In cooperation with the Classics and History Departments, the Department of Anthropology is able to offer a concentration in Mediterranean archaeology. Students who apply in this area should have completed appropriate undergraduate courses in archaeology or anthropology. An anthropology minor is preferred.

All prospective MA students must make formal application to the University of Tennessee, Knoxville, Graduate Admissions. Copies of the application form, transcripts, and GRE scores that are sent to graduate admissions should also be sent directly to the Department of Anthropology at the same time. In addition, the department requires a letter of intent from the applicant indicating career goals and reasons for selecting the University of Tennessee, Knoxville and three letters of recommendation and one sample of the prospective student’s written work (a class paper or research report). These materials should be sent directly to the Graduate Secretary, Department of Anthropology, South Stadium Hall 250, The University of Tennessee, Knoxville, Tennessee 37996-0720.

Graduate applications are considered once a year by the Graduate Committee. All application materials must be received in the department by January 15 for admission 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

- Selection of an MA advisor. This should be done as soon as possible in the student’s program but must be done 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. Coursework must include three core classes taken in the first year
  a. 510 Method and Theory in Cultural Anthropology
  b. 560 Theory in Archaeology
  c. 590 Method and Theory in Biological Anthropology

Additional coursework should be selected in consultation with the student’s advisor and must include one additional course from two anthropology concentrations besides the student’s primary concentration. At least 20 hours of coursework must be at the 500 level or higher. Students concentrating in Mediterranean archaeology, in consultation with their advisor, should select their additional 18 hours from courses offered in 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 GEE scores.
  - All MA students must attend the graduate section of the visiting lecturer program. To insure compliance with this requirement, each student is required to register for one credit 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 GEE.
  - 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 and at least one other member of the anthropology faculty along with 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.
  - Two copies of the thesis are required by the Office of Graduate Student Services. 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 have the option of completing a minor in statistics. The statistics minor requires nine 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 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, but also on 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
or
- 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 shall 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 nine 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
or
- 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 Graduate Studies, 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
Tim Hiles, Associate Director
Tom Riesing, Graduate Liaison

**Professors**

Brakke, M., MFA ................................................................. Yale
Goldenstein, M.B., MFA .............................................................. Nebraska
Habel, D.M., PhD ............................................................... Michigan
Lee, B., MFA ........................................................................ Yale
The Master of Fine Arts is the terminal degree in studio art. It is offered in the concentration areas of ceramics, graphic design, drawing, media arts, painting, printmaking, and sculpture.

**MAJOR OF FINE ARTS**

**Art Major**

**ADMISSION**

To become a candidate, the applicant must be admitted by the Office of Graduate Admissions and approved by the School of Art. In addition to the minimum admission requirements, the School of Art specifically requires the following.

- A detailed letter of intent including statement requesting assistantship, if desired
- Three letters of recommendation from former professors or professionals in the field
- An undergraduate major in art or evidence of equivalent proficiency
- A portfolio 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

- Successful completion of 20 hours of studio in a concentration area. An inter-area program must be approved by the graduate faculty only after the second semester in residence. Ten hours of concentration must be in second year courses (512, 514, etc.).
- A minimum of nine hours of graduate level academic (non-studio) courses of which at least six hours are to be in art history.
- Eleven hours of electives which may consist of any combination of courses offered by the university for graduate credit.
- Art 599, 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 six hours per semester and use of School of Art facilities so that students are available for discussion and criticism.

The candidate’s committee will consist of a minimum of 3 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 (designated as chairperson) and a faculty member from outside the concentration area. The inclusion of an art history faculty member on each committee is encouraged.

Exhibition and oral examination: With the completion of all requirements for the MFA, the student 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 semesters in residence, the student must present a portfolio for evaluation by the faculty and receive permission to continue in the program.
- Second-year evaluation. With completion of all coursework, the student must present work for evaluation by the faculty and receive permission to register for Projects 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, probation 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 complete 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. Graduate Council policy stipulates that a member from the minor unit must serve on the thesis committee.
The master's program in speech pathology is a two-year program and consists of the completion of 42 hours of academic coursework at the 500 or 600 levels. Undergraduate coursework may not be substituted for seminar courses. Students who have not completed an undergraduate course in each of the following areas—speech sound disorders, voice disorders, and fluency disorders—must complete one graduate course in each of the three areas.

Students majoring in speech pathology may elect either the thesis or non-thesis option. The master's program in speech pathology with thesis includes six hours of 500 credit in the preparation of an acceptable thesis representing original independent work, and a final oral examination. Students in the non-thesis option must pass a final written examination.

Aural Habilitation Concentration

Graduate students in both audiology and speech pathology may elect to pursue a concentration in the area of aural habilitation. Admission to the program is competitive and applications are available on the departmental website. The aural habilitation concentration requires:

- three semesters of clinical practicum in treatment of children who have hearing impairments totaling a minimum of 130 clock hours
- completion of six hours of graduate course work in language, audiology and/or aural habilitation in elective requirements for the MA or AuD

Specific requirements are outlined in the MA and AuD Graduate Handbooks as well as on the departmental Web site.

MAJORs

Speech Pathology Major

Admission to this graduate program is competitive. This graduate program is accredited by the Council on Academic Accreditation of the American Speech-Language-Hearing Association.

REQUIREMENTS

The master's program in speech pathology is a two-year program and consists of the completion of 42 hours of academic content courses (including thesis) plus practicum. A minimum of three academic courses must be completed during all semesters (terms) except one. That is, students must take a minimum of nine hours of academic courses for at least four semesters or terms and six hours in the other semester or term.

The required courses are 506, 511, 518, 526, 539 or 541, 561, 582; at least two seminars from the following courses—522, 523, 531, 626, or 661; and at least 15 hours of elective courses. Undergraduate coursework may not be substituted for seminar courses. Students who have not completed an undergraduate course in each of the following areas—speech sound disorders, voice disorders, and fluency disorders—must complete one graduate course in each of the three areas.

Students majoring in speech pathology may elect either the thesis or non-thesis option. The master's program in speech pathology with thesis includes six hours of 500 credit in the preparation of an acceptable thesis representing original independent work, and a final oral examination. Students in the non-thesis option must pass a final written examination.

Aural Habilitation Concentration

Graduate students in both audiology and speech pathology may elect to pursue a concentration in the area of aural habilitation. Admission to the program is competitive and applications are available on the departmental website. The aural habilitation concentration requires:

- three semesters of clinical practicum in treatment of children who have hearing impairments totaling a minimum of 130 clock hours
- completion of six hours of graduate course work in language, audiology and/or aural habilitation in elective requirements for the MA or AuD

Specific requirements are outlined in the MA and AuD Graduate Handbooks as well as on the departmental Web site.

MASTERS OF ARTS

Audiology Major

Graduate study leading to the MA with a major in audiology is available only to those students accepted to and enrolled in the AuD program or the PhD program in speech and hearing sciences. This degree is awarded to students who desire a master's degree as part of their progress toward a doctorate.

A student must be in good standing within the AuD or PhD program and must have completed a minimum of 58 credits of academic coursework at the 500 or 600 levels. Students must pass a qualifying examination or equivalent in their doctoral program and must earn a B or better in all courses that are to count toward the 58 credit hour total.

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
• foundations of practice for 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

The program is 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 audiology, 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 preceding section)

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 speech and language pathology, audiology, speech-language science or hearing 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 course work, 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 (six credits must be at the 600 level within the department). These will include
  a. a minimum of six hours on the topic of major interest
  b. a minimum of six hours earned through participation in two different research projects
  c. three hours of Audiology and Speech Pathology 611 (Experimental Design) course (or equivalent)
  d. three hours of Audiology and Speech Pathology 655 supervised teaching experience

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/bcmb/

Bruce D. McKee, Head and Graduate Liaison

Professors
Ganguly, R., PhD .................................................................Nebraska
Hickok, L., PhD .................................................................Massachusetts
Howell, E., PhD .................................................................Lehigh
Joy, D. (Distinguished Scientist), PhD .............................................Oxford (UK)
Kennedy, J., PhD ............................................................................Iowa
Koontz, J., PhD .............................................................................Kentucky
MacCabe, J., PhD ............................................................................California (Davis)
McKee, B., Ph.D ..............................................................................Michigan State
Mullin, B., Ph.D ..............................................................................North Carolina State
Peterson, C., Ph.D ............................................................................Louisiana State
Roberts, D., PhD .............................................................................California (Davis)
Schwartz, O., PhD ............................................................................North Carolina State
Serpersu, E., Ph.D ............................................................................Hatecepe

Associate Professors
Bruce, B., PhD .............................................................................California (Berkeley)
Hall, J., PhD ..................................................................................Illinois
Prosser, R., Ph.D .............................................................................Illinois

Assistant Professors
Dealwis, C., PhD .............................................................................London
Fernandez, E., PhD ...........................................................................Loyola
Gao, H., PhD ...............................................................................Harvard
Jain, N., PhD ................................................................................Brandeis
Kitazono, A., PhD ...........................................................................Nagasaki (Japan)
Labrador, M., PhD .........................................................................Madrid (Spain)
Nebenführ, A., PhD .........................................................................Oregon State
Park, J., PhD ..................................................................................Texas
Venkataraman, S., PhD .................................................................Ohio State
Von Amim, A., PhD .........................................................................East Anglia (UK)

Adjunct and Research Faculty
Allison, D., MS .................................................................................Tennessee
Georgiou, S., Ph.D ...........................................................................Manchester
Hartman, F., Ph.D ...........................................................................Tennessee
Klebig, M., Ph.D .............................................................................Tennessee
Liu, Yie, Ph.D ................................................................................Sweden
Mazur, P., Ph.D ...............................................................................Harvard
O’Neill, H, Ph.D .............................................................................Dublin
Rinchik, G., PhD .................................................................Duke
Wetzel, R., PhD .................................................................California (Berkeley)

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 3.0 out of 4.0

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 3.0 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.
- Six 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 six 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 six 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, Interim Head
Charles S. Feigler, 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
Feigerle, C.S., PhD ..............................................................Colorado
Guiochon, G.A. (Distinguished Scientist, Science Alliance Center of Excellence), PhD .........................Université de Paris (France)
Kabalka, G.W. (Robert H. Cole Professor, Alumni Distinguished Service Professor), PhD .......................Akron
Kovac, J.D., PhD .................................................................Purdue
Larese, J.Z., PhD .................................................................Yale
Magid, L.J., PhD .................................................................Tennessee
Magid, R.M., PhD .................................................................Yale
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
Sempiaiak, M.J., PhD ...............................................................Iowa State
Williams, T.F. (Alumni Distinguished Service Professor), PhD ................................London (UK)
Woods, III, C., PhD ..............................................................North Carolina State
Xue, Z., PhD .................................................................UCLA
The requirements for the MS with a major in chemistry (except for the chemical physics concentration) consist of the satisfactory completion of

- 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 two hours of credit in Chemistry 601.
- Eighteen 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, 530-531-532-533, 550-551-552-553-554, 570-571-572-573 and 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 in chemistry with concentration in physical chemistry plus six 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.
Computer Science Major

REQUIREMENTS

The student must reach agreement on a thesis topic with a faculty advisor and pass an oral exam on the problems before a committee of three or more faculty members, at least two of whom must be computer science faculty.

Non-Thesis Option

The student must take coursework in an area to prepare for the non-thesis master’s examination. The student’s advisor must verify that an acceptable set of courses has been taken before the student may schedule the examination. Information concerning the examination is available in the departmental office.

Problems in Lieu of Thesis Option

The student must reach agreement on the problem topic with a faculty advisor and pass an oral exam on the problems before a committee of three or more faculty members, at least two of whom must be computer science faculty.

Computer Science Minor

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

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 teachers 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 Admissions.

- The student should satisfy the same background requirements as for the master’s program. See the departmental brochure for details.

REQUIREMENTS

Graduate courses taken outside the department are sometimes allowed but must be approved by the Graduate Committee before enrollment.

Thesis Option

In systems programming are required for admission.

A course in formal languages as well as of college mathematics (e.g. linear algebra, differential equations, probability) and a course in formal languages as well as in systems programming are required for admission.

Requirements

For the master’s degree, 30 hours of graduate credit are required, 24 of which must be 500 level or above. Computer Science 530, 560 and 580 or 581 are required for the degree.

Department of

Computer Science

http://www.cs.utk.edu/

Michael W. Berry, Interim Head
David W. Straugh, Graduate Liaison

Professors

Berry, M.W., PhD ................................................................. Illinois
Dongarra, J.J., PhD ............................................................... New Mexico
Langston, M.A., PhD ............................................................ Texas A&M
Poore, J.H., PhD ................................................................. Georgia Institute of Technology
Thomason, M.G., PhD ........................................................... Duke
Vander Zanden, B.T., PhD ................................................. Cornell
Ward, R.C., PhD ................................................................. Virginia

Associate Professors

Beck, M., PhD ................................................................. Cornell
Gregor, J., PhD ................................................................. Aalborg (Denmark)
MacLennan, B.J., PhD ....................................................... Purdue
Parker, L.E., PhD .............................................................. Massachusetts Institute of Technology
Plank, J.S., PhD ................................................................. Princeton
Vose, M.D., PhD ................................................................. Texas

Assistant Professors

Huang, J., PhD ................................................................. Ohio State
Straight, D.W., PhD .......................................................... Texas

Lecturer

Mayo, J.W., MS ................................................................. Tennessee

MAJOR DEGREES

Computer Science ......................................................... MS, PhD
required for the degree. At least six 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.

Department of
EARTH AND PLANETARY SCIENCES
http://geoweb.gg.utk.edu/
Claudia I. Mora, Head
Larry D. McKay, Graduate Liaison

Professors
Dunne, W.M. (Associate Dean), PhD .............................................Bristol
Hatcher, R.T., (UT Knoxville/ORNL Distinguished Scientist), PhD .................................................................Tennessee
Labotka, T., PhD .................................................................California Institute of Technology
McKay, L.D., PhD .................................................................Waterloo
McKinney, M.L., PhD .............................................................Yale
McSweeney, H., (Distinguished Professor of Science), PhD ..........Harvard
Mitra, K.C., PhD .................................................................Western Ontario
Mora, C.I. (Carden Professor), PhD .................................................Wisconsin
Taylor, L.A., PhD ..................................................................Lehigh

Associate Professors
Clark, G.M., PhD .................................................................Penn State
Perfect, E., PhD ..................................................................Cornell

Assistant Professors
Kah, L.C., PhD .................................................................Harvard
Moersh, J.E., PhD ...............................................................Cornell
Uhle, M., PhD .................................................................Virginia

MAJOR DEGREES
Geology ................................................................................MS, PhD

The Department of Earth and Planetary Sciences offers both the Master of Science and Doctor of Philosophy 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 the deficiencies must be removed within the first year without graduate credit. Substitutions may also be allowed.

MAJOR 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 3.0 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, 475, 480, 530, 563, 565, 568.
  2. 420, 421, 450, 545, 546, 550, 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 group 3 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 3.0 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 field 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 the sum of nine hours of 600-level geology courses, nine hours of 500-level or higher geology courses, and six 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
Arthur C. Echternacht, Associate Head
Gary F. McCracken, Graduate Liaison

Professors
Boake, C.R.B., PhD .................................................Cornell
Burghardt, G.M., PhD ................................................Chicago
Echternacht, A.C., PhD .............................................Kansas
Emier, D.A., PhD ..................................................Minnesota
Gavilets, 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
McCranken, G.R., PhD ............................................Cornell
Petersen, R. (Distinguished Professor), PhD ..................Columbia
Riechert, S.E., PhD .................................................Wisconsin
Sayler, G.S., PhD .....................................................Idaho
Schilling, E., PhD ....................................................Indiana
Schultz, T.W., PhD ..................................................Tennessee
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
Wofford, B.E. (Curator of Herbarium), PhD .....................Tennessee
Weltzin, J.F., PhD ..................................................Arizona

Assistant Professors
Butler, M., PhD ....................................................Washington (St. Louis)
Fordyce, J.A., PhD ..................................................Davis
Gilchrist, M., PhD ...................................................Duke
Near, T.J., PhD ......................................................Illinois
Sanders, N.J., PhD ..................................................Stanford
Williams, J., PhD ...................................................Georgia

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

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

MAJOR
Ecology and Evolutionary Biology ..............................................MS, PhD

The Department of Ecology and Evolutionary Biology administers an interdisciplinary graduate program which offers the Master of Science and Doctor of Philosophy degrees with a major in ecology and evolutionary biology and concentrations in behavior, ecology (including mathematical ecology) and evolutionary biology.

ADMISSION
Applications are accepted once a year. The deadline for receipt of all application materials is 6 January 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 an academic background consistent with a bachelor’s degree in one of the life sciences. They 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 3.0, and 3.0 or above for all science and mathematics courses, on a 4.0 scale (successful applicants will usually have grade-point averages well above these minima).

Application must be made to both the Office of Graduate 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.

MASTER OF SCIENCE
Ecology and Evolutionary Biology Major

REQUIREMENTS
In addition to general requirements of the Graduate Council, aspirants for the Master of Science are expected to (1) during the first semester in residence, 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; (2) complete course requirements as determined by the department and the student’s faculty dissertation research committee; and (3) satisfactorily complete and defend a research thesis.

DOCTOR OF PHILOSOPHY
Ecology and Evolutionary Biology Major

REQUIREMENTS
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 Economics 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
Carroll, D.A. (J. Douglas Bruce Professor), PhD ...........North Carolina
Cox, D.R., PhD .........................................................................Missouri
Dumas, B.K., PhD .................................................................Arkansas
Dunn, A.R., PhD .......................................................................Washington
Ensor, A.R., PhD .....................................................................Indiana
Finneran, R. J. (John C. Hodges Professor), PhD .................North Carolina
Garner, Jr., S.B. (Young Professor), PhD ................................Princeton
Goslee, D.F., PhD ......................................................................Yale
Goslee, N.M. (Alumni Distinguished and Young Professor), PhD ..........Yale
Hefferman, T.J.A. (Curry Professor), PhD ................................Cambridge
Kallet, M. (John C. Hodges Teaching Professor), PhD ..........Rutgers
Keene, M.L., PhD ....................................................................Texas
Leggett, B.J. (Humanities Professor), PhD .........................Florida
Leki, I., PhD ........................................................................Illinois
Liuzzo, R.M., PhD .................................................................Yale
Lofaro, M.A. (Young Professor), PhD .................................Maryland
Luprecht, M.A., PhD ..............................................................Florida
Maland, C, PhD ................................................................Michigan
Papke, M.E., PhD .................................................................McGill (Canada)
Smith, A., 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
Hirst, R., PhD ........................................................................Rensselaer Polytechnic Institute
Howes, L.L., PhD .................................................................Columbia
Jennings, L.D., PhD ..............................................................North Carolina
Knight, M., MFA .................................................................Virginia
Reiff, M.J., PhD .................................................................Kansas

Assistant Professors

Abraham, M., PhD ...............................................................Purdue
Billone, A.C., PhD ...............................................................Princeton
Coleman, D.D., PhD .............................................................Stanford
Fishman, J.M., PhD .............................................................Stanford
Haddox, T.F., PhD ...............................................................Vanderbilt
Hirschfeld, H.A., PhD ..........................................................Duke
Ikard, D., PhD .........................................................................Wisconsin
Schoenbach, L.M., PhD.........................................................Virginia
Seshagiri, U., PhD .................................................................Illinois
Thaggert, M., PhD ..............................................................(California) Berkeley

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
Christie, P.P., PhD .......................................................................Tennessee
Dziuban, E.K., MA .................................................................Tennessee
Forsythe, M.L., MA .................................................................Tennessee
Hardwig, M.R., PhD .............................................................Tennessee
Hardwig, W.J., PhD .................................................................Florida
Harris, S.C., PhD .......................................................................Tennessee
Havens, K.L., PhD .................................................................Tennessee
Hussein, A., PhD .................................................................Tennessee
Knox, L., MA .......................................................................Indiana
Kriete, L.M., PhD .................................................................Washington (St. Louis)
Larsen, W.B., PhD .................................................................Tennessee
McCue, K., MA .................................................................Tennessee
McDowell, M.R., MA .............................................................Tennessee
McKinstry, D.K., PhD .............................................................Tennessee
Melton-Summer, S.E., PhD ..................................................Tennessee
Meredith, E.G., MA .................................................................Tennessee
Morgan, T., PhD ..............................................................State University of New York (Buffalo)
Palmer, H.M., MA .................................................................Tennessee
Pearson, F.M., MA .................................................................Tennessee
Pevler, J.L., MA .................................................................Tennessee
Preston, N.H., PhD .................................................................Tennessee
Renfroe, M.M., PhD .................................................................Tennessee
Robertson, K.C., MA .............................................................Tennessee
Senasti, D.M., PhD .................................................................Alabama
Sheffield, C.L., MA .................................................................Radford
Spirko, R.L., PhD .................................................................North Carolina
Stafford, A.A., PhD ...............................................................Pittsburgh
Wilhelm, R., PhD .................................................................Tennessee
Yost, R., MA .................................................................Tennessee

Permanent Part-Time Lecturer

Berry, L.C., MA .................................................................Tennessee

Writing Center Director

Benson, K.F., EdD .................................................................Tennessee

MAJOR DEGREES

English ..................................................................................MA, 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 about 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 and 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.artsci.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 six hours at the 600 level; 12 additional hours at the 500-600 level (Only three hours of 593 Independent Study may be applied toward the MA); and six hours for graduate credit at any level, including the 400 level. In this coursework, students must maintain at least a 3.0 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 one-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 one-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 free-lance 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.

REQUIREMENTS

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 nine hours in writing and nine in literature, the remaining six to be selected from any English courses at the proper level. Of the courses in writing, at least three must be taken at the 500 level; additional 500-level courses are strongly recommended.

Writing Project

One of the following writing projects for six hours of credit

- 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 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.

Coursework

At least 54 hours beyond the BA (of which at least 24 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 three hours of 593 Independent Study may be applied toward the MA and three after the MA); a three-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 six 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 3.5 GPA.
Dissertation

Twenty-four hours of dissertation. 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 a passing grade on the language examination 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 three of which must be from English 508 or 509 History of the English Language; and completion of one course in language taught in the Department of English at the 300- or 400-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 four-hour qualifying examination taken before the end of the first year of PhD coursework. This examination is given three times a year with the MA written examination.

• A comprehensive written 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 coursework required. 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.

Residence Requirement

Two consecutive semesters as a full-time student. For students not on teaching assistantships, full-time consists of nine or more hours of coursework and/or dissertation hours each semester. For students on assistantships, full-time consists of at least six hours of courses and/or dissertation hours and three hours of teaching each semester.

Department of GEOGRAPHY

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

Bruce A. Ralston, Head
Sidney R. Jumper, Graduate Liaison

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 (Berkely)
Pulsipher, L.M., PhD ...........................................Southern Illinois
Ralston, B.A., PhD ..............................................Northwestern
Rehder, J.B., PhD ..............................................Louisiana State
Shaw, S.L., PhD ................................................Ohio State

Associate Professors
Orvis, K., PhD ..................................................California (Berkely)

Assistant Professors
Drever, A., PhD ................................................California (Los Angeles)
Grissino-Mayer, H., PhD .........................................Arizona

Adjunct Faculty
Blasing, T.J., PhD ................................................Wisconsin
Brown, M.A., PhD ...............................................Ohio State
Griphasover, M.M., PhD ......................................Tennessee
Harrison, G., PhD ................................................Tennessee
Liu, C., PhD ........................................................Tennessee
McKenn, R., PhD .................................................Oregon
Tankersley, R.D., PhD ........................................Tennessee
Washington-Allen, R., PhD ...................................Utah State
Wilbanks, T.J., PhD .............................................Syracuse

MAJOR DEGREES

Geography ..................................................MS, PhD

The department offers the Master of Science and Doctor of Philosophy degrees. 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 PROGRAM
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 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 during residency), 504, and three hours at the 600 level. In the thesis option, six 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 nine 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 units in courses outside of their specialty areas for up to three of the nine required outside units. 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; 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 Economics for program description.

Department of HISTORY
http://web.utk.edu/~history/

Todd A. Diacon, Head
Thomas E. Burman, Graduate Liaison

Professors
Ash, S.V., PhD ................................................................. Tennessee
Bohstedt, J., PhD ......................................................... Harvard
Brummell, P., PhD ....................................................... Chicago
Crabtree, L. (Chancellor), PhD ......................................... Minnesota
Cutler, W., PhD ............................................................. Texas
Diacon, T.A., PhD ....................................................... Wisconsin
Feller, D., PhD ............................................................. Wisconsin
Mayhew, A. (Vice Chancellor), PhD ................................ Texas
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
Fleming, C.G., PhD ...................................................... Duke
Freeberg, E., PhD ........................................................ Emory
Glover, L., PhD ........................................................... Kentucky
Higgs, C., PhD ............................................................. Yale
Liulevicius, V.G., PhD ............................................... Pennsylvania
Piehler, G.K., PhD ........................................................... Rutgers

Assistant Professors
Dessel, J.P., PhD ............................................................. Arizona
DeWeerdt, H., PhD ....................................................... Harvard
Kulikowski, M., PhD .................................................... Toronto
Liu, L., PhD ............................................................... California (San Diego)
McIntosh, J., PhD ..................................................... John Hopkins
Phillips, D., MA .......................................................... Harvard
Sacco, L., PhD ............................................................ Southern California
Tompkins, D., PhD ...................................................... Columbia
White, G., PhD ........................................................... Temple

MAJOR DEGREES
History .................................................................MA, PhD

The Department of History offers graduate study leading to the Master of Arts and Doctor of Philosophy degrees. 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 nine related hours may be taken outside the department. As many as nine graduate credits taken elsewhere may be applied toward the MA degree. Except by prior approval of the Director of Graduate Studies, a student’s coursework must be at the 500 level or above.

Thesis Option

24 hours of coursework and six 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 six hours must be completed in each of two MA fields. The primary field is examined by a two-hour written examination within one week by a one-hour oral examination with the single grade of pass/fail 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 3.0 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 will be dropped from the 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

- Complete History 510 at the University of Tennessee, Knoxville (may be waived for comparable experience elsewhere).

- Spend two consecutive semesters in residence.
- Complete nine hours in one group I doctoral field. There is no minimum hours requirement for a group II field. Complete nine 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 3.0 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 six hours may be taken outside of the department.
- Except by prior approval of the Director of Graduate Studies, a student’s coursework must be at the 500 level or above.

Language Requirements

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 which must be completed at any time before the comprehensive examination is taken. If a student fails this, he or she may retake the exam one time only and must do so the following semester.

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, course work, and language requirements (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 3.0. 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 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:** Premodern 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—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 three 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, 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 African and African-American studies, American studies, Asian studies, cinema studies, comparative literature, environmental studies, global studies, Latin American studies, legal studies, Judaic studies, linguistics, medieval studies, urban 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

Chair
Ilona Leki, English

Graduate Certificate in Linguistics

The linguistics program offers a graduate certificate 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 six 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 3.0. 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 eighteen credit 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 six credit hours may be accepted from candidates upon admission. Students will satisfy the requirements of the certificate program by selecting eighteen 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.

**REQUIREMENTS**

- 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 fifteen credit hours: Audiology and Speech Pathology 506, 601, 652, 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 three-credit 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.

**Graduate Certificate in Medieval Studies**

Chair
Robert Bast, History

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 MA’s 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 six 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 3.0. 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 fifteen credit 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 six credit hours may be accepted from candidates upon admission. Students will satisfy the requirements of the certificate program by selecting fifteen 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.

REQUIREMENTS

- Medieval Studies 510.
- 12 additional hours chosen from at least two disciplines. A minimum of six 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
Chair
Cheryl Brown Travis, Psychology

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 six 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 3.0. 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 fifteen credit hours is required; all courses must be selected in consultation with a program advisor, who approves their selection. A certificate cannot be earned without program approval by the advisor.

REQUIREMENTS

- 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, English 584, Health 420, 520, Public Health 585, Law 849, 862, 958, Women’s Studies 400, 410, 422, 425, 434, 466, 469, 476, 483, 510, 593.
- 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)
Otto J. Schwarz, Chair

MAJOR DEGREES

Life Sciences..........................MS, PhD

The program leading to the Master of Science and Doctor of Philosophy with a major in life sciences are interdepartmental and intercollegiate and are 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
Jeffrey Becker, 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 eight 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 3.0 out of 4.0. 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.

**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; Botany 521, 522; Biochemistry and Cellular and Molecular Biology 511, 512; 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 six 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**


**Robert J. Daverman, Interim Head**

**David F. Anderson, Graduate Liaison**

**Professors**

Alexiades, V., PhD ......................................................... Delaware
Anderson, D.F., PhD ......................................................... Chicago
Conway, J.B., PhD .............................................................. Louisiana State
Daverman, R.J., PhD ......................................................... Wisconsin
Dobbs, D.E., PhD ............................................................... Cornell
Dyak, J., PhD ................................................................. Warsaw (Poland)
Feng, X., PhD ................................................................. Purdue
Gavrilets, S., PhD .............................................................. Moscow State
Gross, L., PhD ................................................................. Cornell
Hallam, T.G, PhD ............................................................ Missouri
Hinton, D.B., Ph.D ............................................................ Tennessee
Jordan, G.S., PhD ............................................................. Wisconsin
Karakashian, O., Ph.D ...................................................... Harvard
Lenhart, S., Ph.D .............................................................. Kentucky
Mulay, S., Ph.D ............................................................... Purdue
Plaut, C.P., Ph.D ............................................................. Maryland
Rajput, B.S., Ph.D ........................................................... Illinois
Richter, S., Ph.D ............................................................. Michigan
Rosinski, J., Ph.D ............................................................. Wroclaw University
Schaefler, P.W., Ph.D ......................................................... Maryland
Simpson, H., Ph.D ............................................................ California Institute of Technology
Soni, R.P., Ph.D ............................................................... Oregon State
Stephenson, K.R., Ph.D ..................................................... Wisconsin
Sundberg, C., Ph.D ............................................................ Wisconsin
Thistledewihte, M., Ph.D ................................................... Manchester (UK)
Wade, W.R., Ph.D ............................................................ California (Riverside)
Wagner, C.G., Ph.D ........................................................... Duke
Xiong, J., Ph.D ............................................................... North Carolina (Chapel Hill)

**Associate Professors**

Collins, C., Ph.D ............................................................ Minnesota
Freire, A., Ph.D ............................................................. Princeton
Guan, B., PhD ................................................................. Massachusetts
Schulze, T., Ph.D ............................................................. Northwestern
Todorova, G.H., Ph.D ....................................................... Moscow State

**Assistant Professors**

Brodsky, N., Ph.D ........................................................... Saskatchewan
Chen, X., Ph.D ............................................................... Case Western Reserve
Conant, J., Ph.D .............................................................. Rutgers
Denzler, J., Ph.D ............................................................. ETH (Zurich)
Kachi, Y., Ph.D ............................................................... Tokyo
Tzermias, P., Ph.D .......................................................... California (Berkeley)
Wang, C., Ph.D .............................................................. Temple

**Lecturers**

Baiamonte, M., MS .......................................................... Texas A&M
Bonee, K., MS ................................................................. Tennessee
Campbell, T., MM ............................................................ Tennessee
Cook, T., MS ................................................................. Tennessee
Farvin, F., MS ............................................................... Tennessee Tech
The program by taking 504 during the summer. Ment (b) might be satisfied concurrently with coursework. A course in matrix algebra (251 or equivalent). Completed one year of calculus (141-142 or equivalent) and 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, six 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. For this option it is also required 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.

- prerequisite courses—Numerical Algorithms 371 or Numerical Analysis 471 or Numerical Algebra 472; Methods in Applied Mathematics 512 or both Differential Equations II 431 and Partial Differential Equations 435; Honors Advanced Calculus 447-448 or Advanced Calculus I, II 445-446; Matrix Algebra II 453
- one hour of Seminar in Applied Mathematics 519 or Seminar in Mathematical Ecology 589

**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.

**MAJOR DEGREES**

Mathematics.................MMath, MS, PhD

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 student offering mathematics as a minor for the master’s degree is required to obtain at least six hours of resident graduate credit in courses numbered above 400 and approved by both the major department and the Department of Mathematics.

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, six 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.

**MAJOR DEGREES**

Mathematics.................MMath, MS, PhD

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 student offering mathematics as a minor for the master’s degree is required to obtain at least six hours of resident graduate credit in courses numbered above 400 and approved by both the major department and the Department of Mathematics.

For additional information, please visit the graduate Web site on the Department of Mathematics’ homepage at www.math.utk.edu.
• 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 at most twice.

• 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 other one-semester 500-level courses from the following list grouped by examination area: analysis (545-546, 547), computational and applied mathematics (571-572, 574, 575, 577, 578), differential equations (513-514, 515-516, 531-532, 535-536, 537-538, 581-582, 585), stochastics (521-522, 523-524, 525-526), and topology-geometry (561-562, 567-568). 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.

**Mathematical Ecology/Evolution Concentration**

A student must pass written examinations on mathematical ecology (581-582) and one of the following year-long sequences: analysis (545-546), computational and applied mathematics (571-572), differential equations (535-536), and stochastics (523-524). 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 cannot take any examinations after four failures.

In addition to the two-year-long sequences chosen for the written examinations, a student must take four other one-semester 500-level courses from the following list grouped by examination area: analysis (545-546, 547), computational and applied mathematics (571-572, 574, 575, 577, 578), differential equations (513-514, 515-516, 531-532, 535-536, 537-538, 581-582, 585), stochastics (521-522, 523-524, 525-526), and topology-geometry (561-562, 567-568). 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.

**Department of MICROBIOLOGY**

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

**Jeffrey M. Becker, Head**

Pamela Small, Graduate Liaison

**Professors**

Becker, J.M., PhD .......................................................... Cincinnati
Brian, D.A., PhD/DVM .................................................. Michigan State
Moore, R.N., PhD ......................................................... Texas (Austin)
Riggsby, W.S., PhD ....................................................... Yale
Rouse, B.T., PhD ......................................................... Guelph (Canada)
BVSc
Sayer, G.S., PhD .......................................................... Idaho
Small, P.L.C., PhD ......................................................... Stanford
White, D.C. (Distinguished Scientist),
MD ................................................................. Tufts
PhD .......................................................... Rockefeller

**Associate Professor**

Wilhelm, S., PhD ......................................................... Western Ontario

**Assistant Professors**

Buchan, A., PhD .............................................................. Yale
Reynolds, T., PhD ........................................................... Vanderbilt
Sanger, T.Y., PhD .......................................................... Western Australia (Perth)
Sparer, T.E., PhD ......................................................... Emory University School of Medicine
Zinser, F., PhD .......................................................... Harvard

**Research Assistant Professors**

Fleming, J., PhD .......................................................... Tennessee
Hauser, M., PhD .......................................................... California (Irvine)
Kumaraguru, U., PhD .................................................... Madras (India)
Layton, A.C., PhD .......................................................... Purdue
Lee, B-K, PhD .......................................................... Tennessee
Pflüger, S., PhD .......................................................... Florida State
Ripp, S., PhD ............................................................ Oklahoma State
Sanseverino, J., PhD ...................................................... Lehigh

**MAJOR DEGREES**

Microbiology .......................................................... MS, PhD

The Department of Microbiology offers both the Master of Science and Doctor of Philosophy. Students have the option of selecting 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 3.0 or better GPA on a 4.0 system. Included in the undergraduate course credits should be (1) a full year of general biological science; (2) one year of calculus; (3) two years of chemistry, including one year of organic; (4) one year of physics; and (5) an introductory course in microbiology. In many cases, deficiencies in requirements may be remedied 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 six thesis credits
- a 3.0 GPA in all courses taken for graduate credit after 12 hours of credit have been earned in courses graded on the A-F system
- a 3.0 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 the master’s degree usually take three or four years to complete the degree.

REQUIREMENTS

Departmental requirements are

- a 3.0 GPA in all courses taken for graduate credit after 12 hours of credit have been earned in courses graded on the A-F scale
- a 3.0 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/

Chaucer J. Mellor, Interim Head
Stefanie Ohnesorg, Graduate Liaison

Professors

Brady, P., (Shumway Chair of Excellence), PhD ..............................................................Université de Paris (Sorbonne)
Brazio-Skov, F., PhD .........................................................................................Washington
Campion, E.J., PhD ..................................................................................Yale
Cree, B., PhD .............................................................................................................California (Davis)
DiMaria, S., PhD .............................................................................................Wisconsin
Handelsman, M.H. (Distinguished Professor), PhD ................................Florida
Hodges C.R. (Associate Dean), PhD .................................................................Chicago
Holmlok, C., 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

Beauvois, M., PhD ....................................................................................Texas
Blackwell, S.H., PhD ................................................................................Indiana
Essif, L., PhD ..............................................................................................................Brown
Hoeing, P., PhD ..............................................................................................Wisconsin
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 ........................................................................Bryan Mawr
Silva-Filho, E., PhD .............................................................................................North Carolina

Assistant Professors

Arnold, M.N., PhD ....................................................................................Texas
Ayo, A., PhD .....................................................................................................Arizona
Berwald, O., PhD ..............................................................................................North Carolina
Cano, L., PhD ......................................................................................................Penn State
Cruz-Cámara, N., PhD ........................................................................State University of New York (Buffalo)
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
Magilow, D., Phd ..........................................................Princeton

MAJORS DEGREES
French .................................................................................. MA
German ................................................................................... MA
Spanish .................................................................................... MA
Modern Foreign Languages .................................................. 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 head of the department.

MASTER OF ARTS
French Major

Thesis Option

• Completion of a minimum of 24 hours in coursework plus at least six hours in course 500 Thesis. French 501 is required. A maximum of six 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 six hours of thesis) must be taken in the major, six in the minor.
• A thesis, with a minimum of six 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 nine at the 400 level, 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, six 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 519-520 are required, as are three courses on German literature or culture, one of which may be at the 400 level. In addition, students must take three further 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. All MA candidates must sit for a standardized language examination, such as the Zentrale Mittelstufenprüfung. Students who are interested in future PhD-level study are strongly advised to choose the thesis option.

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 519-520 are required, as are three courses on German literature or culture, one of which may be at the 400 level. In addition, students must take three further 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 six hours in course 500 Thesis. Spanish 550 is required. A maximum of six 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 six hours of thesis) must be taken in the major, six in the minor.
• A thesis, with a minimum of six 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 six at the 400 level, 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, six 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 Foreign Languages Major

The PhD with a major in modern foreign languages requires advanced training in a major language and either a second language or applied linguistics.
ADMISSION

Applicants must have completed a BA in either 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 3.0. 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 six 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 in this way: at least 45 hours in the first concentration; at least 12 hours in the second concentration; and at least six 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 institutions 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 six 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, 520, and 560. Thesis 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 six 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. Thesis 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 nine (Track I) or three (Track II) hours of appropriate electives in English or French. German students choosing applied linguistics must take German 425, 435 or 510, 512, three hours of German linguistics, such as 426, 436, 631, or 632, and six hours of linguistics electives in English or German. Spanish students choosing applied linguistics must take Spanish 421 or 429; 425; 512; and nine (Track I) or three (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 six hours in the cognate field may be substituted by six hours in either 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 to 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).
The School of Music provides specialized training in music to prepare students for professional work or advanced study; for teaching music in the elementary and secondary schools, and in higher education; and for general cultural enrichment.

The curriculum of the School of Music, therefore, is designed to present the learning of music as an integrated whole. Solo and ensemble performance, theoretical and historical studies, concert attendance, and electives both within and outside the school are intended to provide a balanced education. The school also provides general music studies and performance.

### MASTER OF MUSIC

**Music Major**

The School of Music offers the Master of Music degree with concentrations in accompanying, choral conducting, composition, instrumental conducting, jazz, music education, music theory (with an optional emphasis in music technology), musicology, performance (organ, piano, strings, voice, winds, and percussion), and pedagogy (piano or vocal).

Applicants 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 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.
The Department of Philosophy offers graduate study leading to the Master of Arts and Doctor of Philosophy. The MA program includes thesis and non-thesis options and offers a concentration in medical ethics and in religious studies. The PhD program also has a concentration in medical ethics. Detailed information may be obtained from the Director of Graduate Studies in Philosophy, as well as the director of the medical ethics program. Details concerning the religious studies concentration may be obtained from the Director of Graduate Studies in the Department of Religious Studies.

MAJOR DEGREES
Philosophy MA, PhD

The course requirements for an MA with thesis are 30 hours, including six hours in Philosophy 500. Of non-thesis hours, at least two-thirds must be in courses at or above the 500 level. No philosophy course numbered under 400 may be taken for graduate credit. There are no particular courses that MA students are required to take. The nature of the student’s coursework should be determined in consultation with the student’s faculty committee.

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 must hold an MA with a major in philosophy or an equivalent degree when entering the PhD program. Thirty-three hours of coursework beyond the MA are required, of which six hours will be in courses numbered above 600. See the Philosophy Department Graduate Student Handbook for specific course requirements.

Students must demonstrate a reading knowledge of one foreign language, normally a living 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.) This may be done by passing the doctoral language examination given by the appropriate department, if available, or by passing French 302 or German 332 with a B or better. Bi- or multilingual (normally, foreign) students, whose native language (other than English) is one in which there is a significant body of philosophical literature, are exempted from the foreign language requirement. Students receiving the PhD with concentration in medical ethics are also exempted.
Riedinger, L.L., PhD ...........................................Vanderbilt
Shih, C.C. ...........................................................................Cornell
Sorensen, S.P., PhD ...................................................Copenhagen (Denmark)
Thompson, J.R., PhD .................................................Duke
Weitinger, H.H. (Joint Faculty), PhD ..................................Groningen
Zhang, Z. (Joint Faculty), PhD ........................................Rutgers

**Associate Professors**

Dai, P. (Joint Faculty), PhD ...........................................Missouri
Davis, L. (UTSI), PhD .................................................Auckland
Dean, D.J., PhD ......................................................Vanderbilt
Efremenko, Y.Y. (Joint Faculty), PhD .........................ITEP (Russia)
Parigger, C. (UTSI), PhD ..........................................New Zealand
Read, K.F. (Joint Faculty), PhD ...........................................Cornell
Siopsis, G., PhD ..................................................California Institute of Technology

**Assistant Professors**

Barzykin, V., PhD ..............................................Illinois-Urbana (Champaign)
Graywacz, R., PhD .................................................Warsaw
Papenbrock, T.F. (Joint Faculty), PhD ..................Heidelberg
Spanier, S.M., PhD .................................................Mainz

**Director of Undergraduate Laboratories**

Parks, J.E., PhD ...................................................Kentucky

**MAJOR DEGREES**

**Physics** ..........................................................MS, PhD

Graduate programs leading to the Master of Science and Doctor of Philosophy are offered in a number of concentration areas: astrophysics; atomic, molecular, optical and low temperature physics; biophysics; chemical physics; condensed matter and surface physics; elementary particle physics; geophysics (master’s only); health physics (master’s only); mathematical and computational physics; nuclear and relativistic heavy ion physics; and theoretical physics.

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 courses 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 511-512 or 513-514, 521-522, 531-532, 541-542, 571-572, 573. Each candidate must present an acceptable thesis, six 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 513-514, 521-522, 531-532, 541-542, 571-572, 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, six 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; six hours from Physics 593, 594 for a Project in Lieu of Thesis; nine hours from general physics: 411-412, 421, 431-432, 461-472, 507, 508, 521-522, 531-532, 541-542, 555, 571-572, 573 (at least three hours above the 500 level); and six 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 to 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 511-512 or 513-514, 521-522, 531-532, 541-542, 571-572, 573; six hours in a minor field; and 6 hours from other courses numbered above 400 (preferably of advanced laboratory nature.) At least 20 hours must be taken at the 500-level or above. In addition, the candidate must pass a written examination administered by his/her committee.

**DOCTOR OF PHILOSOPHY**

**Physics Major**

**REQUIREMENTS**

All students are expected to take the graduate core curriculum in physics consisting of the following courses—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 six hours from Chemistry 530, 540, 570, 571, 573, 595, 630, 670, and 690.
Students must take a minimum of 15 hours of 600-level courses, with six 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.

To be admitted to PhD candidacy students must (a) fulfill all general requirements by the Graduate Council; (b) pass the qualifying examination; (c) have at least a 3.0 GPA on the graduate core curriculum in physics; (d) form a doctoral committee; and (e) 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 master 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 (a) the qualifying examination; (b) the coursework; (c) the GRE scores; and (d) 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 (a) specific knowledge and skills in the areas essential to the student’s research program; (b) capability to successfully complete the doctoral dissertation; and (c) 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.

**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 (Milwaukee)  
Gant, M.M., PhD .................................................................Michigan State  
Gorman, R., PhD .................................................................New York  

Lyons, W., PhD .................................................................Oklahoma  
Scheb, J.M., PhD .................................................................Florida  
Stephens, Jr., O.H. (Alumni Distinguished Service Professor),  
PhD .................................................................Johns Hopkins  
Tom, B., PhD .................................................................Northwestern  
Zhong, Y., PhD .................................................................Kentucky

**Associate Professors**

Houston, D.J., PhD ..........................State University of New York (Binghampton)  
Nownes, A.J., PhD .................................................................Kansas

**Assistant Professors**

Caprioli, M., PhD .............................................................Connecticut  
Carcieri, M., PhD ..................................................California (Santa Barbara)  
Carroll, D., PhD .........................................................Wisconsin (Milwaukee)  
Down, I., PhD .................................................................North Carolina  
Jepson, E., PhD .................................................................Wisconsin  
Morgan, A., PhD .................................................................Georgetown

**MAJORS DEGREES**

Planning .........................................................MSP  
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 Office of Graduate Admissions, 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.

**MASTER OF ARTS**

**Political Science Major**

**ADMISSION**

A bachelor’s degree or its equivalent is required for admission. Normally an overall average of 3.0 is also required together with an average of 3.2 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, is required. At least 12 of these hours must be in political science, with six 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, plus a written comprehensive examination on all coursework is required. At least 12 of these hours must be in political science, with six in the field of methodology (Political Science 510 and either 511 or 512), and three 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 3.0 and an average of 3.2 in the last two years of political science or social science courses is 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, Workshops in Computer Applications. 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 Public Administration; 552 Organizational Theory; and any one of the following: 442 Administrative Law; 539 State and Local Government; 540 Public Law; 548 Public Policy Process; 558 Politics of Administration; or 566 Ethics, Values, and Morality in Public Administration.
  Analytical skills (6 hours): 512 Quantitative Political Analysis; 514 Research and Methodology in Public Administration.
  Management skills (9 hours): 560 Public Budgeting and Finance; and any two of the following: 562 Public Management; 564 Human Resources Management; 556 Policy Analysis.

• 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 coordinat-ed 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 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 2.3 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 3.0 and an average of 3.2 in the last two years of 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 credit hours. Specific requirements include the following:

- **Core Curriculum (28 hours):** 514, 546, 560, 581, 582, 583, 584, 585, 589, and 596 (1 credit). 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 following: environmental planning, transportation planning, land use, urban design, and real estate development/economic development. Concentration courses are drawn from a prescribed set in the subject area from the department’s curriculum and from other departments in the university. Students may also design their own concentration in consultation with the coordinator of the MSP degree program.

- **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 3.5 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 six 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.
Department of
PSYCHOLOGY
http://psychology.utk.edu

James E. Lawler, Head
Deborah R. Baldwin, Liaison
Frederick T.L. Leong, Liaison
Robert G Wahler, Liaison

Professors
Burgardt, 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
Leong, F.T.L., PhD ..................................................Maryland
Lounsbury, J.W., PhD ..............................................Michigan State
Malone, J.C., PhD ...................................................Duke
Nash, M.R., PhD ......................................................Ohio
Row, K.A.L., PhD ..................................................North Carolina
Samejima, F., PhD .................................................Georgia
Saudargas, R.A. PhD ...........................................Florida State
Sundstrom, E.D., PhD ..........................................Utah
Travis, C.B., PhD ..................................................California (Davis)
Wahler, R.G., PhD ................................................Washington

Associate Professors
Baldwin, D., PhD ...................................................Kent State
Gordon, K., PhD ..................................................North Carolina
Hutchens, T., PhD ................................................Georgia
McIntyre, A., PhD .....................................................Yale
Morgan, W.G, PhD ...............................................Tennessee
Welsh, D.F., PhD ....................................................Massachusetts

Assistant Professors
Freeberg, T.M, PhD .................................................Indiana
Gaertner, L., PhD ..................................................North Carolina
Hopko, D., PhD ..................................................West Virginia
Levy, J., PhD ..........................................................Indiana
MacFie, J., PhD .....................................................Rochester
Olson, M., PhD .....................................................Rochester

MAJOR DEGREES
Psychology ..........................................................MA, PhD

MASTER OF ARTS
Psychology Major

Graduate study leading to the Master of Arts with a major in psychology is available and a concentration in experimen-
tal psychology. 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 stu-
dents must also 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; six hours of Thesis 500; and twelve 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 suc-
cessfully defend an original piece of research in the form of
a master’s thesis.

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 experimental psychology or clinical psy-
chology. All students must submit scores from the Graduate
Record Examination (general and subject).

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

- Twelve hours of statistics and research (521-522 or
Statistics 531-532 or equivalent and six additional
hours in research methods or design).
- Fifteen hours in experimental psychology (565 or equiv-
alent and four courses from the following—510, 511 or
512, 513, 543, 546 or 547, 550, 560, and 570 or 571).
- Six hours of research practicum (509).
- Psychology 528—preparation for college teaching.
- Two 600-level graduate seminars.
- Six hours of graduate level courses outside the
Psychology Department.
- Pre-dissertation research project involving the collect-
on of original data or the original analysis of existing
data, reported in publishable form and accepted by the
student’s advisory committee.
- Comprehensive examination, determined and evaluat-
ed by the student’s doctoral committee. This examina-
tion is comprised of an integrative review or theoretical
paper and an oral exam or additional questions.
- Twenty-four hours of dissertation research (600).
- An original piece of research in the form of a doctoral
dissertation, proposed, conducted, and defended.
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 six 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.

• Pre-dissertation research project completed before forming a doctoral supervisory committee, reported in written form acceptable to two members of the faculty or, if reviewed and accepted for publication or external presentation, by one member of the faculty.

• Supervised clinical placement two days (16 hours) each week during the second year, and the following option during the third and fourth years: (a) continued two day clinical placement in the third and fourth years; (b) 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 sixteen 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)
  6. History and Systems of Psychology (565)
  7. Research Questions and Designs (580)
  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)
  10. Social Psychology (550)
  11. Field Placement in Clinical Psychology (695) (18 hours)
  12. Clinical Psychopathology (599)
  13. Psychometrics (555) or Applied Psychological Measurement (557)
  14. Ethical Issues in Professional Psychology (598)
  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 course work 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 examinations, 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 University of Tennessee, Knoxville, Graduate Catalog, current edition.

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 course work, 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
   3. Cognitive-Affective Bases of Behavior
   4. Social Basis of Behavior
   5. Individual Behavior—minimum of six hours
   6. Life Span or Developmental Psychology
  B. Quantitative and Research Skills—minimum of 15 hours
   1. Statistics—minimum of six hours
   2. Qualitative Research—minimum of three hours
   3. Research Design—minimum of three Hours Directed Research
  C. Counseling Psychology Core—minimum of 39 hours
   1. Prepracticum in Career Development
   2. Vocational Theory and Practice
   3. Practicum—minimum of nine hours
   4. Foundations of Counseling Psychology—minimum of six hours
   5. Cross-cultural Counseling
   6. Ethical, Legal and Professional Issues in Psychology
   7. Assessment—minimum of six hours
   8. Group Counseling
   9. Supervision
  D. Departmental Seminar
• Students are also required to complete a 2000-hour internship prior to graduation. In consultation with the student and the student’s doctoral committee chair, the Training Director approves the internship site, which must meet APA Guidelines.
• Students who wish to have experiences as a teaching assistant must first satisfactorily complete department’s teaching practicum course.

Department of
RELIIGIOUS STUDIES
http://web.utk.edu/~utreligion
Gilya G. Schmidt, Head
James L. Fitzgerald, Graduate Liaison

Professors
Fitzgerald, J.L., PhD .........................................................Chicago
Hackett, R.I.J., PhD .................................................................Aberdeen
Levering, M.L., PhD ...............................................................Harvard
Reynolds, C.H., PhD ...............................................................Harvard
Schmidt, G.G, PhD ...............................................................Pittsburgh

Associate Professors
Gwyne, R.W., PhD ............................................................Washington
Hodges, J.O., PhD .................................................................Chicago
Hulsether, M.D., PhD ............................................................Minnesota

Assistant Professors
Jacobs, R., PhD ...............................................................Northwestern
Shepardson, C.C., PhD ...........................................................Duke
Stiebert, J., PhD .................................................................Glasgow

Adjunct Faculty
Shefner, J., PhD .................................................................California (Davis)

A Master of Arts 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
Hastings, D.W., PhD .............................................................Massachusetts
Jalata, A., PhD ............................................................State University of New York (Binghamton)
Shover, N.E., PhD ..............................................................Illinois (Urbana)

Associate Professors
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)
Shefner, J., PhD ...............................................................California (Davis)

Assistant Professors
Bui, H., PhD ...............................................................Michigan State
Gulick, J., PhD ...........................................................California (Santa Cruz)
Presser, L., PhD .............................................................Cincinnati

MAJOR DEGREES
Sociology.................................................................MA, PhD

The Sociology Department offers graduate study leading to the Master of Arts and the Doctor of Philosophy. The MA program includes a thesis and non-thesis option.

The graduate program has concentrations in criminology, environmental sociology, and political economy. The criminology concentration includes 505, 551, 653 and 655. The environmental sociology concentration includes 560, 661 and 665. The political economy concentration includes 504, 540, 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 and applications must be received by the Graduate Student Services Office by February 1.

ADMISSION
• Acceptable scores on the general Graduate Record Examination (verbal, quantitative, and analytical) are required.
• 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 the following: 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 six 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 nine 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 Graduate Student Services.

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 Economics for program description.

Gerontology Minor

Graduate students in the Department of Sociology may pursue a specialized minor in gerontology. This interdepartmental/interdisciplinary minor gives the student an opportunity for combining the knowledge about aging in American society with his/her major concentration.

Department of THEATRE

http://theatre.utk.edu

Bill Black, Interim Head

Professors

Black, W.R., MFA .................................................................Illinois
Custer, M., MFA .................................................................Wisconsin

Associate Professors

Diamond, J., MA .................................................................New York
Gould, B.K.A., MFA ..........................................................Catholic
Van den Berg, K., PhD .....................................................Indiana
Weber, T., MFA .................................................................Alabama

Assistant Professors

Champpelli, J., MFA ..........................................................Penn State
Sams, J. MS .................................................................Penn State
Yeager, K., BFA ...............................................................Penn State

MAJOR DEGREE

THEATRE

MFA
The Department of Theatre offers the Master of Fine Arts degree with a major in theatre and concentrations in costume design, lighting design, scene design, performance, and dramaturgy. Not all areas of concentration accept applicants every year.

UT Theatre maintains an active presence on the international theatre scene through the engagement of distinguished guest artists, touring to foreign theatre festivals, participation in international conferences, and other educational initiatives.

Applicants must have completed undergraduate degrees approximately equivalent in requirements to those specified for degrees conferred by the University of Tennessee, Knoxville.

**ADMISSION**

Three letters of recommendation and interviews with appropriate faculty are required of all applicants. Applicants for admission to the MFA design/technical theatre programs must submit samples of their work. Auditions are required of MFA degree performance applicants.

For detailed information about the graduate program, contact the Director of Graduate Studies, Department of Theatre.

### MASTER OF FINE ARTS

**Theatre Major**

**REQUIREMENTS**

At least 60 hours, 40 of which must be at the 500 level or above, are required for the Master of Fine Arts with a major in theatre, which is normally to be completed in three consecutive years of full time residence. Theatre 501 is required the first year of residence. Three additional hours at the 500 level are required from history, literature, or dramaturgy. Students in the MFA degree program are evaluated annually by juried performance or portfolio submission. Continuation in the program is with the approval of the faculty committee for the MFA degree program. Theatre 599 (Projects in Lieu of Thesis) and an oral defense of the project must be completed satisfactorily before the degree is conferred.

In addition to the core requirements listed above, each area of concentration has specific requirements:

#### Design Concentration

Required courses are at least 12 hours of Theatre 580 (Design Seminar) and at least six hours in the projects courses. Theatre 503 (Elements of Design for Theatre) is required in the first year of residence.

#### Dramaturgy Concentration

Required courses include Theatre 430, 510 (9 hours), 512, 585 (12 hours), 6 hours in theory and literary criticism, plus electives from music, film, art, and business. Dramaturgy students must also satisfy a foreign language requirement (proficiency in one language or reading knowledge of two).

#### Performance Concentration

At least 12 hours each of 520 (Master Class in Performance Acting); 523 (Master Class in Performance: Movement); and 525 (Master Class in Performance: Voice). 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.

#### Requirements for a Second Master’s Degree

Students admitted to the MFA program who have already earned a master’s or a doctoral degree may apply up to 12 credit hours from the previous graduate program to the MFA degree with approval of the student’s committee, the Dean of the College of Arts and Sciences, and the Dean of Graduate Studies.

Any such credits applied from a previous graduate program would be from courses that are directly relevant to the student’s MFA curriculum and must have been earned within the time limit (six years) established for completion of the MFA.
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 10 to 20 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.
**Academic Standards**

A graduate student in the College of Business Administration whose grade point average falls below 3.0 will be placed on probation. A student on probation will be dropped from the program unless his/her cumulative grade point average is 3.0 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 the executive program.

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 two full-time dual-degree programs: the JD-MBA with the College of Law and the MS-MBA with the College of Engineering. 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 three programs within the executive track of the MBA. 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 in the executive track follow the description of the regular, full-time program.

To obtain an MBA application, contact the MBA Program Office, 527 Stokely Management Center, College of Business Administration, The University of Tennessee, Knoxville, Tennessee 37996-0552, Phone (865) 974-5001; email: mba@utk.edu. The application may also be downloaded from the Web site at http://mba.bus.utk.edu. For the executive programs, contact the Center for Executive Education, 708 Stokely Management Center, College of Business Administration, The University of Tennessee, Knoxville, Tennessee 37996-0575; Phone (865) 974-5001.

**Full-Time MBA**

The full-time MBA program is designed for students with undergraduate degrees in a wide variety of fields, including the social and natural sciences, the humanities, and professional fields such as engineering, business, agriculture, and architecture. In addition, most students in this program should have two or more years of work experience beyond their undergraduate degree(s). The MBA program is a 17-month program with students beginning in late July of each year and graduating in December of the following year. During the summer between the second and third semesters, students must complete an internship with a company using those skills acquired during the first year of the MBA program.

The MBA program consists of a common core (29 hours) and a selection of concentration and elective courses (15 hours). The first-year core develops a general management foundation upon which specialization is developed in the concentration area.

The objective of the 17-month program is to develop leaders able to enhance the success of their organizations. Specific emphasis is placed upon competency in the area of integrated value chain management. This managerial perspective acknowledges that an organization’s success is strongly related to its ability to function effectively and efficiently within a larger network of allied businesses. Managers must understand how to integrate business functions within their organizations, as well as across the other organizations within their value chain. Integrated value chain management rests upon a foundation including: supply chain management, information management, resource management, and customer relationship management. In addition, students will pursue concentrations and careers in a variety of areas, including finance, logistics, marketing, and operations management.

**ADMISSION**

Applications are accepted for fall semester only. The application deadline for fall semester is March 1. Applications by United States citizens and permanent residents received after March 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, the MBA program application, two completed applicant recommendation forms, and the Graduate Management Admission Test (GMAT) score report. The first items should reach the Office of Graduate Admissions one month before the MBA application deadline to allow for processing. Additional information is required by Graduate 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) 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, undergraduate courses and work experience should demonstrate ability with both qualitative and quantitative work.

**REQUIREMENTS**

**MBA Core**

The MBA core (29 hours total) consists of a three-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 nine-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, strategy, decision tools, environmental analysis, and leadership skills development. The second theme focuses on functions involved in the flows of product, information, and
finances within an integrated value chain, to include, but 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 area must be submitted for approval to the MBA Program Office.

Among the 15 credit hours in the concentration/electives block, 9 credit hours must be taken in one of the following concentration areas. For specific courses required in concentration areas, see the appropriate department.

- Finance
- Logistics
- Marketing
- Operations Management

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 three hours in a nine-hour elective. Rather, these courses are self-contained, intensive introductions to a specialty area of business. Students will 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.

**Transfer Credits**

Graduate-level courses taken at other institutions accredited by the American Assembly of Collegiate Schools of Business that otherwise conform to university policy may be credited toward MBA degree requirements within the following limits:

- Concentration area—six hours (provided at least six hours of work at this institution are included in the concentration area).
- Elective Area—three 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 six semester hours. Transfer credit will be considered upon formal petition to the Dean 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 Associate Dean for Academic Programs. It should be submitted to the Office of the University Registrar at least one full semester prior to the date the degree is conferred. (Admission to candidacy 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 (3.0) 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.

**Executive MBA Programs**

Each of the four programs of the executive track 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 executive track programs. 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 specific 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 is required for admission to graduate study.
Physician Executive MBA Program

The physician executive MBA is provided for a national audience of physicians. The students for whom this program is designed have an MD 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 context 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 12 months. The class meets in Knoxville for 8-day 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 learning sessions each week.

Applications are accepted for January entry only. Applications are accepted throughout the year. The final application deadline is November 1. Applicants to the physician executive MBA are not required to take the GMAT test.

Additional information on the physician executive MBA can be found at www.pemba.utk.edu.

Senior Executive MBA Program

The senior executive MBA is provided for a national audience of managers holding middle and upper level positions in organizations that support their attainment of an MBA degree. The students for whom this program is designed have at least 10 years of work experience and are currently in management positions. Typical students bring a greater knowledge of business fundamentals than is true of other MBA programs. The senior executive MBA places considerable emphasis on global business and on individual skills of leadership. The program also has a heavy emphasis on strategic thinking and leading-edge management concepts. The senior executive MBA is the right choice for individuals who are in positions of broad responsibility or who have been designated to fulfill such roles within their organizations in the future.

The senior executive MBA is three consecutive semesters completed in 12 months. The class meets in Knoxville for 11-day residence periods in alternate months starting in January and ending in December. The May residence period is a global business seminar of two weeks and is held in South...
America, Asia or Europe. Off-campus work includes distance learning classes and requires substantial and regular contact with faculty and other participants. The project work in the senior executive MBA is a large-scale management project running throughout the year. Students work with managers in their own organizations to choose a project of significant scale and scope. Each project has a faculty advisor.

Applications are accepted for January entry only. The early application deadline is June 1, and the final application deadline is September 15. The GMAT may be waived depending on work experience. Students will receive materials for study in mid-November preceding the January start date.

Additional information on the executive MBA can be found at www.emba.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 creation 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, Graduate 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 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 nine 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 six 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 nine semester hours approved by the College of Law. The six hours of law courses in which the student has earned a 2.3 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 MS–MBA Program**

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 application to, and be competitively and independently accepted by, Graduate 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 (March 1) will be considered as space allows. Additional information is required and different application dates are established by Graduate 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 three-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 such that the student can accomplish his/her teamwork assignments.

**Curriculum for Dual MS-MBA Degree**

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<td>*508 Integrated Product, Process, and Manufacturing System Design</td>
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### Summer (first session)

*594 Culminating Integrated Project Report …………………3

Total 60

*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.

### 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 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 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 not 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 of study 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.

There are seven concentrations offered in the PhD program.
- Accounting
- Finance
- Human Resource Development
- Logistics
- Management (Operations Management and Strategic Management)
- Marketing
- 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 nine semester hours of graduate research methods must be completed. At least 6 semester hours in statistics courses beyond Statistics 531 are required. The remaining three 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—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 coursework is required, including at least nine 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. Available concentrations are: accounting, finance, human resource development, logistics, management (operations management and strategic management), marketing, and statistics. See the appropriate departments for specific course requirements.
- A minimum of nine semester hours of graduate coursework is required in an area outside, but complementary to, the concentration. The student may choose the cognate area from one of the following: one of the seven concentration business 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 four hours each. Students qualify in the cognate area by completing a one-session, four-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 13 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 must be included. Under “Other Requirements,” the date of acceptance of the research proposal by the doctoral committee should be indicated. The application must be approved by the student’s doctoral committee and the Associate Dean before submission to the Office of the University Registrar.

Dissertation

Minimum of 24 semester hours—The student must complete a dissertation embodying the results of original research demonstrating the ability to do scholarly writing. The dissertation is supervised by the candidate’s doctoral committee, which must certify its completion and acceptability after oral defense of the candidate’s research effort.

The dissertation normally must be completed within three years of the student’s advancement to candidacy.

Department of
ACCOUNTING AND INFORMATION MANAGEMENT

http://bus.utk.edu/acct

Daniel P. Murphy, Head
Kenneth E. Anderson, Graduate Liaison

Professors
Anderson, K.E. (Pugh and Company Professor), PhD, CPA ................................ Indiana State
Carcello, J.V. (William B. Stokely Distinguished Scholar), PhD, CPA, CMA, CIA ................................................................. Georgia State
Fisher, B.D., LLM ................................................................. George Washington
Kiger, J.E. (Warren L. Slagle Professor), PhD, CPA ........................................ Missouri State
Murphy, D.P. (Deloitte & Touche Professor), PhD, CPA ................................ North Carolina
Reeve, J.M. (William and Sara Clark Professor of Enterprise Information Management), PhD, CPA ........................................ Oklahoma State
Roth, H.P., PhD, CPA, CMA ....................................................... Virginia Tech
Stanga, K.G. (Andersen Professor), PhD, CPA ........................................ Louisiana State
Williams, J.R. (Dean and Ernst & Young Professor), PhD, CPA ........... Arkansas

Associate Professors
Behn, B.K. (William B. Stokely Distinguished Scholar), PhD, CPA ................................................................. Arizona State
Townsend, R.L. (Accounting Excellence Teaching Scholar), PhD, CPA ................................................................. Texas Tech
Woodroof, J.B., PhD, CPA ........................................................ Texas Tech

Assistant Professors
Devries, D.D., PhD, CPA, CISA ................................................. Arizona State
Pennington, R.R., PhD, CPA ....................................................... South Carolina

Lecturers
Anderson, E.B., MAcc, CPA ........................................................... Tennessee
Gilbert, P.S., MS ........................................................................ Tennessee
Hendrick, L.W., MBA, CPA, JD ...................................................... Houston
Hollander, A.S. (Reagan Faculty Scholar), PhD .................................. Tennessee
Hughes, H.N., BS ....................................................................... Tennessee
Reeves, L.M., MAcc, CPA .......................................................... Tennessee
Valades, K.L., MAcc ................................................................. Tennessee

MAJORS DEGREES

Accounting ................................................................. MAcc
Business Administration ....................................................... PhD

MASTER OF ACCOUNTANCY

Accounting Major

The objective of the Master of Accountancy program is to prepare individuals who have a high level of ability and motivation for successful careers in professional accounting and industry. This nationally recognized program uses active learning methods to engage students in global business planning, practices, and strategies. The program offers students the breadth of a broad business perspective and exposure to cutting-edge management issues. It also provides students with the technical depth required for a career in assurance services, information management, or taxation. Coursework includes a particular focus on the development of analytical skills, communication skills (both oral and written), and research skills.

The Master of Accountancy program is a full-time, week-day program. The nature of the program precludes students from simultaneously working full-time outside of classes. UT’s accounting undergraduate and graduate programs are accredited 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 degree only in fall semester. The application deadline is March 1 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. In addition, students choosing the information management concentration must have completed Information Management 351 or an equivalent course in object oriented-programming. 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 records 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 cut-off for either grade point averages 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** (12 hours) Business Administration 521, 522, 523, 524
- **Accounting Concentration** (18 hours)

Three concentrations are available:
- **Assurance Services:** Accounting 507, Accounting 518, Accounting 519, Accounting 531; Information Management 541 and 543.
- **Information Management:** Information Management 541, 542, 543, 549; Accounting 507, and 518.
- **Taxation:** Accounting 531, 532, 533, 534, 539, and an additional course.

Students may further modify their programs with approval of the Director of the MAcc program.

**Transfer Credits**

A maximum of six semester hours taken at other AACSB accredited institutions that otherwise conform to the transfer policy of the Graduate Council may be credited toward MAcc degree requirements.

**Other Requirements**

To qualify for the degree, a student must maintain a B average (3.0) or above in the 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 in each concentration as follows: Accounting 519, 539, and Information Management 549.

**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 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. (Head), PhD ........................................Washington (St. Louis)
Chang, H.S., PhD .........................................................Vanderbilt
Clark, D.P. (Stokely Faculty Scholar), PhD ..................Michigan State
Fox, W.F. (William B. Stokely Distinguished Professor of Business),
PhD ................................................................................Ohio State
Herzog, Jr., H.W. (George A. Spiva Scholar), PhD ..........Maryland
McKee, M. (J. Fred Holly Chair of Excellence), PhD .......Carlton (Canada)
Murray, M.N. (Douglas A. and Brenda Horne Professor), PhD ....Syracuse

**Associate Professor**

Gauger, J.A., PhD .......................................................Iowa State

**Assistant Professors**

Bruce, D., PhD .................................................Syracuse
Evans, M., PhD .........................................................Colorado
Gilpatrick, S., PhD .............................................Texas A&M
Mohsin, M., PhD ..................................................York (Canada)
Munkin, M., PhD ...................................................Indiana
Santore, R., PhD ......................................................Ohio State
Vossler, C., PhD ..................................................Cornell

**Research Associate Professor**

Burton, M., PhD ....................................................Tennessee

**Lecturers**

Baker, K., PhD ......................................................New Mexico
Bueckeman, D., PhD ................................................Tennessee
Das, S., PhD ........................................................Vanderbilt
Schuler, G., PhD ......................................................Houston

**Emeriti Faculty**

Davidson, P. (J. Fred Holly Chair of Excellence Emeritus),
PhD ............................................................................Pennsylvania
Moore, J.R. (Alumni Distinguished Service Professor Emeritus),
PhD ...............................................................................Cornell
Russell, M., PhD ....................................................Oklahoma
Spiva, Jr., G.A., PhD .................................................Texas

**Adjunct Faculty**

Bjornstad, David, PhD ........................................Syracuse
Curlee, T.R., PhD ..................................................Purdue
D’Urso, V.T., PhD ...........................................Massachusetts Institute of Technology
Schrader, W.R., PhD ..............................................Tennessee
Shelton, R.B., PhD ..............................................Southern Illinois
Vogt, D.P., PhD ..................................................Syracuse

**MAJORS DEGREES**

Economics .................................................................MA, PhD

The Department of Economics offers graduate programs leading to the MA and PhD. The MA may be completed by either a thesis or non-thesis option, while the PhD requires successful completion of a dissertation. Applicants to these programs should contact the Director of Graduate Studies, Department of Economics, for further information.

**ACADEMIC STANDARDS**

A graduate student whose grade point average falls below 3.0 will be placed on probation. A student on probation will be dropped from the program unless his/her cumulative grade point average is 3.0 or higher at the end of the probationary period. The probationary period is defined as the next semester’s coursework established by the degree program for
full-time students and the next two semesters’ coursework as established by the degree program for part-time students.

**STUDENT’S RIGHT TO PETITION**

Graduate students in good academic standing have the right to petition the department for modification of departmental degree requirements and redress of grievances. Petitions must be in writing and addressed to the Director of Graduate Studies.

**MASTER OF ARTS**

**Economics Major**

Admission to the MA program is based on undergraduate academic performance and on scores from the general portion of the GRE. The student may choose either the thesis or non-thesis option.

**REQUIREMENTS**

**Non-Thesis Option**

Thirty hours of coursework at the 400 level or above. Of these, at least 24 hours (at least 18 hours of which are in economics) must be at the 500 level or above. Of the minimum of 18 hours in economics at the 500 level or above, 12 hours must consist of 511, 512 and 513, 514, and the remaining six hours must be in one field of economics. Of the 30 hours, a maximum of nine hours in courses approved by the department may be taken in fields other than economics. Students electing the non-thesis option are required to pass a final comprehensive examination.

**Thesis Option**

Thirty hours of coursework at the 400 level or above, including at least 24 hours at the 500 level or above, six hours of which may be thesis hours. Of the remaining 18 hours at the 500 level or above, at least 15 hours must be in economics and must include 511, 512, 513, and 514. A maximum of six hours may be in an area other than economics.

**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, 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.
- 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, 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.

**Environmental Policy Minor**

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; Botany; Civil and Environmental Engineering; Ecology and Evolutionary Biology; Economics; Forestry, Wildlife and Fisheries; Geography; Management; Planning; 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 at least three hours of Economics 579, Environmental Policy Research Workshop, and to complete successfully the following.

- Ecology and Evolutionary Biology 520 or Plant Sciences 414 or Geography 433 or an equivalent course approved by the coordinating committee.
- Six 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
FINANCE

http://bus.utk.edu/finance

James W. Wansley, Head
Phillip R. Daves, Doctoral Program Advisor

Professors
Black, H.A. (James F. Smith Professor, Jr.), PhD ................................Ohio State
Boehm, T.P. (AmSouth Scholar), PhD ................................Washington (St. Louis)
DeGennaro, R.P. (SunTrust Professor, Jr.), 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
Shriebes, R.E. (William Voigt Professor), PhD ................................UCLA
Wachowicz, Jr., J.M. (AmSouth Scholar), PhD ................................Illinois
Wansley, J.W. (Clayton Homes Chair of Excellence),
PhD .................................................................South Carolina

Associate Professors
Collins, M.C. (Home Federal Faculty Fellow), PhD ......................Georgia
Daves, P.R., PhD ....................................................North Carolina
Murphy, D.L. (Reagan Faculty Scholar), PhD .................................Florida

Instructors
Murphy, S.P., MBA ....................................................Loyola
Sexton, L.S., MBA .....................................................Tennessee

MAJOR DEGREES
Business Administration ..................................................MBA, PhD

MASTER OF BUSINESS ADMINISTRATION
Business Administration Major · Finance Concentration

The curriculum offers courses for those interested in careers in corporate financial management, security analysis and investments, banking and financial institutions, and real estate. Minimum course requirements are three courses—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—Finance 641, 651, 652, 653, and 654.

INDUSTRIAL AND ORGANIZATIONAL PSYCHOLOGY
(Interdepartmental)

http://bus.utk.edu/iopsyc

David J. Woehr, Program Liaison

Committee
James, L.R., Management
Ladd, R.T., Management
Rentsch, J.R., Management
Rush, M.C., Management
Woehr, D.J., Management

Adjunct Members
Judge, W.Q., Management
Schumann, D.W., Marketing and Logistics

MAJOR DEGREE
Industrial and Organizational Psychology ........................................PhD

The doctoral program is designed to prepare students for personnel, managerial, and organizational research; for university teaching; and for consulting relationships with industry. The program emphasizes a scientist/practitioner model in applying and conducting research based on accepted theory, organizational behavior, psychology, management, and statistics. The degree program is administered by a committee appointed by the Dean of Graduate Studies on recommendations from the Management Department Head and the Program Director.

It is intended that students entering the Industrial/Organizational Psychology program will represent widely different undergraduate and graduate backgrounds including psychology, business administration, engineering, science, and liberal arts. The first-year program provides the opportunity to take courses that will assist the students in attaining a reasonable level of sophistication in areas of deficiency.

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, 218 Student Services Building; and the Director, Industrial and Organizational Psychology Program, 408 Stokely Management Center, The University of Tennessee, Knoxville, Tennessee 37996-0545.

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 program. Deadline—new students are admitted in fall semester only, and applications must be received by Graduate Admissions by February 1.

The Master’s Degree 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 3.7 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 3.0 grade point average with no more than one grade below B in the Industrial/Organizational Psychology, General Psychology,
and Research core; must complete an applied research project prior to beginning dissertation work; must pass a comprehen-
sive examination; and must pass a final oral examination on
their dissertation research.

Course Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Hours Credit</th>
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<tbody>
<tr>
<td>1Industrial/Organizational Psychology Core</td>
<td>9</td>
</tr>
<tr>
<td>2Research Core</td>
<td>12</td>
</tr>
<tr>
<td>3General Psychology Core</td>
<td>9</td>
</tr>
<tr>
<td>4Industrial/Organizational Psychology Seminars</td>
<td>9</td>
</tr>
<tr>
<td>5Approved Electives</td>
<td>9</td>
</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 90</td>
<td></td>
</tr>
</tbody>
</table>

1Industrial and Organizational Psychology 567, 568, and 569.
2Statistics 537 and 538 or equivalents, 579, 679 or equivalent, 605 or equivalent.
3One course in each of the following areas: biological bases of behavior, cognitive
   bases of behavior, history, and systems of psychology.
400 level Industrial/Organizational Psychology courses, from a program committee
   approved list.
5Courses supporting the student’s course of study.

Department of

MANAGEMENT

http://bus.utk.edu/mgt

William Q. Judge, Interim Head

Professors
Judge, W.Q. (Reagan Faculty Scholar), PhD .................. North Carolina
Ladd, R.T. (Associate Dean), PhD .................................. Georgia
Miller, A. (Associate Dean and William B. Stokely Professor of Management), PhD .............. Washington
Neel, C.W. (William B. Stokely Distinguished Professor in Corporate Governance), PhD ..................................... Alabama
Rentisch, J.R., PhD ............................................. Maryland
Rush, M.C., PhD .................................................. Akron
Stahl, M.J. (William B. Stokely Distinguished Professor of Management), PhD ......................... Louisiana
Woehr, D.J., PhD .................................................. Georgia Institute of Technology

Associate Professors
Elenkov, D.S., PhD............................................. Massachusetts Institute of Technology
Kupritz, V.W., PhD ...................................................... Virginia Tech
Morris, M.L. (Stokely Faculty Scholar), PhD, CFLE .......... Tennessee
Seat, J.E., PhD ...................................................... Tennessee
Stout, V.J., EdD ...................................................... Tennessee

Assistant Professors
Bartley, S.J., PhD ..................................................... Tennessee
Lim, D.H., PhD ....................................................... Illinois
Pierce, R.H., PhD ..................................................... Ohio State
Smith, A.D., PhD ...................................................... North Carolina

Lecturers
Anderson, J.C., MBA ............................................. Thunderbird
Atchley, E.K.P., PhD ............................................. Tennessee
Lyle, L.G., PhD .......................................................... Tennessee
Mackey, D.L., PhD ..................................................... Tennessee
McIntyre, M.D., PhD .................................................. Tennessee
Neubert, R.L., PhD ..................................................... Tennessee
Swift, G.D., MBA ...................................................... Georgia State

MAJORS

Business Administration ........................................ MBA, PhD
Human Resource Development .................................. MS

The human resource development program integrates occupa-
tional education, training, career development, and organiza-
tional development. The curriculum goal of the program centers
around producing organizational effectiveness through a guid-
ing framework that focuses on developing human resource
skills and understanding of organizational culture, systems and
structures, and decision-making; individual, group, organiza-
tional learning; high performance teaming; organizational
change, communication processes; and analysis, action, meas-
urement of economic outcomes. Human resource development
required (core) courses and human resource electives are
offered in diverse formats enabling working professionals to
obtain the master’s or doctoral degree.

MASTER OF SCIENCE

Human Resource Development Major

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 for admission should request information and
application forms from both the Office of Graduate and
International Admissions (218 Student Services Building)
and the Human Resource Development Program (408
Stokely Management Center, The University of Tennessee,
Knoxville, Tennessee 37996).

Applicants are to submit an application for admission to
Graduate and International Admissions. Additionally, appli-
cants are to submit an application, three letters of reference
from individuals familiar with their potential for success in
academic work, and a statement describing personal career
objectives directly to the Human Resource Development
Program. Applicants must hold a bachelor’s degree from an
accredited institution and present evidence of ability to do
degree work, including a GPA of 3.0 on a 4.0 scale for the
last two years of undergraduate work. Any student below
this level of academic quality must justify admission via
other exceptional credentials. If the applicant has prior work
experience in human resource development, a reference let-
ter should also be provided by the work supervisor.
Applicants without an undergraduate degree in an area relat-
ed to human resource development, previous human
resource employment experience, or a statistical background
may be required to complete additional course work as part
of their program. Recent Graduate Record Examination
(GRE) or Graduate Management Admission Test (GMAT)
scores are required of all applicants. Deadline—new stu-
dents are admitted in fall semester only. Applications must
be received by March 1.

REQUIREMENTS

The human resource development master’s degree program
is a 39 hour non-thesis program. All students must take the
program core of 18 hours consisting of Human Resource
Development 510, 556, 557, 559, 561, and 563. In addition to
the program core, all students must complete Management 521
and six hours of 400 and/or 500 level courses in human resource
management. For the remaining 12 hours, students will select
four out of the five following courses: Human Resource
Development 511, 517, 518, 519, or 520.
DOCTOR OF PHILOSOPHY
Business Administration Major · Human Resource Development Concentration

ADMISSION

Applicants for admission should request information and application forms from both the Office of Graduate and International Admissions, 218 Student Services Building, and the Human Resource Development Program, 408 Stokely Management Center, The University of Tennessee, Knoxville, Tennessee 37996.

Applicants are to submit an application for admission to Graduate and International Admissions. Additionally, applicants are to submit an application, three letters of reference from persons familiar with their potential for success in doctoral work, a statement describing personal objectives, and a sample of written work directly to the Human Resource Development Program. Deadline: New students are admitted in fall semester only. Applications must be received by the Graduate and International Admissions Office and the Human Resource Development Program by March 1.

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 3.3 on a 4.0 scale or better. Applicants without a graduate degree in an area related to human resources may be required to complete additional course work 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 (60 hours) is designed to enable students to achieve professional objectives, develop needed competencies, and gain desirable experiences and understanding of human resource management. Students not possessing a master’s degree before acceptance to the program maybe required to complete additional course work before enrolling into any courses associated with the doctoral program. Students must be in residence full time for one year; must maintain an overall 3.0 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 must pass 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.

Note: For latest update, check the homepage of the Human Resource Development Program through the College of Business Administration’s Web site.

Course Requirements

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Human Resource Development Core</td>
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<tr>
<td>9</td>
<td>Human Resource Development Seminars</td>
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<td>12</td>
<td>Research Core</td>
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<tr>
<td>9</td>
<td>Business Core</td>
</tr>
<tr>
<td>24</td>
<td>Dissertation</td>
</tr>
</tbody>
</table>

Total 60

Human Resource Development 602 (Fall First Year), 603 (Spring First Year).

Students consult with doctoral advisor and committee to select 3 courses from:

- Statistics 531-532 or 537-538 or equivalent; Statistics 579 or Industrial/Organizational Psychology 627 or equivalent; Marketing 612.
- Marketing 611; Management 571; Industrial/Organizational Psychology 586.

DOCTOR OF PHILOSOPHY
Business Administration Major · Management Concentration

Minimum course requirements are

- for operations management—541 and 542; two semesters of 640 (may be repeated for credit); one additional semester of approved doctoral seminar work;
- for strategic management—610, 611, 612, 613.

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 Economics for program description.

Department of
MARKETING AND LOGISTICS
http://mkt.bus.utk.edu

Robert B. Woodruff, Head
Lloyd M. Rinehart, Graduate Liaison (Logistics)
D.W. Schumann, Graduate Liaison (Marketing)

Professors

- Barnaby, D.J., PhD ............................................................Purdue
- Cadotte, E.R., PhD ..........................................................Ohio State
- Davis, Jr., F.W., PhD ......................................................Michigan State
- Gardial, S.F. (Associate Dean and Stokely Faculty Scholar), PhD .......Houston
- Menter, 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
- Woodruff, R.B. (Proffitt’s, Inc. Professor of Marketing), DBA ......Indiana

Associate Professors

- Dabholkar, P.A., PhD .......................................................Georgia State
- Fogggin, J.H., DBA ............................................................Indiana
- Holcomb, M.C., PhD .......................................................Tennessee
- Kahn, K.B., PhD ............................................................Virginia Tech
- Moon, MA, PhD ..............................................................North Carolina
- Myers, M.B. (Reagan Faculty Scholar), 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
- Flint, D.J., PhD ..............................................................Tennessee
- Sahin, F., PhD .................................................................Texas A&M
 Martial of Business Administration
Business Administration Major

Logistics Concentration
Minimum course requirements: Logistics 510, 546, and 547.

Marketing Concentration
Minimum course requirements: Marketing 520 and 530.

Doctor of Philosophy
Business Administration Major

Logistics Concentration
Minimum course requirements—Logistics 611, 612, 613, 614, and 615.

Marketing Concentration
Minimum course requirements—611, 612, 613, 614, 615, and 616.

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
Gilbert, K.C., PhD..............................................................................Tennessee
Guess, F.M., PhD ..............................................................................Kentucky
Mee, R.W.(Stokely Faculty Scholar), PhD .....................................Iowa State
Noon, C.E., PhD ................................................................................Michigan
Srinivasan, M.M. (Ball Corporation Distinguished Professor of Business),
PhD ......................................................................................................Northwestern

Associate Professors
Bowers, M.R., PhD.................................................................Clemson
Leon, R.V., PhD ..............................................................................Florida State
Seaver, W.L., PhD ............................................................................Texas A&M
Younger, MS, PhD ...........................................................................Virginia Tech

Assistant Professor
Bensmail, H., PhD ..............................................................................Paris VI

Lecturers
Cwick, M.C., MS ..................................................................................Tennessee
Schmidhammer, J.L., PhD .............................................................Pittsburgh

Adjunct Faculty
Cooper, T., PhD ...................................................................................Tennessee
Hild, C., PhD ......................................................................................Tennessee
Husch, D.S., PhD ..............................................................................Tennessee
McGuiire, S.A., PhD ........................................................................Kansas State

MAJORS DEGREES
Business Administration ....................................................................MBA, PhD

MASTER OF BUSINESS ADMINISTRATION

Business Administration Major

Logistics Concentration
Minimum course requirements: Logistics 510, 546, and 547.

Marketing Concentration
Minimum course requirements: Marketing 520 and 530.

Doctor of Philosophy
Business Administration Major

Logistics Concentration
Minimum course requirements—Logistics 611, 612, 613, 614, and 615.

Marketing Concentration
Minimum course requirements—611, 612, 613, 614, 615, and 616.

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
Gilbert, K.C., PhD..............................................................................Tennessee
Guess, F.M., PhD ..............................................................................Kentucky
Mee, R.W.(Stokely Faculty Scholar), PhD .....................................Iowa State
Noon, C.E., PhD ................................................................................Michigan
Srinivasan, M.M. (Ball Corporation Distinguished Professor of Business),
PhD ......................................................................................................Northwestern

Associate Professors
Bowers, M.R., PhD.................................................................Clemson
Leon, R.V., PhD ..............................................................................Florida State
Seaver, W.L., PhD ............................................................................Texas A&M
Younger, MS, PhD ...........................................................................Virginia Tech

Assistant Professor
Bensmail, H., PhD ..............................................................................Paris VI

Lecturers
Cwick, M.C., MS ..................................................................................Tennessee
Schmidhammer, J.L., PhD .............................................................Pittsburgh

Adjunct Faculty
Cooper, T., PhD ...................................................................................Tennessee
Hild, C., PhD ......................................................................................Tennessee
Husch, D.S., PhD ..............................................................................Tennessee
McGuiire, S.A., PhD ........................................................................Kansas State

MAJORS DEGREES
Business Administration ....................................................................MBA, PhD

MASTER OF BUSINESS ADMINISTRATION

Business Administration Major · Operations Management Concentration

Minimum course requirements—Operations and Management Science 540, 541, and one course from the following: 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 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 an Master of Science in Management Science on a part-time basis.
REQUIREMENTS

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Requirements</td>
<td>16</td>
</tr>
<tr>
<td>Applied specialization area (approved by advisor)</td>
<td>16</td>
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<tr>
<td>Technical electives</td>
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<tr>
<td>Electives</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
</tr>
</tbody>
</table>

1. Management Science 531, 532, 533, 534, and 691 or 692; Statistics 563.
2. Statistics (500 level or above as approved by advisor); Mathematics (400 level or above as approved by advisor); Industrial Engineering (400 level or above as approved by advisor); or other elective (as approved by advisor).
3. Selected from mathematics, statistics, computer science, business, management science, industrial engineering, or other approved area.

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 40 hours for all students.

DOCTOR OF PHILOSOPHY

Management Science Major

The PhD 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 transportation 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 applicant 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 this 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 semester hours at the University of Tennessee, Knoxville, at least six of which must be at the 600 level. Both of these requirements are also exclusive of thesis or dissertation credits. Entering students who have completed graduate studies in applicable fields will be granted course credits for work which 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 science. 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 3.0 will be placed on probation. A student on probation will be dropped from the program unless his/her cumulative graduate grade point average is 3.0 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 for full-time students and the next two semester’s coursework 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 in Statistics provides students with the foundations 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 participates 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 also collaborates 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 internship 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 mathematics background should include differential and integral calculus of several variables. Individuals with limited mathematics 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 mleitnaker@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 for the statistics program 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. Required of all students are six hours in statistical methods, six hours in statistical theory and 1 hour in statistical computing. 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 six 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.

INTERCOLLEGIATE 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.

REQUIREMENTS

Degree Program | Hours in Approved IGSP Courses
--- | ---
Master’s in home department, minor in statistics | 9
Master’s in home department, MS in statistics* | 24
Doctorate in home department, minor in statistics | 15
Doctorate in home department, MS in statistics* | 24

*The MS in statistics requires 33 hours.

Course 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 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, which 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 contact 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 in Science 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 not decide 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 msyounger@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-credit certificate is available by completing two required courses, 571-572, and two electives selected from the following: 573, 575, 579, and 585 or 566 or other graduate statistics courses as approved by the Statistics Graduate Program Committee Chair.
was changed to Communications after the School gained college status in 1970. The doctoral program was initiated in 1974. A chair of excellence was established in 1987 to support a distinguished professorship in science, technology, and medical writing.

The College of Communication and Information offers the Master of Science for the Schools of Advertising and Public Relations, Journalism and Electronic Media, Information Sciences, and Communication Studies. The School of Information Sciences provides a program of study leading to the Master of Science with a major in Information Sciences for librarians and information professionals. The Doctor of Philosophy with a major in communication and information is offered with concentrations in the areas noted above. In addition, communication is available as a minor for students majoring in other departments. Required coursework will be selected after discussion with the major advisor and an advisor from the College of Communication and Information.

The MS programs in advertising/public relations and journalism/electronic media are accredited by the Accrediting Council on Education in Journalism and Mass Communication. The MS program in information sciences is accredited by the American Library Association and the National Council for Accreditation of Teacher Education. The college is a member of the Association of Schools of Journalism and Mass Communication, Broadcast Education Association, and the American Library Association.

For application forms and other information about the MS and PhD programs in communication and information, write to Associate Dean for Graduate Studies, College of Communication and Information, 420 Communications Building, the University of Tennessee, Knoxville, Tennessee 37996-0347 or go to http://excellent.com.utk.edu/gradstudies.
Admission

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. Minimum requirements for admission to full potential candidate status normally include a 3.0 (4.0 system) grade point average in undergraduate studies and scores at or above the fiftieth percentile in verbal, quantitative and analytical aptitude on the Graduate Record Examination. All application materials are screened by an admissions committee authorized by the faculty of the College of Communication and Information.

New students normally are admitted to the programs at the beginning of fall semester. However, under special circumstances, a student may be admitted at the beginning of spring semester in a temporary non-degree status. Applications for fall admission must be received by May 1. Applications for financial aid are due by March 1.

A baccalaureate degree in communication, information sciences, or a related field is recommended. Admission is possible with other baccalaureate degrees. However, all applicants without the appropriate background are required to take up to 18 semester hours of prerequisite and corequisite courses as determined by the school in which the student is enrolled.

Master’s students who have had no courses in their major area of concentration may expect to spend four or more full-time semesters in the program, including a media internship.

Academic Standards

A student in the College of Communication and Information whose graduate grade point average, not including incomplete grades, is below 3.0 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 grade point average is 3.0 or higher at the end of the probationary period. The probationary period is defined as the next 12 semester hours of prerequisite and corequisite courses as determined by the school in which the student is enrolled.

Master’s students who have had no courses in their major area of concentration may expect to spend four or more full-time semesters in the program, including a media internship.

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. Orientation attendance is also required.

- Seven hours of core courses—Communication and Information 501 (Orientation, one hour), Communication and Information 540 (Theory, three hours), and one of the following research methods courses (Advertising 530, Communication Studies 505, Information Science 540, Journalism and Electronic Media 512, Public Relations 530), to be taken during the first two semesters of the student’s program, except with the written approval of the director of graduate studies of the college.
- Fifteen hours within a concentration. Primary concentrations include advertising, communication studies, converging media, electronic media, journalism, public relations, and science communication. Students may also construct their own coherent set of courses for a concentration, with the approval of the director of graduate studies for the college. At least six hours of the concentration must be at the 500 level or above. An internship, if needed, may be included in the concentration hours.
- Six hours for the thesis option, or nine hours for the non-thesis option, of approved electives.
- All students must take courses from at least two of the schools in the College of Communication and Information. The outside course may be included in the core, concentration, or electives.
- Six hours of thesis work, or a three-hour project.

Additional hours may be required for those who do not have academic prerequisites, and an internship may be required for those who do not have professional experience in the field that they wish to study.

A student’s internship experience requires approval by his/her advisor, on the basis of three hours of credit for the equivalent of 15 weeks of full-time professional experience. This credit is to be included in the hour requirements for the MS program.

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. The 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 program is interdisciplinary, consisting of a required core curriculum and recommended courses outside the college in the related social and behavioral sciences. The program is flexible and will accommodate a wide variety of career goals in communications. New students may be admitted to the program at any time; however, core courses begin only in the fall semester. Orientation attendance is required.

The master’s degree is required for entry into the doctoral program. Students lacking academic or professional experience in communications will be required to take prerequisite courses. In general, however, the program may be completed within three academic years of full-time study beyond the master’s degree.

**ADMISSION**

The following are normally minimal requirements for admission to full potential candidate status:

- a 3.0 (4.0 system) grade point average in undergraduate studies, and 3.5 for graduate work in a master’s degree;
- at or above the fiftieth percentile in verbal, quantitative and analytical aptitude on the Graduate Record Examination;
- endorsement by at least three former teachers or professional colleagues; and
- 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 communications is a highly desirable criterion for admission.

**REQUIREMENTS**

A minimum of 87 hours of approved graduate work is required for the PhD.

- 27 hours of core courses—Communication and Information 612, 620, 640, 641; 6 hours of statistics; and three of the following courses: Communication and Information 622, 632, 642, and 652.
- 15 hours in a primary concentration (advertising, electronic media, information sciences, journalism, public relations, science communication, or communication studies) supplementing the core. Courses may be taken in one or more of the schools in the college.
- 12 hours in a secondary concentration (outside the College of Communication and Information).
- 9 hours of electives.
- 24 hours of dissertation.

All courses require the approval of the student’s advising committee.

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. Results will be reported to the student by his/her program advisor, who will convey the committee’s recommendation concerning the student’s remaining in the program (non-binding) and suggestions for improvement in performance.

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**School of ADVERTISING AND PUBLIC RELATIONS**

_http://www.cci.ohio.edu/~advpr_

_Ronald E. Taylor, Director_

**Professors**

Hovland, R., PhD .......................................................... Illinois
Hoy, M., PhD ................................................................. Ohio State
Taylor, R.E., PhD ........................................................... Illinois

**Associate Professors**

Haley, E., PhD ................................................................. Georgia
McMillan, S., PhD ........................................................... Oregon
Morrison, M., PhD ........................................................... Georgia
Morrow, J.L., PhD ............................................................ Toledo
White, C.L., PhD ............................................................. Georgia

**Assistant Professors**

Blakeman, R., MA .......................................................... Southern Methodist
Fall, L.T., PhD ................................................................. Michigan State
Riechert, B.P., PhD .......................................................... Tennessee

**Instructors**

Haygood, D., MA .......................................................... North Carolina
Palenchar, M., MA .......................................................... Houston

**MAJOR DEGREES**

Communication ............................................................. MS
Communication and Information ............................................. PhD

The School of Advertising and Public Relations offers a concentration area for the master’s degree with a major in communication and participates in the interdisciplinary doctoral program.

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**School of COMMUNICATION STUDIES**

_http://www.cci.ohio.edu/~commstudies/_

_John W. Haas, Director_

**Professor**

Julian, F.D. (Dean), PhD ............................................... Tennessee

**Associate Professors**

Ambrester, M.L., PhD ...................................................... Ohio
Gleas, R.W., PhD .......................................................... Northwestern
Haas, J.W., PhD .......................................................... Kentucky
Violanti, M.T., PhD .......................................................... Kansas

**Assistant Professors**

Ambler, R.S., PhD .......................................................... Ohio State
Halone, K.K., PhD .......................................................... Oklahoma
Levine, K.J., PhD .......................................................... Michigan State

**MAJORS**

Communication ............................................................. MS
Communication and Information ......................................... PhD

The School of Communication Studies offers a concentration area for the master’s degree with a major in communication 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., Ph.D. ................................................. 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
Watson, J., EdD .......................................................... Vanderbilt
Whitney, G., PhD ........................................................ Michigan

Assistant Professor
Albright, K., PhD ...................................................... Tennessee
Allard, S.L., PhD ........................................................ Kentucky
Mehra, B., PhD .......................................................... Illinois

MAJOR DEGREE
Information Sciences .................................................. MS
Communication and Information ......................... PhD

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. A PhD may also be pursued with a major in communication and information, concentration in information sciences.

The mission of the school is to educate people to live, work, and flourish in an information society through excellence in teaching, research, and public service in information sciences.

The plan for the future of the School of Information Sciences states: “The School of Information Sciences will be recognized nationally and internationally as an interdisciplinary program of excellence in the information sciences. Graduates of the school’s programs will be knowledgeable, skillful, and ethical users of information and information technology in their educational, professional, and personal endeavors. They will be well prepared for further study and inquiry, for leadership in the information professions, and for enlightened participation in a global information society. The school’s graduates will recognize their responsibilities to contribute new knowledge and to engage in lifelong learning in the field.”

The vision for the future of the school will be realized through
- excellent teaching
- innovative research
- distinguished service

To achieve distinction in teaching, research, and service, the school is committed to
- a forward-looking curriculum that embraces diversity in intellectual approaches to knowledge, skills, and values
- a highly competent and visible faculty
- a highly competent, effective staff
- an academically able and diverse student body
- extensive partnerships within higher education and professional communities in both private and not-for-profit sectors
- service to the State of Tennessee and to the region
- the exemplary use of state-of-the-art information technologies in both academics and administration
- exceptional support
- collaborative and inclusive governance

ADMISSION

Applicants to the information sciences program must have a minimum undergraduate grade point average of 3.0 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 Graduate Record Examination (GRE) are required of all applicants unless a graduate degree has been completed prior to application for admission. Applicants should take the GRE at least one semester in advance of application for admission and are expected to score 1500 points or better.

A personal data sheet and three recommendation forms (obtained from the School of Information Sciences) should be returned to the admissions office of the school. Foreign applicants are required to take the Test of English as a Foreign Language.

MASTER OF SCIENCE

Information Sciences Major

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

Required Courses

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.

Highly Recommended Courses

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 law 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 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 hold the master’s degree, the requirements for initial endorsement include the three required courses plus 551, 567, 571, 572, 585, 595 and 2 electives (upon approval of faculty advisor). In addition, students must complete three corequisite courses from the College of Education, Health, and Human Sciences (six credit hours) that do not count toward the master’s degree requirements. Students pursuing the initial endorsement must follow the non-theses option. Upon completion of the requirements, students will earn a master’s degree in information sciences and a Tennessee State Department of Education license as a School Library Information Specialist.

Initial Endorsement for Non-Licensed Teachers with a Master’s Degree in Library or Information Sciences

For those students who hold an ALA-accredited master’s degree and have approval of the faculty advisor, the requirements are a maximum of 24 hours within the school’s program, including the required Information Sciences 595. In addition, students must complete three corequisite courses from the College of Education, Health, and Human Sciences (6 credit hours) beyond the required 24 hours. Upon completion of the requirements, students will 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) plus 5 electives (upon approval of the faculty advisor). Upon completion of the requirements, students will earn a master’s degree in Information Sciences and a Tennessee State Department of Education additional endorsement as a School Library Information Specialist.

Initial Endorsement for Non-Licensed Teachers with 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.

Additional 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 Science 500) must be taken within the 42 hours required for graduation. (Students may register for more than six hours of 500, but only six 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 in Information Sciences, write to Admissions, College of Communication and Information, The University of Tennessee, Knoxville, 451 Communications Building, Knoxville, Tennessee 37996-034 or go to http://excellent.com.utk.edu/gradstudies.
School of
JOURNALISM AND ELECTRONIC MEDIA

http://www.cci.utk.edu/~jem/

James A. Crook, Interim Director

Professors
Ashdown, P.G., PhD ......................................................... Bowling Green
Bates, B.J., PhD ................................................................. Michigan
Bowles, D., PhD ................................................................. Wisconsin
Caudill, C.E. (Associate Dean), PhD .................................. North Carolina
Littmann, M. (Chair of Excellence), PhD .............................. Northwestern
Moore, B.A., PhD ................................................................. Ohio
Swan, N.R., PhD ................................................................. Missouri
Teeter, Jr., D.L., PhD .............................................................. Wisconsin

Associate Professors
Foley, D.J., MSJ ................................................................. Northwestern
Harmon, M., PhD ............................................................... Ohio
Heller, R.B., MA ................................................................. Syracuse

Assistant Professors
Clark, N., PhD ................................................................. Florida
Kaye, B., PhD ................................................................. Florida State
Legg, J.R., PhD ................................................................. Ohio
LePre, L., PhD ................................................................. Florida
Luther, C., PhD ................................................................. Minnesota

Instructor
Hufford, B.L., MEd ......................................................... Bowling Green

Emeriti Faculty
Crook, J.A., PhD ............................................................... Iowa State
Howard, H.H., PhD .......................................................... Ohio
Leiter, B.K., PhD .............................................................. Southern Illinois
Singletary, M.W., PhD ..................................................... Southern Illinois

MAJOR DEGREES
Communication ................................................................. MS
Communication and Information ........................................ PhD

The School of Journalism and Electronic Media offers concentration areas for the master’s with a major in communication 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; 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.

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 Science degree, Specialist in Education degree, and Doctor of Philosophy degree. Additionally, the college makes available graduate certificate programs and various minors.

MINORS

Minors are available in gerontology through Health and Safety Programs and in nutrition through the Department of Nutrition.

GRADUATE CERTIFICATE PROGRAMS

Four certificate programs are available in the college. The certificate in urban education is available through the Department of Theory and Practice in Teacher Education. The Department of Consumer Services Management offers certificates in services management and tourism development. A certificate in applied epidemiology is offered by the Master of Public Health Program.

MASTER OF SCIENCE (MS)

- Child and family studies major with concentrations in child and family studies; early childhood education (Department of Child and Family Studies)
- College student personnel major (Department of Educational Psychology and Counseling)
- Consumer services management major with concentrations in hospitality and tourism management; retail and consumer sciences (Department of Consumer Services Management)
- Counseling major with concentrations in mental health counseling; rehabilitation counselor education; school counseling (Department of Educational Psychology and Counseling)
- Educational administration major (Department of Theory and Practice in Teacher Education)
- Educational psychology major with concentrations in adult education; applied educational psychology (Department of Educational Psychology and Counseling)
- Exercise science major with concentrations in exercise physiology; biomechanics/sports medicine (Department of Exercise, Sport, and Leisure Studies)
- Instructional technology and educational studies major with concentrations in cultural studies of educational foundations; curriculum; instructional technology (Department of Instructional Technology and Educational Studies)
- Nutrition major with concentrations in nutrition science; public health nutrition (Department of Nutrition)
- Recreation and leisure studies major with concentrations in recreation and leisure administration; therapeutic recreation (Department of Exercise, Sport, and Leisure Studies)
- Safety major with concentrations in emergency management; safety management (Health and Safety Programs)
- Sport studies major with concentrations in sport management; sport studies (Department of Exercise, Sport, and Leisure Studies)
- Teacher education major with concentrations in art education; early childhood special education; education of the deaf and hard of hearing; elementary education; elementary teaching; English education; foreign language/ESL education; mathematics education; middle grades; modified and early childhood special education; reading education; science education; science education (environmental education); secondary teaching; social science education; special education; (Department of Theory and Practice in Teacher Education)

Refer to the specific department for information on the above majors.
MASTER OF PUBLIC HEALTH (MPH)
- The MPH is offered through Health and Safety Programs.

SPECIALIST IN EDUCATION (EDS)
- Educational administration major (Department of Theory and Practice in Teacher Education)
- Instructional technology and educational studies major with concentrations in curriculum; instructional technology (Department of Instructional Technology and Educational Studies)
- School counseling major (Department of Educational Psychology and Counseling)
- School psychology major (Department of Educational Psychology and Counseling)
- Teacher education major with concentrations in elementary education; English education; foreign language/ESL education; mathematics education; reading education; science education; social science education; special education
- Refer to the specific department for information on the above majors.

DOCTOR OF PHILOSOPHY (PhD)
Education Major
- Counselor education concentration with specializations in career development; rehabilitation; group process (Department of Educational Psychology and Counseling)
- Cultural studies of educational foundations concentration with specializations in philosophy of education, cultural studies, sociology of education, and history of education (Department of Instructional Technology and Educational Studies)
- Curriculum, educational research, and evaluation concentration with specializations in curriculum, educational research, and evaluation; educational application of technology (Department of Instructional Technology and Educational Studies)
- Early childhood education concentration with specialization in early childhood special education (Department of Theory and Practice in Teacher Education)
- Educational administration and supervision concentration (Department of Theory and Practice in Teacher Education)
- Educational psychology concentration with specializations in adult education; applied educational psychology; collaborative learning (Department of Educational Psychology and Counseling)
- Exercise science concentration with specializations in biomechanics/sport medicine; exercise physiology; physical activity and population health (Department of Exercise, Sport, and Leisure Studies)
- Higher education administration (Department of Educational Psychology and Counseling)
- Instructional technology concentration (Department of Instructional Technology and Educational Studies)
- Literacy, language, and ESL education concentrations with specializations in literacy; language education; ESL education (Department of Theory and Practice in Teacher Education)
- School psychology concentration (Department of Educational Psychology and Counseling)
- Sport studies concentration (Department of Exercise, Sport, and Leisure Studies)
- Teacher education concentration with specializations in elementary education, mathematics education, science education, social science education (Department of Theory and Practice in Teacher Education)
- Refer to the specific department for information on the above concentrations.

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 the Graduate Studies: Admission Requirements section 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 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 4.5 points on the Analytic Writing subtest (for score interpretation see: http://www.gre.org/interpret.html).

Applicants should be aware that departments and/or concentration areas 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 (see previous section of catalog for concentration/department affiliation).

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/~7Ecehhsstu/.
DOCTOR OF PHILOSOPHY (PhD)

Human Ecology Major

- Child and family studies concentration (Department of Child and Family Studies)
- Community health concentration (Department of Health and Exercise Science)
- Hospitality and tourism management concentration (Department of Consumer Services Management)
- Nutrition science concentration (Department of Nutrition)
- Retail and consumer sciences concentration (Department of Consumer Services Management)

Refer to the specific department for information on the above concentrations.

Application Process

Individuals seeking admission to the PhD with a major in human ecology must first be admissible to the University of Tennessee, Knoxville, (see Graduate Studies Admission Requirements section of this catalog) and then admitted to a concentration within the PhD with a major in human ecology. 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., PhD .................................................................Michigan
Moran, J., PhD ...............................................................Oklahoma State
Nordquist, V., PhD ..........................................................Tennessee
Twardosz, S., PhD ............................................................Kansas

Associate Professors
Brandon, D., PhD ............................................................Tennessee
Malia, J., PhD .................................................................Iowa State
Smith, D., PhD ...............................................................Oklahoma State
Tegano, D., PhD .............................................................Virginia Tech

Assistant Professors
Devereaux, M., PhD ........................................................Tennessee
Hallam, R.A., PhD ..........................................................Delaware

Moran, M., PhD ............................................................New Hampshire
Stolz, H.E., PhD ...............................................................Brigham Young
Wass, T., PhD .................................................................Denver

ECE Internship Coordinators
Cooper, C., MS ..............................................................Tennessee
Stott, A., MS .................................................................Tennessee

MAJORS DEGREES
Child and Family Studies ................................................MS
Human Ecology .................................................................PhD

The Department of Child and Family Studies offers graduate programs leading to the following degrees, majors, and concentrations

Master of Science
Child and family studies major
- Child and family studies concentration
- Early childhood education concentration

Doctor of Philosophy
- Human ecology major
- 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 researchers, 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 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 foci. Prerequisites for admission to the master’s program are nine 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, three hours of computationally-based, graduate-level statistics, and completion of a thesis as part of the master’s degree.

MAJOR 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 students are expected to engage in productive research culminating in a thesis or project. Students choose to concentrate either in child and family studies, leading to doctoral study or careers in community agencies serving children and families, or early childhood education, leading to an educator career in early childhood or school settings. The early childhood education concentration is ordinarily restricted to students currently enrolled in the undergraduate fifth-year licensure program at the University of Tennessee, Knoxville.

Child and Family Studies Concentration

REQUIREMENTS

The child and family studies concentration requires a minimum of 36 credits of coursework—12 credits in foundation coursework; 24 credits in specialization; and 24 additional credit hours, selected with guidance of the student’s master’s committee (nine credit hours in child and family studies prefix courses; six credit hours in graduate electives, which may include child and family studies-prefix courses; three credit hours in Statistics 531, Statistics 537, or Social Work 605; and six credit hours of thesis research in Child and Family Studies 500). Students seeking the MS with a major in child and family studies must select a master’s committee chair and file a plan of study with the department head after 12 hours of graduate credit.

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Child and Family Studies Foundation Courses</td>
</tr>
<tr>
<td>3</td>
<td>Computation-based Statistics</td>
</tr>
<tr>
<td>3</td>
<td>Child and Family Studies Specialization Electives</td>
</tr>
<tr>
<td>6</td>
<td>General Electives</td>
</tr>
<tr>
<td>6</td>
<td>Thesis Research (Child and Family Studies 500)</td>
</tr>
<tr>
<td></td>
<td>Total 36</td>
</tr>
</tbody>
</table>

Early Childhood Education Concentration

REQUIREMENTS

The early childhood education concentration is designed for students seeking a MS along with initial teacher licensure in early childhood education (pre-K through grade 4). At the University of Tennessee, Knoxville, students interested in the MS with a major in child and family studies (early childhood education concentration) must apply for admission to graduate study through the procedures outlined above. (Application for admission to the Teacher Education program in child and family studies, early childhood education, is a part of the application process to the graduate program and is described in the Undergraduate Catalog. Admission to the Teacher Education program is concurrent with admission to the child and family studies master’s program.) The course of study (39 hours) for the child and family studies major with a concentration in early childhood teacher education includes: 9 credit hours in the child and family studies foundation courses; 24 credit hours in the early childhood education core (including completion of a research project in Child and Family Studies 569); 3 credit hours of computation- or consumer-based graduate statistics (Statistics 531, 537; Social Work 605; or Educational Psychology 550); 3 credit hours in early childhood education specialization electives; and a written comprehensive examination.

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>Child and Family Studies Concentration (includes licensure)</td>
</tr>
<tr>
<td>3</td>
<td>Computation or Consumer-base Statistics</td>
</tr>
<tr>
<td>3</td>
<td>Child and Family Studies Specialization Elective</td>
</tr>
<tr>
<td></td>
<td>Total 39</td>
</tr>
</tbody>
</table>

Human Ecology Major • Child and Family Studies Concentration

The department supports a doctoral program leading to a PhD with a major in human ecology. Two themes are highlighted—the integration of human development and family studies and concentration in a selected area of study. A doctoral program that is concurrently specialized and integrative in nature reflects the complexity of the disciplinary subject matter, provides a broader context to formulate theoretical questions, and broadens the empirical literature for addressing these questions. The PhD is primarily a research degree. A core component of the program focuses on the development of expertise in research methods and statistics so that graduate students are capable of advancing knowledge in their field of study.

REQUIREMENTS

- Completion of the foundation courses in the master’s program—510, 511, 550, and 570.
- Completion of the doctoral core—640 and 634.
• Minimum of 18 credits of additional coursework in child and family studies.
• Statistics 538 or Social Work 660.
• Three credits of advanced statistics.
• Complete six credits of supervised research practica, Child and Family Studies 680 and 681.
• Complete three credits of either Child and Family Studies 633 or 660; and complete three credits from among Child and Family Studies 633, 660, 650, 670, or 691 for a total of six credits of doctoral level child and family studies research methods.
• Minimum three credits in specialized research methods
• Completion of two credits of Child and Family Studies 572.
• Minimum of six credits in a cognate area.
• Minimum of 24 credits of 600.
• Minimum of 95 credits beyond the bachelor’s degree.

**Department of**

**CONSUMER SERVICES MANAGEMENT**

[Web site: csm.utk.edu]

Nancy B. Fair, Head
Laura Jolly, RCS Graduate Liaison
Carol Costello, HRT Graduate Liaison

**Professors**
Costello, C., PhD ........................................Tennessee
Fair, N., PhD ........................................North Carolina State
Fairhurst, A., PhD ....................................Oklahoma State
Jolly, L., PhD .........................................Oklahoma State

**Associate Professors**
Kim, Y., PhD ........................................North Carolina (Greensboro)
Wis, D., PhD .........................................Texas A&M

**Assistant Professors**
Antun, J., PhD .......................................South Carolina
Chen, R., PhD ........................................North Carolina State

**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
Human Ecology ........................................PhD

The Department of Consumer Services Management offers graduate programs leading to the following degrees, majors, and concentrations.

**Master of Science**
Consumer services management major
Hospitality and tourism management concentration
Retail and consumer sciences concentration

**Doctor of Philosophy**
Human ecology major
Hospitality and tourism management concentration
Retail and consumer sciences concentration

**Certificate Programs**
Services management
Tourism development

The Department of Consumer Services 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. The advanced work undertaken for the doctoral degree focuses on building and applying research skills to advance the fields of retail and consumer sciences and hospitality and tourism.

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 Consumer Services 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 degree 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 supported 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 3.0), 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.

Retail and Consumer Sciences Concentration (Thesis)

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Services Management ................................................................. 12</td>
</tr>
<tr>
<td>2Research Methods ................................................................. 3</td>
</tr>
<tr>
<td>Statistical Methods ................................................................. 6</td>
</tr>
<tr>
<td>Cognate Area ........................................................................ 6</td>
</tr>
<tr>
<td>Retail and Consumer Sciences Elective ......................................... 3</td>
</tr>
<tr>
<td>Thesis ................................................................................ 6</td>
</tr>
<tr>
<td>Total 36</td>
</tr>
</tbody>
</table>

Retail and Consumer Sciences Concentration (Non-Thesis)

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Services Management ................................................................. 12</td>
</tr>
<tr>
<td>2Research Methods ................................................................. 3</td>
</tr>
<tr>
<td>Statistical Methods ................................................................. 6</td>
</tr>
<tr>
<td>Cognate Area ........................................................................ 6</td>
</tr>
<tr>
<td>Retail and Consumer Sciences Electives ...................................... 9</td>
</tr>
<tr>
<td>Professional Paper/Project ......................................................... 3</td>
</tr>
<tr>
<td>Total 36</td>
</tr>
</tbody>
</table>

Hospitality and Tourism Management Concentration (Thesis)

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Services Management ................................................................. 12</td>
</tr>
<tr>
<td>2Tourism ................................................................................ 3</td>
</tr>
<tr>
<td>3Research Methods .................................................................. 3</td>
</tr>
<tr>
<td>Statistical Methods ................................................................. 6</td>
</tr>
<tr>
<td>Cognate Area ........................................................................ 6</td>
</tr>
<tr>
<td>Hotel, Restaurant, and Tourism 547 ............................................ 3</td>
</tr>
<tr>
<td>Thesis ................................................................................ 6</td>
</tr>
<tr>
<td>Total 39</td>
</tr>
</tbody>
</table>

Hospitality and Tourism Management Concentration (Non-Thesis)

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Services Management ................................................................. 12</td>
</tr>
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<td>2Tourism ................................................................................ 6</td>
</tr>
<tr>
<td>3Research Methods .................................................................. 3</td>
</tr>
<tr>
<td>Statistical Methods ................................................................. 3</td>
</tr>
<tr>
<td>Cognate Area ........................................................................ 6</td>
</tr>
<tr>
<td>Hotel, Restaurant, and Tourism 547 ............................................ 6</td>
</tr>
<tr>
<td>Professional Paper/Project ......................................................... 3</td>
</tr>
<tr>
<td>Total 36</td>
</tr>
</tbody>
</table>

DOCTOR OF PHILOSOPHY
Human Ecology Major

REQUIREMENTS

The requirements for the doctoral degree are listed below by concentration.

Retail and Consumer Sciences Concentration

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Required Courses .................................................................. 12</td>
</tr>
<tr>
<td>2Research Methods .................................................................. 5</td>
</tr>
<tr>
<td>3Statistics ............................................................................ 12</td>
</tr>
<tr>
<td>4Cognate Area ....................................................................... 9</td>
</tr>
<tr>
<td>5Instructional Methods ........................................................ 3</td>
</tr>
<tr>
<td>Electives ............................................................................... 21</td>
</tr>
<tr>
<td>Dissertation .......................................................................... 24</td>
</tr>
<tr>
<td>Total 86</td>
</tr>
</tbody>
</table>

Hospitality and Tourism Management Concentration

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Hotel, Restaurant, and Tourism 614, 615, 547, 523, 524.</td>
</tr>
<tr>
<td>2Hotel, Restaurant, and Tourism 537, Retail and Consumer Sciences 616.</td>
</tr>
<tr>
<td>3Statistics 537, 538, 579.</td>
</tr>
<tr>
<td>4Required Courses .................................................................. 15</td>
</tr>
<tr>
<td>5Research Methods .................................................................. 5</td>
</tr>
<tr>
<td>6Statistics ............................................................................ 5</td>
</tr>
<tr>
<td>7Cognate Area ....................................................................... 9</td>
</tr>
<tr>
<td>8Instructional Methods ........................................................ 3</td>
</tr>
<tr>
<td>Electives ............................................................................... 21</td>
</tr>
<tr>
<td>Dissertation .......................................................................... 24</td>
</tr>
<tr>
<td>Total 86</td>
</tr>
</tbody>
</table>

CERTIFICATE IN SERVICES MANAGEMENT

The Department of Consumer Services Management offers a graduate certificate in services management for students seeking continuing education and career advancement opportunities in the services industry.

The 12-credit hour certificate is available by completing the following courses: Retail and Consumer Sciences 541, 538, Hotel, Restaurant, and Tourism 510, 532.

CERTIFICATE IN TOURISM DEVELOPMENT

The Department of Consumer Services 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-credit hour certificate is available by completing the following courses: Hotel, Restaurant, and Tourism 523, 524, 435, 423.
Department of
EDUCATIONAL PSYCHOLOGY AND COUNSELING
http://web.utk.edu/%7Eedpsych/

R.S. McCallum, Head
Tricia McClam, Associate Head, Graduate Liaison

Professors
Bogue, 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
Petersen, M, PhD ............................................................Ohio State
Skinner, C, PhD ..............................................................Lehigh
Thompson, C, PhD ........................................................Ohio State
Williams, R, PhD ...........................................................George Peabody
Woodside, M, EdD ........................................................Virginia Tech

Associate Professors
Bain, S, PhD ................................................................Southern Mississippi
Studer, J, EdD ...............................................................Toledo
Ziegler, M, EdD ..............................................................Columbia

Assistant Professors
Diambra, J, EdD .............................................................William & Mary
Paulus, T, PhD ...............................................................Indiana
Skinner, A, PhD ..............................................................Mississippi State

Research Professors
Cassell, J, PhD ...............................................................Kansas
Colvin, C, EdD ...............................................................Virginia
Mulkey, S, PhD ..............................................................Florida State

Research Assistant Professor
Grubbs, L, ........................................................................Tennessee

MAJORS       DEGREES
College Student Personnel ...........................................MS
Counseling .................................................................MS
Educational Psychology ..............................................MS
School Counseling ....................................................EdS
School Psychology .....................................................EdS
Education .................................................................PhD

The Department of Educational Psychology and Counseling offers graduate programs leading to the following degrees, majors, and concentrations.

Master of Science
College student personnel major
Educational psychology major
Adult education concentration
Applied educational psychology concentration
Counseling major
Mental health counseling concentration
Rehabilitation counselor education concentration
School counseling concentration

Educational Specialist
School counseling major
School psychology major

Doctor of Philosophy
Education major
Counselor education concentration
Educational psychology concentration
Higher education administration concentration
School psychology concentration

EDUCATIONAL PSYCHOLOGY
Adult Education Program
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. Degrees offered are the Master of Science and Doctor of Philosophy.

MASTER OF SCIENCE
Educational Psychology Major • Adult Education Concentration

REQUIREMENTS

The master’s program involves a minimum of 36 hours of course work (except for the thesis option, which is 33 hours minimum). Programs typically consist of the following:

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult Education Core .........................................15</td>
</tr>
<tr>
<td>Research ..............................................................3</td>
</tr>
<tr>
<td>Courses outside of Educational Psychology ................6</td>
</tr>
<tr>
<td>Departmental Electives ........................................12+</td>
</tr>
</tbody>
</table>

1Educational Psychology 513, 520, 521, 522, 525.
2Options could include: Educational Psychology 550; Cultural Studies in Education 560, 561; Curriculum, Educational Research, and Evaluation 580; Educational Administration and Policy Studies 516; Educational Psychology 530.
3This 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, 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 six 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.

DOCTOR OF PHILOSOPHY
Education Major • Educational Psychology
Concentration • 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. These hours are distributed as follows:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentration</td>
<td>15</td>
</tr>
<tr>
<td>Specialization</td>
<td>9</td>
</tr>
<tr>
<td>Research</td>
<td>15</td>
</tr>
<tr>
<td>PhD Core</td>
<td>10</td>
</tr>
<tr>
<td>Cognate</td>
<td>6</td>
</tr>
</tbody>
</table>

The concentration consists of courses selected from various areas within Educational Psychology and Counseling, which can include selected courses in adult education. Courses for the specialization are from adult education courses such as those listed under the Master’s degree requirements and electives. To meet the research requirement, students take courses that provide them with knowledge and skills in both quantitative and qualitative research methods. The PhD core consists of a seminar in the specialization along with courses listed elsewhere in this catalog. At least six hours must be taken in a cognate area outside the College of Education, Health, and Human Sciences. Finally, dissertation hours are taken after all or most coursework is completed; once begun, students must register for a minimum of three hours until the dissertation is completed.

APPLIED EDUCATIONAL PSYCHOLOGY PROGRAM

http://web.utk.edu/~edpsych/grad/app_ed Psych/default.html

The applied educational psychology program is designed for individuals who seek to provide professional leadership in promoting and facilitating learning and/or its measurement. It offers two degree programs—Master of Science with a major in educational psychology (concentration in applied educational psychology) and Doctor of Philosophy with a major in education (concentration in educational psychology, specialization in applied educational psychology).

MASTER OF SCIENCE

Educational Psychology Major • 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. They must take six hours of dissertation. Students must choose between thesis and non-thesis options. Thesis students take six thesis hours toward the 36-hour program in lieu of electives. Approved courses and an additional program requirement are listed below. Equivalent courses may be substituted with the consent of the program committee.

The 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 characteristics of adult learners as well as children. The emphasis is on comparing individual and collaborative learning principles. Students will explore statistics and research from a conceptual perspective. The assessment courses provide an overview of assessment concepts, approaches, and issues. 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.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>'Core Requirements</td>
<td>3</td>
</tr>
<tr>
<td>'Human Development</td>
<td>6</td>
</tr>
<tr>
<td>'Learning Principles</td>
<td>9</td>
</tr>
<tr>
<td>'Research and Assessment</td>
<td>6</td>
</tr>
<tr>
<td>'Intervention</td>
<td>6</td>
</tr>
<tr>
<td>'Thesis or Electives (non-thesis)</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>36</strong></td>
</tr>
</tbody>
</table>

1Educational Psychology 507. AEP/MS Colloquium Meetings (no credit, attendance required at three sessions per semester).
2Educational Psychology 510, 522; Psychology 511.
3Educational Psychology 515, 671; Psychology 560.
4Counselor Education 525 and either Educational Psychology 550 (required of nonthesis option students) or 577 (required of thesis option students).
5Educational Psychology 572, 573, 574.
DOCTOR OF PHILOSOPHY
Education Major • Educational Psychology
Concentration • Collaborative Learning
Specialization
http://web.utk.edu/~edpsych/grad/collab_learning/default.html

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 93 hours of graduate credit above 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 credit hours of course work 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:

- **Concentration Core in Educational Psychology (15 hours).** The concentration core consists of a minimum of one course in the area of Collaborative Learning and one course from each of the other specializations in Educational Psychology: Adult Education and Applied Educational Psychology.

- **Specialization Core in Collaborative Learning (24 hours).** The specialization core consists of four courses in the area of Collaborative Learning plus the doctoral seminar. Educational Psychology 630 Doctoral Seminar in Collaborative Learning 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 credit hours are awarded per semester for a total of 12 hours of credit.

- **Related Studies (30 hours).** The related studies component incorporates three areas of study:
  
  1. **Research Methods (15 hours).** This set of courses normally includes courses in qualitative and quantitative research methods and statistics. Educational Psychology 530 is required.
  2. **Cognate (6 hours).** Courses taken in an area outside the major area of study.
  3. **Area (12 hours).** Additional courses of the student’s choice that support his or her program emphasis.

- **Dissertation Research (24 hours).** 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.

DOCTOR OF PHILOSOPHY
Education Major • Educational Psychology
Concentration • 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

Regardless of his/her area of emphasis, each student completes 98 hours beyond the baccalaureate degree. These hours are distributed across the following categories:

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentration Core</td>
</tr>
<tr>
<td>Specialization</td>
</tr>
<tr>
<td>Research</td>
</tr>
<tr>
<td>PhD Core</td>
</tr>
<tr>
<td>Cognate</td>
</tr>
<tr>
<td>Dissertation</td>
</tr>
</tbody>
</table>

The concentration core provides a grounding in educational psychology, with required courses such as psychology of learning, theories of human development applied to education, and formal measurement. The specialization involves 12 hours of the doctoral seminar in applied educational psychology, three hours of facilitating group change, and 12 hours reflecting the student’s area of emphasis. For students with the learning/development emphasis, course options include (but are not limited to) mediated learning theory, educational applications of cognitive learning theories, collaborative learning, and seminar in cognitive science. For students with the statistics/testing emphasis, course options include (but are not limited to) survey design and analysis, categorical data analysis, applied multivariate methods, and scale construction.

To meet the 15-hour requirement in research, students can elect to take a full set of courses that deal with quantitative 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, ethnography) or they can elect to take a mix of these courses.

The cognate requires a minimum of two courses outside the College of Education, Health, and Human Sciences. Many students set up their cognate to be psychology or statistics, although other cognates are possible.

The requirements/options for the PhD core are listed elsewhere in this catalog, as are the requirements for the 24 hours of dissertation.
COUNSELING PROGRAMS

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 counselor education, and school counseling); Specialist in Education with a major in school counseling; Doctor of Philosophy with a major in education (concentration in counselor education). Each degree leads to counseling licensure. The mental health counseling and school counseling programs are accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP). The graduate program in Rehabilitation Counselor Education (RCE) is service oriented and is accredited by the Council on Rehabilitation Education (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-semester hours) is accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP). The program requires a 900-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).

REQUIREMENTS

Year 1
Counselor Education 431 .................................................................3
Counselor Education 525 .................................................................3
Counselor Education 551 .................................................................3
Counselor Education 554 .................................................................3
Counselor Education 555 .................................................................3
Counselor Education 556 .................................................................3
Counselor Education 550 .................................................................3
Psychology 512 or Educational Psychology 510 .........................3
Counselor Education 500 or electives ...........................................6

Year 1 Total 30

Year 2
Counselor Education 521 .................................................................3
Counselor Education 535 .................................................................3
Counselor Education 552 .................................................................3
Counselor Education 559 .................................................................9
Counselor Education 570 .................................................................3
Psychology 573 or Social Work 524 ..............................................3
Counselor Education 651 .................................................................3
Counselor Education 500 or electives ...........................................3

Year 2 Total 30

Total program hours 60

MASTER OF SCIENCE
Counseling Major • Rehabilitation Counselor Education 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 counselor education is designed to prepare students for professional careers as clinicians in the field of rehabilitation counseling. The rehabilitation counselor education concentration is service-oriented and includes practica and internship experiences. Completion of the two year (16 month) program culminates in a Master of Science degree. The program is fully accredited by the Council on Rehabilitation Education (CORE).

Students may be admitted to the program either full-time, part-time, 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 Counselor Education 547. The fall (fall 2) semester is experiential, with students working full-time to fulfill the 600-hour requirement of Rehabilitation Counselor Education 549.

Students who are interested in working with people who are deaf or hard of hearing may choose the optional deafness focus area for their Rehabilitation Counselor Education master’s program. This allows individuals who have bachelor degrees in deafness related fields to expand their competencies to serve rehabilitation consumers who are deaf or hard of hearing. Interested students must have knowledge of American Sign Language. Contact Terry Osborne at the Center on Deafness (COD) for details—(865) 974-4147 (Voice/TTY).

REQUIREMENTS

The recommended course of study for full-time rehabilitation counselor education concentration students is

Fall 1
• Counselor Education 431
• Rehabilitation Counselor Education 530, 543, 545, 592, 549 (second year students only)

Spring 1
• Educational Psychology 550
• Rehabilitation Counselor Education 547, 532, 537, 579, 549 (second year students only)
Summer 1
- Rehabilitation Counselor Education 533, 579, 570
- Counselor Education 554, 549 (second year students only)

Fall 2
- Rehabilitation Counselor Education 549 (second year students only)

Students are admitted to rehabilitation counselor education courses upon program admission only. All rehabilitation counselor education courses, with the exception of Rehabilitation Counselor Education 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
- Dr. Amy L. Skinner, LPC, CRC, NCC Program Coordinator, askinner@utk.edu
- Terry Osborne, Instructor and Deafness-Focus Area Advisor, osborne@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, 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 Pre-K-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</td>
<td>3</td>
</tr>
<tr>
<td>Counselor Education 525</td>
<td>3</td>
</tr>
<tr>
<td>Counselor Education 550</td>
<td>3</td>
</tr>
<tr>
<td>Counselor Education 551</td>
<td>3</td>
</tr>
<tr>
<td>Counselor Education 552, 553</td>
<td>6</td>
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<tr>
<td>Counselor Education 554</td>
<td>3</td>
</tr>
<tr>
<td>Educational Psychology 550</td>
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</tbody>
</table>

Year 1 Total 24

Year 2
- Counselor Education 555
- Counselor Education 558
- Counselor Education 561
- Counselor Education 570

SPECIALIST IN EDUCATION
School Counseling Major

The Specialist in Education program 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 hours beyond the bachelor’s degree. Applicants for degrees 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 the following: 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 license 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 semester hours beyond the master’s. The program is individualized and planned by the student and a faculty committee. A minimum of six hours is required from outside the counselor education program. Please refer to the current Graduate Catalog for general information on the EdS.

REQUIREMENTS

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Hours Credit</th>
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<tbody>
<tr>
<td>1School Counseling Core</td>
<td>13</td>
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<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>
</tbody>
</table>

Total program hours 22

1Counselor 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 one of the following careers: 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 course work, 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. To be considered for acceptance, the applicant must have:

- Master’s degree in counseling or counselor-related field
- Preference given to those with a 3.5 GPA on any graduate work completed prior to application
- 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
- Preference given to those 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 4.5 on the Analytic Writing subtest.
- 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 3.0 or higher. English language proficiency requirements include a minimum score of 575 on the written test of the TOEFL (with a minimum of 52 on each sub score or comparable score for electronic version) and scores on the GRE that meet the admission requirements.

### REQUIREMENTS

Coursework for the program in counselor education includes

<table>
<thead>
<tr>
<th>Concentration</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<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>Total</td>
<td>97</td>
</tr>
</tbody>
</table>

1. Concentration
2. Core
3. Research
4. Dissertation

1. Counselor Education 553; Counselor Education 571 or 671 or Educational Psychology 541 or Counselor Education 625; Counselor Education 655, 660, 665, 670, 675; Psychology 679 (6 hours); Counselor Education 672 or Psychology 573 or Social Work 530 or Educational Psychology 690; Sociology 543 or Social Work 532 or Sociology 465.
2. Seminar in Primary Concentration: Counselor Education 650; Philosophy of Science (3) (substitute Counselor Education 535); Theoretical Foundations and/or Applications (3); Department Seminar (1).
3. Nine hours quantitative research including a two-semester statistics sequence and six hours qualitative research.

### HIGHER EDUCATION ADMINISTRATION PROGRAMS

Under Higher Education Administration, two programs are offered: a major in college student personnel and a concentration in higher education administration under the PhD major in education. Following are program goals/mission, admissions, and requirements for each of these two programs.

### MASTER OF SCIENCE

#### College Student Personnel Major

**Mission/Purpose.** 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 the following: enrollment services in 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 15th: College Student Personnel Program Application form, 3 rating/reference forms; application to the Office of Graduate Admissions. It is recommended that all materials be submitted by February 15.

**Requirements.** The college student personnel program requires a minimum of 36 semester 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

**Mission/Purpose.** 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 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 course work 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.
Admissions. 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, Application for Graduate Study at the University of Tennessee, 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 3.3 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 semester hours of course work (exclusive of dissertation enrollment), completion of a written and oral comprehensive examination (an overall GPA of 3.5 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/grad/school_psych/default.html.

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. We offer two degree programs, the Specialist in Education and the Doctor of Philosophy. The school psychology programs are accredited or approved by the 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. Admission occurs once a year and materials are due by January 15.

SPECIALIST IN EDUCATION
School Psychology Major

Every school psychology student is expected to meet the University of Tennessee, Knoxville, school psychology training programs 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, practica 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., NASP, SDE-Tennessee; and the University of Tennessee, Knoxville, Graduate Admissions) 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, Knoxville, school psychology training programs meet the goals and objectives of these various training groups. The University of Tennessee, Knoxville, 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, and field experience and professional practice.

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Hours Credit</th>
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</thead>
<tbody>
<tr>
<td>Professional School Psychology</td>
<td>15</td>
</tr>
<tr>
<td>Consultation and Intervention</td>
<td>27</td>
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<tr>
<td>Assessment</td>
<td>24</td>
</tr>
<tr>
<td>Research and Statistics</td>
<td>15</td>
</tr>
<tr>
<td>Psychoeducational Core</td>
<td>33</td>
</tr>
</tbody>
</table>

Field and Practica Experiences by Semester Years 1-3
Research in the Schools or with Children (75 hours); Educational Psychology 655 (4-6)

First Year, Fall and Spring
Knowledge, Roles, and Functions (75 hours); Educational Psychology 650; Supervised via 540 (fall); 635 (fall)

Second Year, Fall
Introduction to consultation and intervention practices (50 hours); Educational Psychology 650 supervised via 545

Second Year, Spring
Develop consultation skills (150 hours); Educational Psychology 546

Third Year, Fall and Spring
Practice professional assessment skills (e.g., administration, interpreting, report writing) (75 hours /semester); Educational Psychology 542

Fourth Year, Fall and Spring
Educational Psychology 549 (9); knowledge and skill development and mastery (1200-1500 hours)

DOCTOR OF PHILOSOPHY
Education Major • School Psychology Concentration

Every school psychology student is expected to meet the University of Tennessee, Knoxville, school psychology training programs 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, practica 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; and the University of Tennessee, Knoxville, Graduate Admissions) 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, Knoxville, school psychology training programs meet the goals and objectives of these various training groups. The University of Tennessee, Knoxville, school psychology 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, and field experience and professional practice.
Department of EXERCISE, SPORT, AND LEISURE STUDIES
http://web.utk.edu/~sals/

DeSensi, Joy T., Head

Professors
Bassett, Jr., D.R., PhD.................................................................Wisconsin
DeSensi, J.T., EdD .................................................................North Carolina (Greensboro)
Hayes, G.A., PhD .................................................................North Texas State
Howley, E.T., PhD.................................................................Wisconsin
Wrisberg, C.A., PhD .............................................................Michigan

Associate Professors
Jones, R.E., PhD .................................................................Toledo
Kelley, D.R., PhD .................................................................Georgia State
Krick, K.L., ReD .................................................................Indiana
Thompson, D., PhD .............................................................Virginia
Zhang, S., PhD .................................................................Oregon

Assistant Professors
Fairbrother, J., PhD .............................................................Florida State
Fisher, L.A., PhD .............................................................California (Berkeley)
FitzHugh, E., PhD .............................................................Alabama
Hardin, R.L., PhD .............................................................Tennessee
Klein, D., PhD .................................................................Arizona State
McCUTCheN, M.G., EdD ........................................................North Carolina (Greensboro)

Emeriti Faculty
Kozar, A., PhD .................................................................Michigan
Liemohn, W., PhD .............................................................Iowa

Internship Coordinator
Brown, L.Y., MS .................................................................Tennessee

PEAP Program Director
Catignani, E., MS .................................................................Wisconsin

Lecturers
BeMiller, J., JD .................................................................Tennessee
Causey, S., MS .................................................................Tennessee

Artist in Residence—Dance
Burke, P.

MAJORS
Exercise Science .................................................................PhD
Recreation and Leisure Studies ........................................MS
Sport Studies .................................................................MS
Education .................................................................PhD

DEGREES
Exercise Science .................................................................MS
Recreation and Leisure Studies ........................................MS
Sport Studies .................................................................MS
Education .................................................................PhD

The Department of Exercise, Sport, and Leisure Studies is committed to excellence in research, teaching, practice, and service within the multifaceted contexts 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.

The Department of Exercise, Sport, and Leisure Studies offers graduate programs leading to the following degrees, majors and concentrations.

Master of Science
Exercise science major
Exercise physiology concentration
Biomechanics/sports medicine concentration
Recreation and leisure studies major
Recreation and leisure administration concentration
Therapeutic recreation concentration
Sport studies major
Sport management concentration
Sport studies concentration

Doctor of Philosophy
Education major
Exercise science (exercise physiology or biomechanics/sports medicine concentration)
Sport studies concentration

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 exercise science faculty
offers graduate degrees (MS and PhD) in two specialties: exercise physiology and biomechanics/sports medicine.

The exercise physiology specialty 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: (1) adult fitness/cardiac rehabilitation, or (2) 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 PhD program requires course work 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.

The biomechanics/sports medicine specialty 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 PhD program requires course work 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.

**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. Letters should be addressed to Graduate Assistantships Coordinator, Health and Exercise Science Department, The University of Tennessee, Knoxville, Tennessee 37996-2700.

**ADMISSION**

Applicants are required to complete the departmental application which will be sent to all persons upon their initial inquiry about the program. This is in addition to the Graduate Application for Admission. Applications from persons who have less than a 3.0 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 3.0 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.
- If a student’s overall GPA remains below 3.0 for a second semester, the student will have his/her degree status revoked.

---

**MASTER OF SCIENCE**

**Exercise Science Major • Exercise Physiology Concentration**

**REQUIREMENTS**

- Exercise Science 508 (or Health 590), 533, 565, 567, 635, 601 (1 hr seminar, 2 enrollments). 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, or Nutrition.

**Biomechanics • Sports Medicine Concentration**

**REQUIREMENTS**

- Exercise Science 508 (or Health 590), 513, 516, 531, 581 (1-3 hours), 601 (1 hour seminar, 2 enrollments).
- Either Exercise Science 501 (project) or 500 (thesis—must also take a statistics course approved by advisor). Electives approved by advisor from Exercise Science, Sports Studies, or Biomedical Engineering.

**DOCTOR OF PHILOSOPHY**

**Education Major • Exercise Science Concentration**

**REQUIREMENTS**

- 15 hours in exercise science.
- Nine 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.
- Six 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.

---

**MASTER OF SCIENCE**

**Recreation and Leisure Studies Major**

**REQUIREMENTS**

Requirements for concentrations appear below.

---

**Recreation and Leisure Studies Major • Recreation and Leisure Administration Concentration (Thesis Option)**

<table>
<thead>
<tr>
<th>Hours</th>
<th>Credit</th>
</tr>
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<tbody>
<tr>
<td>Recreation and Leisure Studies 415</td>
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</tr>
<tr>
<td>Recreation and Leisure Studies 510</td>
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</tr>
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<td>Recreation and Leisure Studies 540</td>
<td>3</td>
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</table>
Recreation and Leisure Studies Major • Recreation and Leisure Administration Concentration (Non-Thesis Option)

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours Credit</th>
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<td>3</td>
</tr>
<tr>
<td>Recreation and Leisure Studies 540</td>
<td>3</td>
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<tr>
<td>Recreation and Leisure Studies 541</td>
<td>3</td>
</tr>
<tr>
<td>Safety 443</td>
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</tr>
<tr>
<td>Sport Management 512</td>
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<tr>
<td>Recreation and Leisure Studies 590 Graduate Internship*</td>
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<tr>
<td>Research Methods</td>
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</tr>
<tr>
<td>Statistics</td>
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</tr>
<tr>
<td>Electives</td>
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</table>

Total 33

Recreation and Leisure Studies Major • Therapeutic Recreation Concentration (Thesis Option)

<table>
<thead>
<tr>
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<th>Hours Credit</th>
</tr>
</thead>
<tbody>
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</tr>
<tr>
<td>Recreation and Leisure Studies 515</td>
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<tr>
<td>Recreation and Leisure Studies 520</td>
<td>3</td>
</tr>
<tr>
<td>Recreation and Leisure Studies 521</td>
<td>3</td>
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<tr>
<td>Recreation and Leisure Studies 590 Graduate Internship*</td>
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</tr>
<tr>
<td>Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>Statistics</td>
<td>3</td>
</tr>
<tr>
<td>Thesis</td>
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</tr>
</tbody>
</table>

Total 33

*Must meet national certification requirements

Recreation and Leisure Studies Major • Therapeutic Recreation Concentration (Non-Thesis Option)

<table>
<thead>
<tr>
<th>Course</th>
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<tr>
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<tr>
<td>Research Methods</td>
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<td>Statistics</td>
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<tr>
<td>Electives</td>
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</tr>
</tbody>
</table>

Total 36

*Must meet national certification requirements

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 teaching assistantships are available in the Physical Education and Activity Program for sport management students. Please contact Lori Fielden at lfielden1@utk.edu or 865-974-8171 for more information regarding these assistantships.

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 Studies Major • Sport Management Concentration (Project Option)

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours Credit</th>
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<tbody>
<tr>
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<tr>
<td>Sport Management 532</td>
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<tr>
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<td>Sport Studies Elective</td>
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<td>Sport Management 501 – Project</td>
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</table>

Total 33

Sport Studies Major • Sport Management Concentration (Thesis Option)

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours Credit</th>
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<tr>
<td>Sport Management 511</td>
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<td>Sport Management 532</td>
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<tr>
<td>Sport Management Electives</td>
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<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>
</tbody>
</table>

Total 30

*Sport Management 440, 512, 530, 540, 544, 553, 554, 555, 570, 580.
*These courses can be taken within Exercise, Sport, and Leisure Studies or outside the department.
A total of six hours may be earned in Sport Management 590 and 595 combined.

Sports Studies Concentration

REQUIREMENTS

Thesis and Non-Thesis Options

The thesis option is available for all students and is especially encouraged for those who intend to eventually pursue a doctoral degree. All thesis students are required to register for six hours of thesis (Sport Studies 500). Students who choose the non-thesis option are required to take a written comprehensive examination.
All students must complete a minimum of 30 semester hours and are required to take either two semesters (one hour each) of cultural studies in education seminar (Cultural Studies in Education 590) or justice, schools, and sports (three hours Cultural Studies in Education 592). Students must select a minimum of 15 hours from the following Sport Studies courses—Sport Studies 505, 507, 514, 533, 534, 535, *537 (1), 542, 543, *593 (1-3), *594 (1-3), *595 (1-3), *633. Students may select additional courses relevant to their professional and career goals 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 sport sociology and sport psychology. The program stresses an interdisciplinary approach to course work 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.

REQUIREMENTS

The program usually takes 3 years (2 years of coursework and 1 year for the dissertation) and includes

- Concentration 15 hours
- *Research 15 hours
- Specialization 9 hours
- Cognate 6 hours
- Dissertation 24 hours
- *(3 hours of Sports Studies 601 included)

HEALTH AND SAFETY PROGRAMS
http://hes.utk.edu/grad/safety.html

Thomas W. George, Interim Director
Susan M. Smith, Graduate Liaison

Professors
Clarke, B., PhD ......................................................... Virginia Tech
Gorski, J., DrPH .......................................................... UCLA
Hamilton, C., DrPH .................................................. Oklahoma
Keel, M., PhD .......................................................... Tennessee
Petty, G., PhD .......................................................... Missouri

Associate Professors
Pursley, R., PhD ......................................................... Iowa
Smith, S., EdD .......................................................... Tennessee

Emeriti Faculty
Kirk, R., HSD ............................................................ Indiana
Wallace, B., EdD .......................................................... Northern Colorado

MAJORS DEGREES
Safety, ................................................................. MS
Public Health .......................................................... MPH, MS-MPH
Human Ecology .......................................................... PhD

Health and Safety Programs foster development of those with career interests in health education/promotion, public health, and safety. Graduate programs are

Master of Science
Safety major

Master of Public Health
Public health major
- Community health education concentration
- Gerontology concentration
- Health planning/administration concentration
- Veterinary public health concentration

Master of Science – Master of Public Health (Dual Degree)

Doctor of Philosophy
Human ecology major
- Community health concentration

Certificate Program
Applied Epidemiology

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 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.

REQUIREMENTS

Prior to earning more than one-half the total hours required for this minor, students must complete a Declaration of a Minor in the College of Education, Health, and Human Sciences form. Copies of this form are available in the Department of Health and Exercise Science.

Core Experience

Students must complete a core experience of 12 semester hours taken from at least three different departments including nine hours taken from outside the major department.

- Coursework. 9 hours required. A variety of coursework may be taken toward satisfaction of this requirement. Courses which are offered on a regular basis include Health 406, 465, Health/Public Health 650, Nutrition 518, Public Health 523, Social Work 566, Sociology 415, Educational Psychology 504, 522, 525, 528.
- Applied practicum. 2 hours required. Students should register under practicum experiences in the home department of the supervising faculty.
- Health 585. 1 hour required. Cross-listed with participating departments.
- Successful completion of a written comprehensive examination covering subject matter of the minor.
HEALTH

DOCTOR OF PHILOSOPHY

Human Ecology 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

• Minimum 21 hours of foundation courses—610, 620, six hours of statistics, three hours of specialized research methods, and six hours of natural or behavioral sciences
• Minimum 21 hours in primary specialization—530, 540, 650, 655, 660, and six hours of electives
• Minimum 12 hours in supporting specialization in a focused area—public health, safety, gerontology, or a program approved by doctoral committee
• Minimum six hours in a cognate area
• Minimum 24 hours of dissertation

PUBLIC HEALTH

Graduate study with a major in public health leads to the Master of Public Health (MPH). Four professional preparation concentrations are available: community health education, gerontology, 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. Request application packet from the department. Preferential consideration for admission to degree status shall be given to those with a minimum undergraduate grade point average of 2.8 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 38 semester hours of course work 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

Students must complete all assigned prerequisite courses and 21 semester hours of the curriculum with a minimum overall GPA of 3.0 prior to placement in the field.

As an alternative to field practice, preparation of a master’s essay may be used to fulfill the professional skills development component of the curriculum. Approval must be received from the Public Health Academic Program Committee and is contingent on consent of major advisor, formal written proposal by the student, and completion of an additional research methods course. Written guidelines stipulating expectations and eligibility criteria are available.

Requirements include
• Public health foundation courses (16 hours)—509, 510, 520, 530, 540, 555
• Internship (six hours) 587, 588
• Concentration of study (16 hours)
Recommended electives will be selected by the student in consultation with major advisor. A list of courses is available for each concentration: community health education, gerontology, health planning/administration and veterinary public health.

**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; or 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 application to, and be competitively and independently accepted by, the Department of Nutrition for the MS, Department of Health and Exercise Sciences for the MPH, and 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 be 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, two credits of Seminar in Public Health Public Health 509, and a minimum of 60 credits. The Department of Nutrition will award a maximum of nine hours of credit toward the MS for successful completion of approved graduate-level courses offered in the Department of Health and Exercise Science. 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 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 semester 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.

**Gerontology Minor**

Graduate students in Public Health may pursue a specialized minor in gerontology. This interunit/interdisciplinary minor gives the student an opportunity for combining the knowledge about aging in American society with his/her major concentration.

**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 safety management or in emergency 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**

The MS program requires completion of 33 hours. Degree requirements include completion of the 18-hour core curriculum and completion of a concentration area (15 hours). Concentration course options include specific courses offered by the Human Resource Development Program, and Departments of Industrial and Information Engineering, Civil and Environmental Engineering, and Political Science (Public Administration) in addition to those offered by the Department of Health and Exercise Science. A list of courses is available for each concentration. Students may elect an internship experience with private industry or non-profit organizations to fulfill part of their course requirements. Curricular experiences will assist graduates in preparation for certified safety professional (CSP) examination.

**Department of INSTRUCTIONAL TECHNOLOGY AND EDUCATIONAL STUDIES**

http://ites.tennessee.edu/

Russell French, Interim Head

Professors

Counts, E., EdD .........................................................Texas A&M
French, R., PhD ..........................................................Ohio State
Ray, J., EdD .................................................................Tennessee
Thayer-Bacon, B., PhD ..............................................Indiana
Waugh, M., EdD .........................................................Georgia
The Department of Instructional Technology and Educational Studies offers graduate programs leading to the following degrees, majors, and concentrations:

### Master of Science
- Instructional technology and educational studies major
  - Cultural studies of educational foundations concentration
  - Curriculum concentration
  - Instructional technology concentration

### Specialist in Education
- Instructional technology and educational studies major
  - Cultural studies of educational foundations concentration
  - Curriculum concentration
  - Instructional technology concentration

### Doctor of Philosophy
- Education major
  - Cultural studies of educational foundations concentration
  - Curriculum, educational research, and evaluation concentration
  - Instructional technology concentration

The mission of the Instructional Technology and Educational Studies Department is to prepare teachers, instructional designers, theorists and researchers. For additional information, please visit our Web site.

### ADMISSION

Individuals seeking admission to any of the degree programs in the Department of Instructional Technology and Educational Studies must first be admitted to the University of Tennessee, Knoxville (See the Graduate Studies: Admission Requirements section of this catalog). Following the submission of an application for graduate study at the University of Tennessee, Knoxville, individuals must make application to the specific degree program within the Instructional Technology and Educational Studies Department.

Applicants seeking master's and 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 doctoral applicants will be made only once per year, during the spring semester. Doctoral applicants admitted through this process will be notified by April 1.

### Department-Specific Admissions Criteria

Each PhD applicant in the Department of Instructional Technology and Educational Studies is required to submit a current set of GRE scores as part of his/her application. However, the Department of Instructional Technology and Educational Studies does not require MS or EdS applicants to submit GRE scores.

### MASTER OF SCIENCE

#### Instructional Technology and Educational Studies Major

<table>
<thead>
<tr>
<th>REQUIREMENTS</th>
<th>Instructional Technology and Educational Studies Major • Cultural Studies of Educational Foundations Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours Credit</td>
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<tr>
<td>Concentration</td>
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<tr>
<td>Specialization</td>
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<td>Research</td>
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<tr>
<td>Thesis or Problems in Lieu of Thesis</td>
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</tr>
<tr>
<td>Total</td>
<td>35</td>
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</tbody>
</table>

1. Cultural Studies in Education 590 (2), 591, 592. Select two from the following courses: 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, 545, 547, 548, 608, or 609); Sociology of Education (Cultural Studies in Education 545, 549, 648, or 652); History of Education (Cultural Studies in Education 511, 539, 546, 609, or 625).
3. Select two courses from the following: 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 and Educational Studies Major • Curriculum Concentration (Thesis Option)

<table>
<thead>
<tr>
<th>REQUIREMENTS</th>
<th>Instructional Technology and Educational Studies Major • Curriculum Concentration (Thesis Option)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours Credit</td>
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<td>Research</td>
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<td>Thesis: Instructional Technology and Educational Studies 500</td>
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<td>30</td>
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1. Theory and Practice in Teacher Education 517.
2. Select one course in each of the following areas: Educational Foundations; Instructional Technology, Curriculum, Educational Research and Evaluation 534 or 558, 560, 588.

**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 and Educational Studies Major • Curriculum Concentration (Non-Thesis Option)

<table>
<thead>
<tr>
<th>Hours Credit</th>
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</thead>
<tbody>
<tr>
<td>Core: ..................................................</td>
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<td>Concentration: .........................................</td>
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<td>Electives: ................................................</td>
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<tr>
<td>Research: ..................................................</td>
</tr>
<tr>
<td>Total 33</td>
</tr>
</tbody>
</table>

2. *Select one course in each of the following areas: Educational Foundations; Instructional Technology; Curriculum, Educational Research and Evaluation 534 or 558, 560, 588.*

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 and Educational Studies Major • Instructional Technology Concentration (Thesis Option)

<table>
<thead>
<tr>
<th>Hours Credit</th>
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<tbody>
<tr>
<td>Core: ..................................................</td>
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<td>Electives: ................................................</td>
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<tr>
<td>Research: ..................................................</td>
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<tr>
<td>Thesis: Instructional Technology and Educational Studies 500: ...........</td>
</tr>
<tr>
<td>Total 33</td>
</tr>
</tbody>
</table>

1. *Theory and Practice in Teacher Education 517. Select one course in each of the following areas: Educational Foundations; Instructional Technology; Curriculum, Educational Research and Evaluation.*
2. *Instructional Technology 521, 570, 573, 575.*

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 and Educational Studies Major • Instructional Technology Concentration (Non-Thesis Option)

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core: ..................................................</td>
</tr>
<tr>
<td>Concentration: .........................................</td>
</tr>
<tr>
<td>Electives: ................................................</td>
</tr>
<tr>
<td>Research: ..................................................</td>
</tr>
<tr>
<td>Total 33</td>
</tr>
</tbody>
</table>

1. *Theory and Practice in Teacher Education 517. Select one course in each of the following areas: Educational Foundations; Instructional Technology; Curriculum, Educational Research and Evaluation.*
2. *Instructional Technology 521, 570, 573, 575.*

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 Educational Studies Major

REQUIREMENTS

Instructional Technology and Educational Studies Major • Curriculum Concentration (Thesis/Non-Thesis)

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Prerequisites: ........................................</td>
</tr>
<tr>
<td>Concentration: ...............................................</td>
</tr>
<tr>
<td>Research (maximum 3 hours per semester): ..................</td>
</tr>
<tr>
<td>Total 30</td>
</tr>
</tbody>
</table>

1. *Dependent on student background.*
2. *Curriculum, Educational Research, and Evaluation 676; Instructional Technology 521 or 575 (or 600-level substitute).*
3. *Select 9 hours from curriculum, educational research, and evaluation subject area. Select 3 hours from either instructional technology or cultural studies in education subject areas. Select 6 hours electives outside the curriculum concentration.*

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.

Instructional Technology and Educational Studies Major • Instructional Technology Concentration (Thesis/Non-Thesis)

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Prerequisites: ........................................</td>
</tr>
<tr>
<td>Concentration: ...............................................</td>
</tr>
<tr>
<td>Research (maximum 3 hours per semester): ..................</td>
</tr>
<tr>
<td>Total 30</td>
</tr>
</tbody>
</table>

1. *Must hold master’s degree in education or related field.*
2. *Select one course in each of the following areas: Curriculum, Educational Research, and Evaluation; Cultural Studies in Education.*
3. *These courses are required for students who do not have a master’s degree with a major in instructional technology: Instructional Technology 521, 570, 573, 575 (or approved substitutions). Electives (6 hours) taken outside the instructional technology concentration.*

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

Education Major • Cultural Studies of Educational Foundations Concentration

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Prerequisites: ........................................</td>
</tr>
<tr>
<td>Concentration: ...............................................</td>
</tr>
<tr>
<td>Specialization: ................................................</td>
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<tr>
<td>Research: ......................................................</td>
</tr>
<tr>
<td>Cognate: .......................................................</td>
</tr>
<tr>
<td>Dissertation (Instructional Technology and Educational Studies 600): ....</td>
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</tr>
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</table>

1. *Departmental Core: ........................................ | 12 |
2. *Concentration: ............................................... | 16 |
3. *Specialization: ................................................ | 9 |
4. *Research: ...................................................... | 15 |
5. *Cognate: ....................................................... | 6 |
Programming Prerequisites
Program Prerequisites

1. Instructional Technology and Educational Studies 601 (3). Select one course in each of the following areas: Cultural Studies in Education 533, 539, 544, 547, 548, or 568; Sociology of Education (Cultural Studies in Education 545, 549, 548, or 565; History of Education (Cultural Studies in Education 511, 512, 539, 546, 609, or 625).

2. Both qualitative and quantitative research methodologies must be included. Curriculum, Educational Research and Evaluation 520; Research Methods Electives (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.

Education Major • Curriculum, Educational Research, and Evaluation Concentration

<table>
<thead>
<tr>
<th>Hours Credit</th>
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</thead>
<tbody>
<tr>
<td>Program Prerequisites</td>
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<tr>
<td>Departmental Core</td>
<td>12</td>
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<tr>
<td>Concentration</td>
<td>12</td>
</tr>
<tr>
<td>Specialization</td>
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</tr>
<tr>
<td>Research</td>
<td>15</td>
</tr>
<tr>
<td>Cognate</td>
<td>6</td>
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<tr>
<td>Dissertation (Instructional Technology and Educational Studies 600)</td>
<td>24</td>
</tr>
<tr>
<td>Total</td>
<td>81</td>
</tr>
</tbody>
</table>

1. Dependent on student background.

2. Instructional Technology and Educational Studies 601 (3). Select one course in each of the following areas: Cultural Studies in Education 533, 539, 544, 547, 548, or 607; Instructional Technology 521 or 679, or advisor approved substitute; Curriculum, Educational Research and Evaluation 676.


4. Both qualitative and quantitative research methodologies must be included. Curriculum, Educational Research and Evaluation 520; Research Methods Electives (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.

Education Major • Instructional Technology Concentration

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Prerequisites</td>
<td>1</td>
</tr>
<tr>
<td>Departmental Core</td>
<td>12</td>
</tr>
<tr>
<td>Concentration</td>
<td>15</td>
</tr>
<tr>
<td>Specialization</td>
<td>9</td>
</tr>
<tr>
<td>Cognate</td>
<td>6</td>
</tr>
<tr>
<td>Research</td>
<td>15</td>
</tr>
<tr>
<td>Dissertation (Instructional Technology and Educational Studies 600)</td>
<td>24</td>
</tr>
<tr>
<td>Total</td>
<td>81</td>
</tr>
</tbody>
</table>

1. Students entering the PhD program with a concentration in IT must possess a master’s degree in a related field of study.

2. Instructional Technology and Educational Studies 601 (3). Select one course in each of the following areas: Cultural Studies in Education 533, 539, 544, 547, 548, or 607; Instructional Technology 521, 679, Curriculum, Educational Research and Evaluation 534, 558, 675, or 676.

3. Instructional Technology 521, 679, or advisor approved substitute; Curriculum, Educational Research and Evaluation 534, 558, 675, or 676.

4. Select three courses in one of the following areas: Philosophy of Education (Cultural Studies in Education 550, 590 (4), 591, 592, 609).

5. Both qualitative and quantitative research methodologies must be included. Curriculum, Educational Research and Evaluation 520; Research Methods Electives (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.

Department of NUTRITION

http://nutrition.uth.edu

Jay Whelan, Head
Michael Zemel, Graduate Liaison

Professors

Haughton, B., EdD .........................................................Columbia
Karlstad, M., PhD ...............................................................Loyola
Moustaid-Moussa, N., PhD .............................................Paris
Sachan, D., PhD .................................................................Illinois
Whelan, J., PhD ................................................................Penn State
Zemel, M., PhD .................................................................Wisconsin

Associate Professor

Bailey, J., PhD .................................................................Iowa State

Assistant Professors

Bittle, J., PhD .................................................................Tennessee
Jahns, L., PhD .................................................................North Carolina
Jones, S., PhD .................................................................North Carolina
Kim, J., PhD .................................................................Tennessee
Truett, G., PhD .................................................................Georgia

Emeritus Faculty

Skinner, J., PhD .................................................................Oregon State

MAJORS

DEGREES

Nutrition .................................................................MS, MS-MPH
Human Ecology ...............................................................PhD

The Department of Nutrition offers graduate programs leading to the following degrees, majors, and concentrations.

Master of Science

Nutrition major
Nutrition science concentration
Public health nutrition concentration

Master of Science – Master of Public Health (Dual Degree)

Doctor of Philosophy

Human ecology major
Nutrition science concentration

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 DI program 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 file, 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, 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. Admission to the PhD program with a major in human ecology and a concentration in nutrition science requires a master’s degree. 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.
- Students in public health nutrition must take 511, 512, 513, 514, 515, 541 and the minor in public health.
- Six 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, 2 hours from 542-544 and 3 hours of graduate level statistics are required.
- Students in public health nutrition must take 511, 512, 513, 514, 515 and the minor in public health.
- Six 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 application to, and be competitively and independently accepted by, the Department of Nutrition for the MS, Department of Health and Exercise Sciences for the MPH, and 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 be 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, as well as the requirements for the dual program. All candidates for the dual degree must successfully complete Health and Society (Public Health 555), two credits of Seminar in Public Health (Public Health 509), and a minimum of 60 credits. The Department of Nutrition will award a maximum of nine hours of credit toward the MS for successful completion of approved graduate level courses offered in the Department of Health and Exercise Science. The Department of Health and Exercise Science 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**

MS courses to be counted toward the MPH program must include 10 semester hours of Field Study in Community Nutrition (Nutrition 515) and one hour of Graduate Seminar in Public Health (Nutrition 509). MPH courses to be counted toward the MS include public health administration (Public Health 520), biostatistics (Public Health 530), and epidemiology (Public Health 540).
DOCTOR OF PHILOSOPHY

Human Ecology 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. Cognitive areas may include anthropology, biochemistry, chemistry, communications, education, food technology, human development, physiology, public health, sociology, statistics, and/or toxicology.

REQUIREMENTS

• Sixteen hours in nutrition including 4 hours at the 600 level (exclusive of dissertation).
• Nutrition 511, 512, 541, and 2 hours from either 542-544.
• Four hours of Nutrition 540, attendance required every semester.
• Six hours of statistics.
• Six hours in a cognate area.
• Nine hours at the 600 level.
• Students without college teaching experience are required to take the fall semester teaching seminar for GTAs and Nutrition 548 comprising a faculty-supervised problem in college teaching.

Nutrition Minor

The graduate minor consists of Nutrition 511 and 512 plus at least three hours from any letter-graded 500-level or above nutrition courses.

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 ...................................................Northern Colorado
Hatch, J., PhD ......................................................Florida
Jost, K., EdD .........................................................Oklahoma
Judge, S., PhD ..................................................California (Santa Barbara)
Knight, L., PhD ...................................................Texas
Long, V., EdD ......................................................Missouri (Columbia)
McCullough-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
Ubiben, G., PhD ..................................................Minnesota
Welch, O., EdD ....................................................Tennessee

Associate Professors

Anfara, V., PhD .....................................................New Orleans
Barclay-McLaughlin, M., PhD ...............................Michigan
Bentley, M., EdD ................................................ Virginia
Cagle, L. (Associate Dean), EdD .........................Georgia
Davis, J., EdD ......................................................New Mexico
Gilrane, C., PhD .................................................Illinois
Hannum, J., EdD .................................................Northern Colorado
Melear, C., PhD ................................................ Ohio State
Warden, K., PhD ...............................................Tennessee

Assistant Professors

Bell, S., PhD .........................................................Tennessee
Broemmell, A., PhD ..........................................Southern Illinois
Brown, C., EdD ..................................................George Washington
Cady, J., PhD ......................................................Illinois State
Groeneke, S., PhD ...........................................Virginia Tech
Hendricks, D., PhD ..........................................Alabama
Patterson, F., EdD ...............................................Tennessee
Rearden, K., PhD ...............................................Texas A&M
Scheff, E., PhD ................................................ Florida State
Taylor, M., PhD .................................................Missouri
Wooten, D., PhD ...............................................New York

MAJORS

MAJORS DEGREES

Education .................................................................PhD
Education Administration .......................................MS, EdS
Teacher Education ................................................MS, EdS, EdD

The Department of Theory and Practice in Teacher Education offers graduate programs leading to the following degrees, majors, and concentrations.

Master of Science

Education Administration major
Teacher Education major

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
• Foreign language/ESL education concentration
• Mathematics education concentration
• Reading education concentration
• Science education concentration
• Science education (environmental education) concentration
• Social science education concentration
• Special education concentration

Track 2 (for individuals seeking an initial teaching license)
• Art education concentration
• Education of the deaf and hard of hearing concentration
• Elementary teaching concentration
• Middle grades concentration
• Modified and early childhood special education
• Secondary teaching concentration

Specialist in Education

Educational Administration major
Teacher education major

Elementary education concentration
English education concentration
Foreign language/ESL education concentration
Mathematics education concentration  
Reading education concentration  
Science education concentration  
Social science education concentration  
Special education concentration  

**Doctor of Philosophy**  
Education major  
Early childhood education concentration  
Educational administration and supervision concentration  
Literacy, language and ESL education concentration  
Teacher education concentration  

**Certificate Program**  
Urban Education  
The College of Education, Health and Human Sciences offers the Master of Science, Specialist in Education, and Doctor of Philosophy degrees through the Department of Theory and Practice in Teacher Education. The department houses graduate programs in educational administration and supervision, and teacher education.

**Educational Administration and Supervision**  
Through 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.

**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/~tpte/.

**FINANCIAL ASSISTANCE**  
The department offers a variety of scholarship and financial assistance opportunities and graduate assistantships for qualified students. For application forms visit the departmental website or contact our department office.

**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 P.M.) 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 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**  
The applications required by both the Office of Graduate Admissions and the Educational Administration program
must be completed. A current Graduate Record Examination (GRE) score (within the past five years) is required for admission and a grade point average (GPA) of 2.7 or higher for undergraduate work or GPA 3.2 or higher for prior graduate work is required. Applicants to the MS 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.

**Teacher Education Major**

The Master of Science 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.

**TEACHER EDUCATION MAJOR**

**TRACK 1: NON-LICENSEURE CONCENTRATIONS**

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 (environmental education)
Social science education
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, Curriculum, Educational Research, and Evaluation 520 (thesis only), Curriculum, Educational Research, and Evaluation 580 (non-thesis), 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 semester 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 semester hours, satisfactory completion of written comprehensive examination; 2/3 of total hours for MS must be 500-level or above.

**Teacher Education Major - Art Education Concentration - Track 1**

**Advising Note for Thesis and Non-Thesis Options**

- The Track 1 MS serves those students who have a 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 offered instead of a thesis toward graduation must be of work directed by art and art education faculty, and the artwork completed while pursuing the master’s degree; a written paper must accompany the exhibition. The paper includes (a) philosophical statement; (b) process and media explanation (demonstration of knowledge); (c) compositional analysis of each work; and (d) how the work relates to ones 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 of the Graduate School with regard to admission applications, candidacy forms, scheduling comprehensive exam, as well as meeting all requirements regarding the courses in their graduate program.

**Art Education Concentration (Thesis Option) • Track 1**

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Core</td>
</tr>
<tr>
<td>18</td>
<td>Concentration</td>
</tr>
<tr>
<td>6</td>
<td>Thesis: Theory and Practice in Teacher Education 500</td>
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</tbody>
</table>

Total 30

**Art Education Concentration (Non-Thesis Option) • Track 1**

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Core</td>
</tr>
<tr>
<td>21</td>
<td>Concentration</td>
</tr>
<tr>
<td>6</td>
<td>500-Level Electives</td>
</tr>
</tbody>
</table>

Total 33
Content Fields Teaching · Track 1
Concentrations in English Education, Foreign Language/ESL, Mathematics Education, Science Education, Social Science Education

Non-Thesis Option

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Core Area</th>
<th>Concentration</th>
<th>Related Studies</th>
<th>*Curriculum, Educational Research and Evaluation 580; Theory and Practice in Teacher Education 517; 3 hours determined by student and advisor.</th>
<th>3Determined by student and advisor.</th>
</tr>
</thead>
</table>

All classes must be approved by major advisor.

\*Theory and Practice in Teacher Education 517, Curriculum, Educational Research, and Evaluation 580, Instructional Technology 521, 573 or other approved Instructional Technology course.

Non-Thesis: Minimum 33 semester hours of approved coursework, and satisfactory completion of written and oral comprehensive examination. 2/3 of the total hours for the MS must be 500 level or above.

Thesis Option

Minimum 30 semester 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

| Hours Credit | Audiology and Speech Pathology 563 | Special Education 554 | Elementary Education 566 | Elementary Education 567 | Special Education 568 | Special Education 504 | Child and Family Studies 530 | Curriculum, Educational Research, and Evaluation 580 (other approved research design class may be substituted) | Electives Advisor approval required | \*Core Area |

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 (Thesis Option) · Track 1

| Hours Credit | Core | Concentration | Related Studies | Thesis: Theory and Practice in Teacher Education 500 |

Total 30

Elementary Education Concentration (Non-Thesis Option) · Track 1

| Hours Credit | Core | Concentration | Related Studies |

Total 33

Reading Education Concentration (Thesis Option) · Track 1

| Hours Credit | Core | Concentration (reading education courses) | Related Studies | Thesis: Theory and Practice in Teacher Education 500 |

Total 30

Reading Education Concentration (Non-Thesis Option) · Track 1

| Hours Credit | Core | Concentration (reading education courses) | Related Studies |

Total 33

Science Education (Environmental Education) Concentration · Track 1 (Thesis Option)

| Hours Credit | Core | Concentration | Related Studies | Thesis: Theory and Practice in Teacher Education 500 |

Total 30

1Curriculum, Educational Research, and Evaluation 580; Theory and Practice in Teacher Education 517; 3 hours determined by student and advisor.

2Choose 9 hours from: reading education, language arts, education, mathematics education, science education, social studies education, elementary curriculum, middle school curriculum.

3Determined by student and advisor.

1Curriculum, Educational Research and Evaluation 580; Theory and Practice in Teacher Education 517; 6 hours determined by student and advisor.

2Choose from at least three areas: reading education, language arts, education, mathematics education, science education, social studies education, elementary curriculum, middle school curriculum.

3Determined by student and advisor.

1Curriculum, Educational Research, and Evaluation 580; Theory and Practice in Teacher Education 517; 3 hours determined by student and advisor.

2Science Education 506, 509, 510; 3 hours determined by student and advisor.

3Determined by student and advisor.
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 course of courses, students must complete an additional 12 credit 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; nine 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.
- **Modified and Comprehensive Special Education**: Special Education 553, 590; six hours of electives (see advisor).
- **Secondary Teaching**: Theory and Practice in Teacher Education 517; Curriculum, Educational Research and Evaluation 534 or 541 or 558, or an elective in the history of sociology or philosophy of education; six hours of specialty area electives (see faculty 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 those students who already possess a master’s degree. This degree may be used for the school administrator licensure.

ADMISSION

Applicants must complete all applications forms by March 15. These include the Office of Graduate Admissions application and for those interested in licensure, the Educational Specialist in Educational Administration application. A current GRE score is required for admission and a grade point average (GPA) of 2.7 or higher for undergraduate work or GPA of 3.2 or higher for prior graduate work is required. Three rating forms must be provided with recommendations from three present or former employers that identify a candidate’s strengths, weaknesses, and leadership potential.

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.
thesis and non-thesis options are available. Six hours are to be determined by the student’s committee. Both hours in core courses, 18 hours in specialized courses, and 30 hours of coursework beyond the master’s, including six hours, are related to focus of degree and must be outside the student’s specialty area.

**Elective from outside the Educational Administration area chosen in consultation with advisor.**

**Thesis**

- Theory and Practice in Teacher Education 593, 594, 595.
- Research (516, * 592, **Elective).................................9
- Internship .................................................................6
- 580 .................................................................6

Total (Thesis and Non-Thesis) 30

* A thesis option is available with approval of advisor.
** Elective from outside the Educational Administration area chosen in consultation with advisor.

### Teacher Education Major

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
- Special education

These concentrations require completion of a minimum of 30 hours of coursework beyond the master’s, including six hours in core courses, 18 hours in specialized courses, and six hours to be determined by the student’s committee. Both thesis and non-thesis options are available.

### REQUIREMENTS

A master’s degree is required for admission; most programs in Theory and Practice in Teacher Education also require a minimum of three years of professional experience. The total EdS program involves a minimum of four semesters of study with no fewer than 60 semester 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 semester hours accumulated in master’s and all of the last 30 semester 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 Office of Graduate Studies for final approval and acceptance. The student must register for thesis hours during this time.

### Core Requirements

<table>
<thead>
<tr>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Requirements (513, 515, 548, 553)</td>
</tr>
<tr>
<td>Specialization (523, 554, 583, 590, 596)</td>
</tr>
<tr>
<td>Research (516, * 592, **Elective)</td>
</tr>
<tr>
<td>Internship</td>
</tr>
<tr>
<td>580</td>
</tr>
</tbody>
</table>

Total 45

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### Doctor of Philosophy

**Education Major**

Faculty from the department participate in the delivery of the PhD with a major in education. Concentrations and specializations are available in the following areas.

- Early childhood education (early childhood special education)
- Educational administration and supervision
- Literacy, language, and ESL education (literacy, language, ESL education)
- Teacher education (elementary education, mathematics education, science education, social science education)

Information on admission appears at the beginning of the College of Education, Health, and Human Sciences section of this catalog.

### Education Major

**Early Childhood Education; Literacy, Language, and ESL Education; and Teacher Education Concentrations**

Students in these three 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.

### Hours Credit

<table>
<thead>
<tr>
<th>Concentration</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Requirements</td>
<td>8</td>
</tr>
<tr>
<td>Research Area</td>
<td>15</td>
</tr>
<tr>
<td>Cognate</td>
<td>15</td>
</tr>
<tr>
<td>Dissertation</td>
<td>24</td>
</tr>
</tbody>
</table>

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### Educational Administration and Supervision Concentration

The PhD with a major in education is offered with a concentration in educational administration and supervision. The mission of the educational administration and supervision program is to develop leaders committed to the cultivation of integrity, intelligence, identity, and imagination in promoting educational policy and practice.

- Integrity involves cultivating an acute sense of right and wrong and possessing the courage and conviction to act upon moral principles.
- Intelligence involves recognizing and employing a variety of talents in aligning philosophy, theory, principles, and practice.
- Identity involves cultivating a conscious awareness and appreciation of personal values and attributes, developing quality interpersonal relationships, and appreciating the interdependence fostered through community.
- Imagination involves expanding the limits of conventional wisdom by creating new ideas and by actively seeking diverse perspectives.
ADMISSION

Students must submit the University of Tennessee, Knoxville, Graduate Application for Admission and the Educational Administration and Supervision Program Application for Graduate Study. Applicants must submit current (taken within the past 5 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 leadership record and promise are required. An overall GPA of 3.3 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.

REQUIREMENTS

The doctoral program involves approximately 51 semester hours beyond the master’s degree, completion of a comprehensive examination, completion of the residency requirement, and submission and defense of the doctoral dissertation. Core educational experiences in leadership and organizational theory, educational history/philosophy, ethics, and policy/research will be required of all doctoral students. Core experiences are complemented by focused study in specializations (urban administration, research, administrative licensure, etc.) via selected courses in the college, in cognate work in departments outside the college, and in readings/independent studies/internship course experiences.

An overall GPA 3.5 on all doctoral work is required to sit for the comprehensive examination. Admission to candidacy requires successful completion of a written and oral comprehensive examination as required by Graduate Studies.

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Core Requirements*</th>
<th>Research**</th>
<th>Specialization</th>
<th>Cognate</th>
<th>Leadership Forum</th>
<th>Dissertation</th>
</tr>
</thead>
</table>

Total 87

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, 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.

Prereq: 431 or consent of instructor.
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.

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, 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 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 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 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 course work in the College of Business Administration and 12 hours of common coursework in the College of Engineering. Engineering common coursework includes a culminating three-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.

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.

**Approval Dual Credit**

A maximum of 15 semester hours of the Engineering courses may be counted toward the MBA degree program.

**College Requirements for the Doctor of Philosophy Degree**

Detailed minimum university requirements for the various doctoral degrees are listed on pages 34-36 of this catalog. Most departments have additional specific requirements listed in their portion of the catalog listings. The college of Engineering has the following specific requirements that must be met for all doctoral degree programs in the college.

- A minimum of 72 hours of graduate credit (coursework plus research and dissertation)
- A minimum of 24 hours Doctoral Research and Dissertation
- A minimum of 36 hours of graduate coursework hours. Departments, programs and/or dissertation committees may impose a higher minimum.

**Graduate Program 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/

John R. Collier, Head
Paul D. Frymier, Graduate Liaison

**Professors**

Bienkowski, P.R., PhD .........................................................Purdue
Collier, J.R., PhD ...............................................................Case Institute of Technology
Counce, R.M., PhD ...............................................................Tennessee
Moore, C.F. (Distinguished Service Professor), PhD, PE .........Louisiana State
Sheeth, Arul 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
Wang, T.W., PhD .........................................................Massachusetts Institute of Technology
Weber, F.E., PhD ...............................................................Minnesota

**Adjunct Faculty**

Arnold, J.S., PhD ...............................................................Tennessee
Steele, W.V., PhD ...............................................................Queens (Belfast)

**Emeriti Faculty**

Holmes, J.M., PhD ...............................................................Tennessee
Prados, J.W., PhD, PE .......................................................Tennessee

**MAJOR DEGREES**

Chemical Engineering .......................................................MS, PhD

Graduate programs lead to the degrees of Master of Science and Doctor of Philosophy with a major in chemical engineering with concentrations in chemical engineering, chemical bioengineering, advanced control systems, and polymer science and engineering.

**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 (see above).
- 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**

Under certain conditions, a candidate may apply for a non-thesis program. To be eligible, a candidate must show evidence of significant professional experience after the baccalaureate degree; at least five years of industrial experience or research publications would be examples of such evidence. The departmental faculty will consider each application individually. Upon acceptance, the requirements for completion of the non-thesis option are as follows:

- A total of at least 33 hours in graduate courses in chemical engineering and related areas beyond the baccalaureate. These courses must include the 5 core courses (see above).
- Completion of a critical review of the literature and other sources in an area related to chemical engineering (Chemical Engineering 580).
- A written comprehensive examination over the major field and an oral examination covering the review paper and related areas.

**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 credit hours beyond the bachelor’s degree are required for the PhD degree. These consist of coursework hours and research and dissertation credit hours (Chemical Engineering 600). Specifically, the department 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 (see above) and at least 6 hours of courses at the 600 level from the University of Tennessee, Knoxville.
- The 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 credit 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 Program Requirements).
- Successful oral defense of the dissertation before the student’s dissertation committee.
- Active participation in graduate seminars before the student’s dissertation committee.

**Curriculum For 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.

**Graduate Certificate in Maintenance and Reliability Engineering**

The College of Engineering offers a graduate certificate in maintenance and reliability engineering. The program is designed primarily for part-time students in that several of the courses are available through distance education.

The 12-credit 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. Currently, the available elective courses are Chemical Engineering 561, Industrial 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.

**Department of CIVIL AND ENVIRONMENTAL ENGINEERING**

http://www.engr.utk.edu/civil/

Gregory D. Reed, Head
Richard M. Bennett, Graduate Liaison

**Professors**

Bennett, R.M., PhD, PE .................................................................Illinois
Burdette, E.G. (Fred N. Peebles Professor), PhD, PE ................................Illinois
Chatterjee, A., PhD, PE .................................................................North Carolina State
Davis, W.T. (Associate Dean), PhD ................................................Tennessee
Deatherage, J.H., PhD, PE .............................................................Tennessee
Drumm, E.C. (Research Fellow), PhD, PE ......................................Arizona
Penamadu, D. (Research Fellow), PhD ............................................Georgia Tech
Reed, G.D., PhD, PE ....................................................................Arkansas
Robinson, R.B. (Fisher Professor), PhD, PE ..................................Iowa State
Urbanik, T. (Goodrich Chair), PhD, PE .........................................Texas A&M
Wegmann, J., PhD ........................................................................Northwestern

**Associate Professors**

Cox, C.D., PhD, PE .........................................................................Penn State
Han, L.D., PhD .............................................................................California (Berkeley)
Miller, T.L., PhD, PE ....................................................................Tennessee
Richards, S.H., PhD, PE .............................................................Tennessee
Robinson, K.G., PhD ...................................................................Virginia Tech

**Assistant Professors**

Chu, K.H., PhD, PE .........................................................................California (Berkeley)
Gentry, R., PhD, PE .....................................................................Memphis
Huang, B. (Research Fellow), PhD, PE ..........................................Louisiana State
Schwartz, J., PhD, PE .................................................................Illinois

**Emeriti Faculty**

Goodpasture, D.W., PhD, PE ......................................................Illinois
Tschantz, B.A., ScD, PE ...............................................................New Mexico State

**MAJORS**

**DEGREES**

Civil Engineering ..........................................................MS, PhD
Environmental Engineering ..................................................MS

The Department of Civil and Environmental Engineering offers degrees leading to the Master of Science and Doctor of Philosophy with a major in civil engineering concentrating in construction engineering, environmental engineering, geotechnical/materials engineering, public works engineering, structural engineering, and transportation engineering; to the Master of Science in environmental engineering with concentrations in water quality, water resources, air quality, mixed waste management, waste management, and environmental risk assessment.

The Master of Science programs in civil engineering and environmental engineering are offered to graduates of recognized undergraduate curricula. Departmental requirements provide 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 for the Master of Science in civil engineering.

**Master of Science**

The Master of Science programs in civil engineering and environmental engineering are offered to graduates of recognized undergraduate curricula. 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 Problem (Civil Engineering/Environmental Engineering 590). The appointment letter may specify which of the two options must be selected.

**Civil Engineering Major**

Departmental requirements provide 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 is required, which may include a 3-hour special problems course to be completed under the direction of the student’s major professor.

**Environmental Engineering Major**

For a 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.

**Thesis Option**

A minimum of 30 semester hours of approved graduate courses, including 6 hours of thesis and a minimum of 15 semester hours of approved environmental engineering coursework, is required. A minor may be selected but is not required.

**Non-Thesis Option**

A minimum of 33 semester hours of approved graduate courses is required, which may include a 3-hour special problems course to be completed under the direction of the student’s major professor. The major shall include a minimum of 18 semester hours of approved environmental engineering coursework including a minimum of 9 semester hours of
advanced engineering design courses selected from a list provided by the student’s committee. A minor may be selected but is not necessarily required.

**DOCTOR OF PHILOSOPHY**

**Civil Engineering Major**

A graduate program leading to the Doctor of Philosophy is offered with a major in civil engineering. Specific departmental requirements for the PhD include:

- 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 semester 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 credits 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 Economics for program description.

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**Department of ELECTRICAL AND COMPUTER ENGINEERING**

http://www.ece.utk.edu/

Sanir El-Ghazaly, Head
Jack S. Lawler, Graduate Liaison

**Professors**

- Abidi, M., PhD .......................................................... Tennessee
- Birdwell, J.D., PhD .................................................. Massachusetts Institute of Technology
- Bomar, B.W. (UTSI), PhD ........................................ Tennessee
- Boulidin, D.W., PhD .................................................. Tennessee
- El-Ghazaly, S.M., PhD ............................................... Texas (Austin)
- Kuo, W., PhD (Dean and University Distinguished Professor) ..... Kansas State
- Pace, M.O., PhD ......................................................... Georgia Tech
- Lawler, J.S., PhD ...................................................... Michigan State
- Pujol, S.A. (UTSI), PhD ................................................ Vanderbilt
- Roberts, M.J., PhD ...................................................... Tennessee

**Associate Professors**

- Crilly, P.B., PhD ........................................................ New Mexico State
- Fathy, A., PhD .......................................................... Polytechnic Institute Of New York
- Islam, S.K., PhD ....................................................... Connecticut
- Koch, D.B., PhD ......................................................... Missouri (Rolla)
- Kong, S.G., PhD ........................................................ UCLA
- Smith, L.M. (UTSI), PhD ........................................... Tennessee

**Assistant Professors**

- Blalock, B.J., PhD ....................................................... Georgia Tech
- Chiasson, J.N., PhD ..................................................... Minnesota
- Djouadi, S. M., PhD ................................................... McGill (Canada)
- Elhanany, I., PhD ...................................................... Ben-Gurion (Israel)
- Ferdeljajah, M., PhD ..................................................... Texas (Austin)
- Howlader, M.M.K., PhD ............................................. Virginia Tech
- Peterson, G.D., DSc ................................................... Washington University
- Qi, H., PhD ............................................................. North Carolina State
- Tolbert, L.M., PhD ...................................................... Georgia Tech
- Wu, J., PhD ............................................................. Notre Dame

**Emeriti Faculty**

- Alexeff, I., PhD, PE ................................................... Wisconsin
- Gonzalez, R.C., PhD .................................................. Florida
- Green, W.L., PhD ...................................................... Texas A&M
- Roth, J.R., PhD ........................................................ Cornell

**MAJOR DEGREES**

- Computer Engineering ............................................. MS, PhD
- Electrical Engineering ............................................. MS, PhD

The Department of Electrical and Computer Engineering offers graduate programs leading to the Master of Science and Doctor of Philosophy with a major in electrical engineering or computer engineering. Graduate students are able to conduct research in a wide variety of areas of electrical engineering including communications, electromagnetics, robotics, intelligent control, mixed-signal electronics, microelectronics, plasma engineering, power electronics and systems, and electric power systems. Research areas in computer engineering include computer architecture, networks, image processing, computer vision, VLSI system design, embedded systems, data fusion, data visualization, data structures and information systems.

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 3.0 out of 4.0, both overall and in the senior year. In addition, all applicants are required to submit scores from the General Graduate Record Exam (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 or 550 on the written exam 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 3.0 and a minimum senior year average of 3.0 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 3.0 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 the departmental graduate committee specifying which courses approved by the student’s master’s committee and the graduate committee.

**Thesis Option**

Specific requirements of the thesis option are a minimum of 30 semester hours including

- Six 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’s 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 semester hours.
- A final oral examination covering the thesis and related coursework.

**Non-Thesis Courses Only Option**

Specific requirements of the non-thesis courses only option are a minimum of 30 semester hours including

- Six 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’s committee and the graduate committee.
- 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 hours of work 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**

Specific requirements of the non-thesis project option are a minimum of 30 semester hours including

- Six 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’s committee and the graduate committee.
- 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 hours of work 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
Curriculum For Dual MS-MBA Computer Engineering Major · Electrical 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 .............................................................................................. —
Electrical and Computer Engineering 509 .................................................. 1

Fall—Second Year
Electrical and Computer Engineering 509 .................................................. 1
— Departmental/Engineering Courses ......................................................... 9

Spring
— MBA Hub Course Elective ................................................................. 3
Electrical and Computer Engineering 509 .................................................. 1
— Departmental/Engineering Courses ......................................................... 9
Electrical and Computer Engineering 594 .................................................. 3

Total 60

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.

Applicants are required to submit scores from the General Graduate Record Exam (GRE). A TOEFL score of 550 on the written exam or 213 on the computer exam 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:

1. For students holding only a BS, a minimum of 48 course hours is required. The first 24 course hours should satisfy:
   a. Six 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’s 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:
   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. The comprehensive examination is 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 at least two sections: 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.
Department of
INDUSTRIAL AND INFORMATION ENGINEERING
http://www.engr.utk.edu/ie/

Adeleji B. Badiru, Head
Denise F. Jackson, Graduate Liaison

Professors
Badiru, A.B., PhD, PE .................................................. Central Florida
Ding, F., PhD .............................................................. North Carolina State
Garrison, C.W. (UTSI), PhD ........................................... North Carolina State
Kuo, W. (Dean and University Distinguished Professor), PhD ....... Kansas State

Associate Professors
Aikens III, C.H., PhD .................................................... Tennessee
Hailey, M.L. (UTSI), PhD, PE ........................................ Texas Tech
Jackson, D.F., PhD, PE ................................................ Tennessee
Sawhney, R.S., PhD ..................................................... Tennessee

Assistant Professors
Ford, R.E., PhD ............................................................ Tennessee
Jeong, M., PhD ............................................................ Georgia Tech
Kim, D., PhD .............................................................. Florida
Kong, D., PhD ............................................................ Penn State

Research Faculty and Staff
Halstead, P.D., BS ...................................................... State University of New York

MAJOR DEGREES
Industrial Engineering .................................................. MS, MS-MBA, PhD

The Department of Industrial and Information Engineering offers graduate degrees leading to the Master of Science and a Doctor of Philosophy with a major in industrial engineering.* These degrees offer concentrations in traditional industrial engineering, information engineering, engineering management, human factors engineering, manufacturing systems engineering, and product development and manufacturing (available only in the dual MS/MBA program). 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 departmental faculty.

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 graduate committee in the department sets any prerequisite courses or other measures that apply to the particular situation of the applicant. The department and the Office of Graduate 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 industrial engineering, information engineering, engineering management, human factor engineering, manufacturing systems engineering or product development and manufacturing. 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 six hours thesis. The non-thesis option requires 30 hours of coursework and a three-hour design project; the engineering management concentration requires an additional three 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

Curriculum for Dual MS-MBA Industrial Engineering Major • Manufacturing Systems Engineering or Product Development and Manufacturing

August—First Year
Business Administration 511 MBA Core I ............................................. 3

Fall—First Year
Business Administration 512 MBA Core II ............................................. 15
Industrial Engineering 504 ................................................................. 1

Spring
Business Administration 513 MBA Core III ............................................. 9
Industrial Engineering 506 ................................................................. 2
Industrial Engineering 508 ................................................................. 3

Summer
Internship ................................................................................................ —
Industrial Engineering 509 ................................................................. 1

Fall—Second Year
Industrial Engineering 509 ................................................................. 1
Industrial Engineering Core Courses .................................................... 9

Spring
MBA Hub Course Elective ................................................................. 3
Industrial Engineering 509 ................................................................. 1
Industrial Engineering Concentration Courses ..................................... 9
Summer (first session)
Industrial Engineering 594................................................................. 3

Total 60

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 48 graduate hours of coursework beyond the bachelor’s degree and 24 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 48 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 of the College of Engineering 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-semester hour graduate certificate is earned by completing the following four regularly offered courses: Engineering Management 533, 534, 536, and 539.

Graduate credit will be awarded for any course successfully completed with an average of B or better. The credits 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.

Graduate Certificate in Maintenance and Reliability Engineering

The College of Engineering offers a graduate certificate in maintenance and reliability engineering. The program is designed primarily for part-time students in that several of the courses are available through distance education. The 12-credit 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. Currently, the available elective courses are Industrial 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.
Department of
MATERIALS SCIENCE AND ENGINEERING
http://www.engr.utk.edu/msc/

Raymond A. Buchanan, Head and Graduate Liaison

Professors
Benson, R.S., PhD .................................................Florida State
Bhat, GS, PhD ..................................................Georgia Tech
Bresee, R.R., PhD ..............................................Florida State
Buchanan, R.A, PhD, PE .................................Vanderbilt
Collier, B.J., PhD ..............................................Tennessee
Dahotre, N.B., PhD .............................................Michigan State
Egami, T., PhD ..................................................Pennsylvania
George, E.P., PhD .................................................Pennsylvania
Hansen, M.G, PhD ...............................................Wisconsin
Joy, D.C., DPhil ..................................................Oxford (UK)
Liaw, P.K, PhD ....................................................Northwestern
Lowndes, D.H, PhD ..............................................Colorado
Lundin, C.D, PhD .............................................Rensselaer Polytechnic Institute
McHargue, C.J, PhD ............................................Kentucky
Nieh, T.G, PhD ..................................................Stanford
Pedraza, A.J, PhD ...............................................LaPlata (Argentina)
Pharr, G.M, PhD, PE ..........................................Stanford
Simpson, M.L, PhD ...............................................Tennessee
Spruiell, J.E, PhD ................................................Tennessee
Wadsworth, L.C, PhD ........................................North Carolina State

Associate Professors
Kit, K, PhD .........................................................Delaware
Meeh, T.T, PhD ...................................................Ohio State

Assistant Professors
Choo, H, PhD .....................................................Illinois Institute of Technology
Hu, B, PhD ........................................................Chinese Academy of Sciences
Keppens, V, PhD ..............................................Katholieke Universiteit Leuven (Belgium)
Rack, P.D, PhD ....................................................Florida
Rawn, C.J, PhD .....................................................Arizona

Emeriti Faculty
Brooks, C.R, PhD ..............................................Tennessee
Fellers, J.F, PhD ................................................Akon
Stansbury, E.E, PhD ...........................................Cincinnati

MAJORS

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.

Areas of concentration within the materials science and engineering degree program include metallurgy, polymers, textiles, and materials. Specializations include, but are not limited to: ceramics; composites; electronic materials; physical metallurgy; materials processing; welding metallurgy and materials joining; corrosion science and engineering; biomedical materials; nonwovens science and technology; and mechanical and physical behaviors of materials.

Areas of concentration within the polymer engineering degree program are polymer processing, polymer science, and textile science. Specialty areas include rheology; polymer morphology; mechanical, physical, and chemical behaviors of polymers; composite materials; and nonwovens 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 3.0 out of 4.0 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 must score at least 213 on the computer-based TOEFL examination or 550 on the written examination 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 in either materials science and engineering or polymer engineering. Additional requirements include

- 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; and 511, 512, and two graduate specialization courses approved by the student’s faculty committee for the materials concentration. 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.

- 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.

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

- 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 a culminating experience Materials Science and Engineering 580 (Critical Review) as this course shall include a comprehensive examination administered by the faculty committee.

**DUAL MS-MBA**

**Curriculum For Dual MS-MBA Materials Science and Engineering Major**

**August—First Year**

Business Administration 511 MBA Core I ................................................. 3

**Fall—First Year**

Business Administration 512 MBA Core II .............................................. 15

1. Mechanical Engineering 504 ............................................................ 1

**Spring**

Business Administration 513 MBA Core III .............................................. 9

1. Mechanical Engineering 506 ............................................................ 2

2. Mechanical Engineering 508 ............................................................ 3

**Summer**

— Internship ............................................................................................ —

Materials Science and Engineering 509 ...................................................... 1

**Fall—Second Year**

Materials Science and Engineering 509 ...................................................... 1

— Departmental/Engineering Courses .................................................... 9

**Spring**

— MBA Hub Course Elective .................................................................... 3

Materials Science and Engineering 509 ...................................................... 1

1. Departmental/Engineering Courses .................................................... 9

2. Materials Science and Engineering 594 .................................................. 3

Total 60

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

**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:

- For students proceeding directly to the PhD from the baccalaureate degree, a minimum of 72 graduate credit hours is required. These hours must include 42 graduate course credit hours with at least six 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 credit 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. 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 credit hours is required. These hours must include 18 graduate course credit hours with at least six hours of 600-level courses and 33 hours of dissertation. Three hours of Materials Science and Engineering 503 or 504 may be counted toward degree requirements. At least 12 credit hours must be courses in the department.

- Active participation in graduate seminars conducted by the department.

**Department of**

**MECHANICAL, AEROSPACE, AND BIOMEDICAL ENGINEERING**

http://www.engr.utk.edu/moes/

William Hamel Interim Head

Gary V. Smith, Graduate Liaison

**Professors**

Arimilli, R.V., PhD..................................................Virginia Tech

Baker, A.J., PhD, PE ..................................................New York

Dareing, D.W., PhD, PE ..................................................Illinois

Frankel, J.I., PhD ..................................................Virginia Tech

Hamel, W.R., PhD ..................................................Tennessee

Johnson, W.S., PhD, PE ..................................................Clemson

Keyhani, M., PhD ..................................................Ohio State

Kilren, K.D., PhD ..................................................Stanford

Komistek, R.D., PhD ..................................................Memphis

Landes, J.D., PhD, PE ..................................................Lehigh

Milligan, M.W., PhD PE ..................................................Tennessee

Parang, M. (Associate Dean), PhD, PE ..................................Oklahoma

Parsons, J.R., PhD, PE ..................................................North Carolina State

Smith, G.V., PhD, PE ..................................................Penn State

Soliman, O., PhD, PE ..................................................Tennessee

Speckhart, F.H., PhD, PE ..................................................Georgia Tech

Wasserman, J.F., PhD, PE ..................................................Cincinnati

Weitsman, Y.J. (Distinguished Professor), PhD .......................Rensselaer Polytechnic Institute

**Associate Professors**

Boulet, J.A.M., PhD ..................................................Stanford

Chellaboina, V.S., PhD ..................................................Georgia Tech

Freeman, J.S., PhD ..................................................Wisconsin

Karsa, M., PhD ..................................................Ecole Polytechnique (Canada)
In mechanical engineering or aerospace engineering, entrance into the Master of Science program is available to qualified graduates of recognized undergraduate curricula 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.

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.

**MAJOR DEGREES**

- Aerospace Engineering ................................................MS, MS-MBA, PhD
- Biomedical Engineering ................................................MS, MS-MBA, PhD
- Engineering Science ................................................MS, MS-MBA, PhD
- Mechanical Engineering ..............................................MS, MS-MBA, PhD

Graduate programs leading to the degrees of Master of Science and Doctor of Philosophy are available with majors in mechanical engineering, aerospace 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.

In mechanical engineering, program concentrations include dynamics, control, and robotics; energy conversion and utilization; gas dynamics; heat transfer and fluid mechanics; machine design; power generation; product development and manufacturing (MS only); propulsion; space engineering; stress analysis; and thermodynamics.

In aerospace engineering, program concentrations include aeroacoustics; aerodynamics and performance; energy conversion and utilization; flight and aerospace mechanics; gas dynamics; heat transfer and fluid mechanics; propulsion; space engineering; structures and stress analysis; and thermodynamics.

In biomedical engineering, program concentrations include musculoskeletal biomechanics; biofluid mechanics; biomaterials; bioimaging; and cell and tissue engineering.

In engineering science, program concentrations include applied artificial intelligence, biomedical engineering, computational mechanics, fluid mechanics, mechanics of composite materials, solid mechanics, industrial engineering (PhD only), product development and manufacturing (MS only), optical engineering (UTSI only). In each of these 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.

**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 courses in engineering may be used for graduate credit at the discretion of the advising committee. However, at least two-thirds of minimum required credit 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 senior (400-level) courses in the department for graduate credit. 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**

Credit requirements for these two options in Mechanical Engineering and Aerospace Engineering are:

<table>
<thead>
<tr>
<th>Hours Required</th>
<th>Coursework total</th>
<th>Option I</th>
<th>Option II</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Courses in program (500-level or above)</td>
<td></td>
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<tr>
<td></td>
<td>- Option I – 12 hours minimum</td>
<td></td>
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<tr>
<td></td>
<td>- Option II – 18 hours minimum</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>- Mathematics (400-level or above)</td>
<td>6</td>
<td></td>
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<tr>
<td></td>
<td>- 590 Selected Engineering Problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Option II – 6 hours maximum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thesis</td>
<td>6</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

**Biomedical Engineering Major**

Credit requirements for these two options in biomedical engineering are:

<table>
<thead>
<tr>
<th>Hours Required</th>
<th>Coursework total</th>
<th>Option I</th>
<th>Option II</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Engineering courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Option I – 12 hours minimum</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Option II – 15 hours minimum</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Mathematics (400-level or above)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Related courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Option I – 6 hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Option II – 9 hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- (590 Selected Engineering Problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- 6 hours minimum</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- May include additional courses in mathematics, computer science, or the physical and life sciences, as well as engineering courses.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thesis</td>
<td>6</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

**Engineering Science Major**

Credit requirements for these two options in engineering science are:

<table>
<thead>
<tr>
<th>Hours Required</th>
<th>Coursework total</th>
<th>Option I</th>
<th>Option II</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Engineering courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Option I – 12 hours minimum</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### DUAL MS-MBA

**Curriculum for Dual MS-MBA Degree • Aerospace Engineering Major**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall—First Year</td>
<td>Business Administration 511 MBA Core I</td>
</tr>
<tr>
<td>Spring</td>
<td>Aerospace Engineering 509</td>
</tr>
<tr>
<td>Summer (first session)</td>
<td>Aerospace Engineering 509</td>
</tr>
<tr>
<td>Fall—Second Year</td>
<td>Business Administration 513 MBA Core III</td>
</tr>
<tr>
<td>Spring</td>
<td>Aerospace Engineering 509</td>
</tr>
<tr>
<td>Summer (first session)</td>
<td>Aerospace Engineering 509</td>
</tr>
</tbody>
</table>

**Curriculum for Dual MS-MBA Degree • Biomedical Engineering Major**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall—First Year</td>
<td>Business Administration 511 MBA Core I</td>
</tr>
<tr>
<td>Fall—First Year</td>
<td>Business Administration 512 MBA Core II</td>
</tr>
<tr>
<td>Spring</td>
<td>Mechanical Engineering 504</td>
</tr>
<tr>
<td>Summer</td>
<td>Mechanical Engineering 506</td>
</tr>
<tr>
<td>Spring</td>
<td>Mechanical Engineering 508</td>
</tr>
<tr>
<td>Summer (first session)</td>
<td>Mechanical Engineering 509</td>
</tr>
<tr>
<td>Spring</td>
<td>MBA Hub Course Elective</td>
</tr>
<tr>
<td>Spring</td>
<td>Department/ Engineering Courses</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 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.
Curriculum for Dual MS-MBA Degree • Mechanical 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 ................................................................. 2
Mechanical Engineering 508 ................................................................. 3

Spring
Business Administration 513 MBA Core III ............................................. 9
Mechanical Engineering 551 ................................................................. 3
Mechanical Engineering 537 ................................................................. 3
Mechanical Engineering 527 ................................................................. 3

Summer
— Internship ......................................................................................... 1
Mechanical Engineering 509 ................................................................. 1

Fall—Second Year
Biomedical Engineering 509 ................................................................. 1
— Departmental/Engineering Courses .................................................. 9
— MBA Hub Course Elective ................................................................. 3
Spring
— MBA Hub Course Elective ................................................................. 3
Mechanical Engineering 509 ................................................................. 1
— Engineering Courses ........................................................................ 9

Summer (first session)
Mechanical Engineering 594 ................................................................. 3

Total 60

Curriculum for Dual MS-MBA Degree • Engineering Science 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
— MBA Hub Course Elective ................................................................. 3
Mechanical Engineering 505 ................................................................. 3
Mechanical Engineering 509 ................................................................. 1
Mechanical Engineering 510 ................................................................. 3
— Math/Engineering Elective (select with advisor) ................................ 3

Summer (first session)
Mechanical Engineering 594 ................................................................. 3

Total 60

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 semester 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

• A minimum of 12 semester hours of graduate credit in mathematics in courses numbered 400 or above with at least 9 semester 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 semester 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
  • 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
• 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 course work is permanently archived at the College of Engineering Computational Fluid Dynamics Laboratory Web site, hence available on demand on a totally flexible schedule.

The 12-hour 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 three-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.

The sole academic prerequisite for the certificate program is a bachelor’s degree in engineering. Applicants must meet the minimum admission requirements of the University of Tennessee, Knoxville, Graduate School and become admitted thereto.

Graduate Certificate in Maintenance and Reliability Engineering

The College of Engineering offers a graduate certificate in maintenance and reliability engineering. The program is designed primarily for part-time students in that several of the courses are available through distance education.

The 12-credit 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. Currently, the available elective courses are Industrial 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.

Department of Nuclear Engineering

http://www.engr.utk.edu/nuclear/

H. L. Dodds, Head and Graduate Liaison

Professors
Dodds, H.L. (IBM Professor), PhD, PE ........................................Tennessee
Fontana, M.H. (Research), PhD, PE ........................................Purdue
Groer, P.G., PhD .................................................................Vienna (Austria)
Grossbeck, M.L. (Research), PhD ............................................Illinois
Mihalczko, J.T. (Research), PhD ................................................Tennessee
Miller, L.F., PhD, PE ............................................................Texas A&M
Mynatt, F.R. (Research), PhD ..................................................Tennessee
Pettengill, H.J. (Research), PhD ................................................Michigan
Ruggles, A.E., PhD ............................................................Rensselaer Polytechnic Institute
Townsend, L.W., PhD ............................................................Idaho
Upadhyaya, B.R., PhD, PE ....................................................California (San Diego)

Associate Professors
Hines, J.W., MBA, PhD .........................................................Ohio State
Pevey, R.E., MBA .................................................................Emory
PhD, PE ........................................................................Tennessee
Scott, T.H., PhD, PE ............................................................Florida

Assistant Professors
Gribok, A.V. (Research), PhD ................................................IPPE (Russia)
Moussa, H.M. (Research), PhD ................................................Tennessee
Stephan, A.C. (Research), PhD ................................................Tennessee

Adjunct Faculty
DeHart, M.D., PhD .............................................................Texas A&M
Gelvin, J.C., PhD ...........................................................Massachusetts Institute of Technology
Icenhour, A.S., PhD ..........................................................Tennessee
Nichols, T.L., MD ...............................................................Tennessee
Ramsey, C.R., PhD ............................................................Tennessee

Emeriti Faculty
Kerlin, T.W., PhD ..............................................................Tennessee
Uhlig, R.E. (Distinguished Professor), PhD, PE .......................Iowa State

MAJOR DEGREES

Nuclear Engineering ...............................................................MS, PhD

The Department of Nuclear Engineering offers programs leading to the Master of Science and Doctor of Philosophy degrees. Students may elect a traditional nuclear engineering program focusing on fission energy or fusion energy, or a radiological engineering concentration, which prepares students for careers in the radiation safety field (health physics). Both programs are designed for graduates of accredited undergraduate programs in engineering, physics, chemistry, biology, or mathematics.

All entering students must have, as a minimum, competency in mathematics through ordinary differential equations, competency in atomic and nuclear physics, and competency consistent with an introductory course in nuclear engineering. If such competencies do not exist, the student must take appropriate courses for undergraduate credit. In addition, students without a BS in nuclear engineering, or the equivalent, must take 431 (Radiation Protection) and 470 (Nuclear Reactor Theory I), both of which may be taken for graduate credit. The department head is the contact for all interested students, both those with nuclear engineering degrees and those from other disciplines.
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 six hours of elective courses in mathematics, statistics or computer science
- six hours in either nuclear engineering or a related field
- one of the following three options for a culminating experience
  a. a thesis project (six hours of 500)
  b. two to four engineering practice projects (six hours of 598)
  c. one engineering practice project (three hours of 598) plus six hours of additional nuclear engineering coursework

Thus, options a and b result in a minimum total of 30 hours and option c results 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 UT Knoxville 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 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 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 program 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 Graduate School 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 including the student’s Dual Program Committee Advisor, all work presented for the MS degree—all coursework and the culminating integrated project.

DUAL MS-MBA
Curriculum for Dual MS-MBA Degree • Nuclear 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 Product Development Process .................. 1

Spring
Business Administration 513 MBA Core III ........................................... 9
Mechanical Engineering 506 Product Selection and Evaluation .............. 2
Mechanical Engineering 508 Integrated Product, Process, and Manufacturing System Design................................................................. 3

Summer
—Internship ............................................................................................... —
Nuclear Engineering 509 Project Management ........................................ 1

Fall — Second Year
Nuclear Engineering 509 Project Management ........................................ 1
—Nuclear Engineering Courses ................................................................. 9

Spring
—MBA Hub Course Elective ................................................................. 3
Nuclear Engineering 509 Project Management ........................................ 1
—Nuclear Engineering Courses ................................................................. 9

Summer (first session)
Nuclear Engineering 594 Culminating Integrated Project Report ............. 3

Total 60

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, biology, 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 in nuclear engineering include
• 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 nine hours of 600-level courses. These are exclusive of thesis or dissertation credit. Three of the nine 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, computer science, or statistics courses beyond nuclear engineering undergraduate requirements numbered 400 or above.
• A minimum of six 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 12 hours of written examination that is administered over a three-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 Maintenance and Reliability Engineering

The College of Engineering offers a graduate certificate in maintenance and reliability 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/ne/default.htm).

The 12-credit 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. Currently, the available elective courses are Industrial 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.
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 in that all of the courses are available through distance education (see http://www.anywhere.tennessee.edu/ne/default.htm).

The 12-credit 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 301 (Fundamentals of Nuclear and Radiological Engineering) prior to beginning the graduate coursework described above.
College of Law

Thomas C. Galligan, Jr., Dean
John L. Sobieski, Jr., Associate Dean
Rachel E. Inman, Assistant Dean

http://www.law.utk.edu/

Professors
Ansley, F.L., LLM .........................................................Harvard
Best, R., MLS ..................................................................Florida
Blaze, D.A., JD .......................................................Georgetown
Cohen, N.P., LLM ........................................................Harvard
Cook, J.G., LLM ...............................................................Yale
Davies, T.Y., JD ......................................................Northwestern
Galligan, Jr., T.C., LLM ................................................Columbia
Hess, A.M., JD ...............................................................Virginia
King, J.H., JD ...............................................................Pennsylvania
Leatherman, D.A., LLM ..............................................New York
Lloyd, R.M., JD ...............................................................Michigan
Picquet, C., MLSLS ................................................Tennessee
Pierce, C.A., JD .............................................................Yale
Plank, T.E., JD ...............................................................Maryland
Reynolds, G.H., JD .......................................................Yale
Rivkin, D.H., JD ..........................................................Vanderbilt
Sobieski, Jr., J.L., JD .....................................................Michigan
Stein, G.M., JD ...............................................................Columbia
Stephens, O.H., JD ......................................................Tennessee

Associate Professors
Aarons, D., JD ...............................................................UCLA
Anderson, G.L., LLM .....................................................Harvard
Barton, B.H., JD .............................................................Michigan
Beintema, W.J., JD ........................................................Miami
Black, Jr., J.P., JD ............................................................Vanderbilt
Cornett, J.M., JD ...............................................................Tennessee
Goodwin, I.J., JD ...........................................................New York
Heminway, J.M., JD ........................................................New York
Hendricks, J.S., JD .........................................................Harvard
Hirsch, J.M., JD ...............................................................New York
Jacobs, B.L., JD .............................................................Georgia
Kennedy, Deseriee A., LLM ...........................................Temple
Kuney, G.W., JD ...............................................................California (Hastings)
Parker, C.M., JD .................................................................Illinois
Price, L., MSLS .............................................................Tennessee
Pulsinelli, G.A., JD ......................................................California (Boalt Hall)
Quinn, M.C., LLM ........................................................Georgetown
White, P.J., LLM ...............................................................Georgetown
Williams, P.J., JD ..........................................................New York

Assistant Professors
Cochran, C.R., MS ............................................................Tennessee
Collins, C.M., MS ..............................................................Tennessee
Marshall, S.D., JD ..............................................................Loyola

MAJOR DEGREES

Law ........................................................................................................JD, JD-MBA, JD-MPA

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 semester hours of credit, including all required courses. The required average is 2.0 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 credit hours taken in residence were earned. Averages are computed on weighted grades. Grades are on an alphabetical scale from A+ to F. No credit toward the JD degree is awarded for grades of D- or F.

Eligible law students may receive up to six 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 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
- 833 Representing Enterprises OR
- 978 Transactional Tax Planning

Students electing a concentration in business transactions may not take any of the above courses on an S/NC basis except 826.

*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.

**Concentration in Advocacy and Dispute Resolution**

Students interested in a concentration in advocacy and dispute resolution must complete all of the following courses:

- 813 Evidence
- 815 Introduction to Advocacy and Professional Responsibility
- 920 Trial Practice
- 921 Pretrial Litigation
- 922 Advanced Trial Advocacy
- 928 Case Development and Resolution

Students electing a concentration in advocacy and dispute resolution may not take any of the above courses on an Satisfactory/No Credit basis.

**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 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 nine 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 six 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 nine hours approved by the College of Law. The six hours of law courses in which the student has earned a 2.3 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 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 semester 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 nine 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 nine 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.

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/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 six 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.
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. More specific information about the programs may be obtained under Nursing, Departments and Courses of Instruction, or by contacting 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**

Center for Nursing Practice  
Center for Nursing Research

The College of Nursing offers the Master of Science in Nursing degree with concentrations in adult health nursing, family nurse practitioner, mental health nursing, nurse anesthesia, nursing administration, and nursing of women and children. The program is accredited by the National League for Nursing Accrediting Commission that may be contacted at 61 Broadway, New York, NY 10006, 1-800-669-1656, 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 550 or above 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 3.0 or higher on a 4-point scale, or a GPA of 3.3 for courses in the undergraduate major.
  c. Have completed a health assessment course.
  d. Have completed three 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 3.0 on a 4-point scale.
    b. Have satisfactorily completed the following prerequisite courses: chemistry (eight hours); microbiology (including lab); anatomy and physiology (six to eight hours); nutrition (covering lifespan in health and illness); social sciences (nine hours) and a general psychology course (three hours); undergraduate research course or equivalent; three 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 501, 505, 510, 511, and 515 are open to students in Non-Degree Status. Students not yet accepted into the master’s program must see the Chair of the Master of Science in Nursing program for advising prior to enrolling in any course.

Special Requirements

- 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.
- Contact student services for more detailed information about the application process—Student Services/Master of Science in Nursing Program, The University of Tennessee College of Nursing, 1200 Volunteer Boulevard, Knoxville, Tennessee 37996-4180; (865) 974-7606.

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

All students must complete a minimum of 36 semester hours distributed as follows:

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<thead>
<tr>
<th>Core (7 credits)</th>
<th>Hours</th>
<th>Credit</th>
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<tbody>
<tr>
<td>507 Concepts for Advanced Practice Nursing: Health Promotion and Health Policy ..........................................................4</td>
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<td></td>
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<tr>
<td>510 Theoretical Foundations of Nursing ..........................................................3</td>
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</table>

Advanced Practice Core (9 credits) *

| 504 Advanced Health/Physical Assessment ..........................................................3 |
| 505 Advanced Clinical Pharmacology ..............................................................3 |
| 515 Advanced Pathophysiology for Nursing Practice ........................................3 |

(not required for nurse anesthesia students)

Required for nurse anesthesia students:

| 506 Advanced Anesthesia Pharmacology .........................................................3 |
| 516 Advanced Pathophysiology: Neurological and Cardiovascular with Anesthesia Implications .................................................2 |
| 517 Advanced Pathophysiology: Respiratory/Renal with Anesthesia Implications ..........................................................2 |
| 518 Advanced Pathophysiology: Obstetrics/Regional Anesthesia ...................2 |
| 523 Advanced Principles of Nurse Anesthesia Practice ..................................2 |
| 524 Basic Principles of Anesthesia I ...............................................................3 |
| 525 Basic Principles of Anesthesia II .............................................................3 |
| 526 Professional Issues in Nurse Anesthesia ..................................................2 |
Research (6–9 credits)
501 Nursing Research: Methods, Design and Analysis ........................................3
500 Thesis ..............................................................................................................6
OR
582 Scholarly Inquiry for Advanced Practice Nursing ........................................3

Concentration (choose one)
530-531 Adult Health I, II ..................................................................................13
544-545-546-547-548-549 Clinical Nurse Anesthesia Practicum/
Seminar I, II, III, IV, V, VI ..................................................................................40
550-551 Nursing of Women and Children I, II .................................................16
560-561 Mental Health Nursing I, II .................................................................13
570-571-572-573 Family Nurse Practitioner I, II, III .....................................19
590-591 Nursing Administration I, II .................................................................12

Electives (9 credits)
Required for students in nursing administration concentration only ..............9
* not required for nursing administration concentration

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>
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<tbody>
<tr>
<td>311 Foundations of Professional Nursing Practice</td>
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<tr>
<td>319 Pathophysiology of Health Deviations</td>
<td>4</td>
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<tr>
<td>333 Health Assessment</td>
<td>3</td>
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<tr>
<td>341 Transcultural Nursing</td>
<td>2</td>
</tr>
<tr>
<td>351 Pharmacology I</td>
<td>2</td>
</tr>
<tr>
<td>361 Health Maintenance and Restoration: Adult</td>
<td>5</td>
</tr>
<tr>
<td>382 Health Promotion, Maintenance, and Restoration in the Community</td>
<td>3</td>
</tr>
<tr>
<td>406 Pharmacology II</td>
<td>2</td>
</tr>
<tr>
<td>415 Family/Community Health Nursing</td>
<td>6</td>
</tr>
<tr>
<td>421 Health Maintenance and Restoration in Mental Health</td>
<td>4</td>
</tr>
<tr>
<td>444 Care of Children, Adolescents, and Their Families</td>
<td>2</td>
</tr>
<tr>
<td>454 Professional Leadership Issues</td>
<td>2</td>
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<tr>
<td>461 Health Restoration: Adult</td>
<td>4</td>
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</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, 432, and 454 and complete or successfully challenge the following:

<table>
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<tr>
<td>454 Professional Leadership Issues *</td>
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<tr>
<td>461 Health Restoration: Adult</td>
<td>4</td>
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<tr>
<td>490 Specialty Preceptorship</td>
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<tr>
<td>* cannot be challenged</td>
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</table>

A total of 24 credits 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 3.0 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 3.0 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 3.0 or better and the grade for clinical concentration work is at least 3.0.

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 3.0 (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 (eight hours); microbiology (including lab); anatomy and physiology (six to eight hours) nutrition (covering lifespan in health and illness); social sciences (nine hours) and a general psychology course (three 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 3.0 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, 461, and 421.
- 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 credit hours are required for the baccalaureate degree with the last 30 hours of credit completed in residence at the University of Tennessee, Knoxville.

The following schedules demonstrate full-time attendance. Plans for part-time attendance must be arranged with the RN advisor and communicated to all involved faculty.

ADULT HEALTH NURSING

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NURSING OF WOMEN AND CHILDREN

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FAMILY NURSE PRACTITIONER

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The above courses are part of the Bachelor of Science in Nursing program and include various courses in health assessment, pharmacology, mental health, and family nurse practitioner. The courses are designed to provide a comprehensive education in nursing, preparing students for advanced practice in various settings. The program includes both required and elective courses, with a focus on developing skills in health promotion, clinical decision-making, and leadership. Students will also have the opportunity to complete a scholarly inquiry project and a nursing administration course. The program aims to prepare graduates for a wide range of nursing roles, from clinical practice to leadership positions in healthcare settings.
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 Tennessee, 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 graduate grade point average of 3.3 on a 4.0 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 scores of at least 550 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>Course Code</th>
<th>Course Title</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>601</td>
<td>Philosophy and Theory for Nursing Science</td>
<td>3</td>
</tr>
<tr>
<td>603</td>
<td>Nursing Research and Inquiry</td>
<td>3</td>
</tr>
<tr>
<td>605</td>
<td>Middle-Range Theoretical Formulations for Nursing Science Development</td>
<td>3</td>
</tr>
<tr>
<td>606</td>
<td>Nursing Research Seminar</td>
<td>3</td>
</tr>
<tr>
<td>607</td>
<td>Qualitative Nursing Research</td>
<td>3</td>
</tr>
<tr>
<td>608</td>
<td>Quantitative Nursing Research</td>
<td>3</td>
</tr>
<tr>
<td>609</td>
<td>Research Practicum*</td>
<td>2</td>
</tr>
<tr>
<td>610</td>
<td>Nursing Science Seminar</td>
<td>2</td>
</tr>
<tr>
<td>612</td>
<td>Health and Nursing Policy/Planning</td>
<td>3</td>
</tr>
<tr>
<td>613</td>
<td>Nursing Leadership in Complex Systems</td>
<td>3</td>
</tr>
<tr>
<td>614</td>
<td>Inferential Statistics</td>
<td>3</td>
</tr>
<tr>
<td>615</td>
<td>Multivariate Statistics</td>
<td>3</td>
</tr>
<tr>
<td>616</td>
<td>Cognates**</td>
<td>6</td>
</tr>
<tr>
<td>617</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>600</td>
<td>Dissertation</td>
<td>24</td>
</tr>
</tbody>
</table>

Total 67

*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, medical ethics, public health, social work, philosophy, and statistics.

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 six graduate hours taken before acceptance into the doctoral program may be applied toward the degree.
- A minimum grade of B in all nursing doctoral courses and a 3.0 cumulative GPA are required for continuation in the program.
Gerontology Minor

Graduate students in the College of Nursing may pursue a specialized minor in gerontology. This interdepartmental/interdisciplinary minor gives the student an opportunity for combining knowledge about aging in American society with his/her major concentration.

Nursing Education Minor

Graduate students in the College of Nursing may pursue a nursing education minor. The minor consists of 12 hours—six hours in Nursing and six in Education. Required courses in the College of Nursing are 566 Education Principles and Strategies (3) and 565 Nursing Education Practicum (3). In consultation with the Nursing Education Minor Coordinator, students select 6 credits of coursework from the College of Education, Health, and Human Sciences (see College of Nursing Graduate Handbook for listing) or may substitute courses at the discretion of the student and advisor.

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 credits. Most students complete 16-20 hours of course credit with the exception of those pursuing the nurse anesthesia certificate. Typically, this 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.

• 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—six hours in Nursing and six in Education. Required courses in the College of Nursing are 566 (3) and 565 (3). In consultation with the Nursing Education Minor Coordinator, students select 6 credits 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
Rodney Ellis, 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.csu.utk.edu/

Professors
Cetingok, M., PhD .........................................................Washington (St. Louis)
Glisson, C., PhD .................................................................Washington (St. Louis)
Nooe, R., DSW ..............................................................Tulane
Nugent, W., PhD ..........................................................Florida State
Orme, J., PhD ...............................................................Washington (St. Louis)
Sowers, K., PhD ..........................................................Florida State
Wodarski, J., PhD ............................................................Washington (St. Louis)

Associate Professors
Bowie, S., PhD ...............................................................Barry
Combs-Orme, T., PhD .............................................Washington (St. Louis)
Cummings, S., PhD ..........................................................Georgia
Dulmus, C., PhD ..........................................................State University of New York (Buffalo)
Dupper, D., PhD ..........................................................Florida State
Egan, M., PhD ..............................................................Maryland
Ellis, R., PhD ...............................................................Florida International
Evans, T., PhD .................................................................Minnesota
Faria, G., PhD .................................................................Denver
Patterson, D., PhD .............................................................Utah
Rocha, C., PhD ..............................................................Washington (St. Louis)
Rogge, M., PhD ..............................................................Washington (St. Louis)
Spicuzza, F., MSSW ........................................................Tennessee
Staudt, M., PhD ..............................................................Washington (St. Louis)
Vaughn, H., EdD .............................................................Memphis

Assistant Professors
Bolen, R., PhD ..............................................................Texas (Arlington)
Brown, E., PhD ............................................................Smith
Cho, S., PhD .................................................................Southern California
Davis, C., PhD .................................................................UCLA
Hall, C., PhD .................................................................Smith
Johnson, T., PhD ...............................................................Texas (Austin)
Jones, J., PhD .................................................................Clark
MacMaster, S., PhD .....................................................Case Western Reserve
Neely-Barnes, S., PhD ..................................................Washington (Seattle)
Strand, E., PhD ...............................................................Tennessee

Sullivan, M., PhD ..............................................................Georgia
Thieriot, M., PhD .............................................................Texas (Austin)
Washington, G., PhD ..........................................................Clark

Research Faculty
Campbell, P., DSW ........................................................Alabama
Green, P., PhD .............................................................Tennessee
Hemmelgarn, A., PhD ........................................................Tennessee

Field Coordinators
Betz, P., MSSW (Knoxville) ........................................Tennessee
Enoch, P., EdD (Nashville) ...............................................Tennessee
Jackson, R., MSSW (Knoxville) ....................................Tennessee
Thompson, B., MSSW (Memphis) ..................................Tennessee

MAJOR

DEGREES

Social Work .................................................................MSSW, PhD

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 which 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 which 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 college also offers a post-master’s certificate program in management and community practice. The Tennessee state school social work licensure program is available to currently enrolled MSSW students. Application materials are available from the College of Social Work, Henson Hall, Knoxville, Tennessee 37996-3333, or at http://csw.utk.edu. Please specify MSSW, PhD, or certificate program on the request.

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 Master of Science in Social Work program prepares social workers to provide professional leadership in clinical social work practice and social work management and community practice. These objectives are met through a curriculum requiring of all students a professional foundation and a concentration in either clinical social work practice or social work management and community practice. The MSSW program is accredited by the Council on Social Work Education.

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 2.7 or higher on a 4.0 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 2.7 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 3.0 or above in their undergraduate work with substantial preparation in the social sciences.

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 3.0 or higher; and personal qualifications acceptable for entrance into the professional practice of social work. Students admitted into advanced standing are required to complete a minimum of 36 hours of study in either of the college’s concentrations—clinical social work practice or social work management and community practice. 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 six 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 nine hours by proficiency examination, with the exception of field practice courses. Students interested in proficiency examinations are referred to the Graduate Catalog statement describing the procedure for applying for examination.

REQUIREMENTS

- The program requires successful completion of a minimum total of 60 semester hours including completion of the foundation curriculum (30 hours) and 30 hours in one of the two concentrations (clinical social work practice or social welfare management and community practice).
• Students may select a thesis or non-thesis option. Students pursuing the thesis option receive six credit hours for successful completion.
• Students must successfully complete a comprehensive exam or thesis defense.
• Students must have an overall GPA of 3.0 or better on all graded courses and satisfactory performance in field.

Professional Foundation Curriculum

All students must complete 30 hours in the foundation curriculum consisting of 24 hours in foundation classroom courses and 6 hours in field practice. The foundation is the initial phase of the master’s program. It contributes to the process of professional identification and presents a comprehensive, broad base of theory, knowledge and skills from which to practice. The foundation classroom courses include Foundations of Social Work Practice I, II and III; Human Behavior in the Social Environment I and II; Social Welfare Policy and Services; Social Work Research; and Social Work and Oppression. Students also complete a two-semester field placement, Field Practice (six hours). Upon successful completion of the foundation curriculum, all students must complete a minimum of 30 hours in the concentration curriculum including field practice (12 hours). Students select a concentration in clinical social work practice or social welfare management and community practice.

Field Practice

Field instruction is a critical component of the student’s first-and second-year programs. Through cooperation with a wide range of social agencies and human service programs throughout Tennessee, the college is able to provide field placements in a variety of social work practice areas. The faculty works closely with the placement agencies and the field instructors to ensure that students have quality field practice experiences that meet the objectives of the core curriculum and the concentration.

The college uses a concurrent class and field plan. Students are in field two days per week during the first year and three days per week during the second year.

First-year agency placements are selected to provide practice experiences related to the foundation curriculum content. Within the placement, each student’s experiences are planned and designed according to educational objectives.

Second-year placements are selected according to the student’s area of concentration, individual career interests, and educational needs. The student actively participates with the field practice coordinator and the educational committee in selection of the second-year placement. The second-year field placement experience focuses on the integration of social work knowledge and values and emphasizes the acquisition and development of practice skills.

Students are responsible for meeting the requirements of their placement agencies in terms of office hours and workload coverage. This responsibility takes precedence over scheduled university breaks and may result in variations in holidays and office hours for the student.

Students receiving a grade of NC in field practice may not repeat the field practice.

Clinical Social Work Practice Concentration

The clinical social work practice concentration focuses on students developing expertise in clinical social work practice with client systems including individuals and small groups, particularly with clients from high-risk and vulnerable groups. The concentration emphasizes theoretical and empirical knowledge and practice skills in differential assessment, clinical interventions and practice evaluation. The concentration also emphasizes knowledge and skills directed toward (1) amelioration of complex psychosocial, interpersonal problems; (2) ethically sound and culturally sensitive practice; and (3) influencing the development of services and programs that are responsive to the needs of vulnerable, high-risk clients and groups.

Required courses are

• 521 Clinical Social Work Practice with Individuals (three hours)
• 525 Clinical Social Work Practice with Groups (three hours)
• 526 Evaluating Clinical Practice (three hours)
• 582-583 Field Practice (12 hours)
• Minimum of three (total of nine hours) advanced course electives as follows:
  • one or more from a pool of advanced clinical practice courses; one or more from a pool of advanced general courses

Social Welfare Management and Community Practice Concentration

The social welfare management and community practice concentration focuses on students’ developing skills directed toward the management and analysis of complex service delivery needs within organizations and communities, knowledge and skills in the development of service intervention strategies to address such and related needs, and the organizational and management skills that enable practitioners to work in a variety of challenging and turbulent environments. The concentration emphasizes theory and skills related to leadership and administration and permits flexibility in tailoring a program to fit the student’s individual interests, capabilities, and career goals.

Required courses are

• 541 Leadership and Management in Human Services (three hours)
• 543 Financial Management and Resource Development (three hours)
• 547 Evaluation Research (three hours)
• 582-583 Field Practice (12 hours)
• Minimum of three (total of nine hours) advanced course electives as follows:
  one course in advanced policy (three hours); two courses from a pool of advanced general courses (six hours),
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

• completion of 27 hours of required coursework
• completion of 15 credits of advanced electives, at least 12 of which are taken outside the department, and nine of those 12 related to the dissertation
• completion of at least 24 credit 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, and 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 examination is final.

Gerontology Minor

Graduate students in the College of Social Work, at the Knoxville location, may pursue a specialized minor in gerontology. This interdepartmental/interdisciplinary minor gives the student an opportunity for combining the knowledge about aging in American society with his/her major concentration. Please refer to the College of Education, Health, and Human Sciences for specific requirements.

Graduate Certificate in Management and Community Practice

The College of Social Work offers a 15-credit hour graduate certificate designed for social workers desiring supervisory, management, administration and community practice training and education to enhance career advancement or career redirection. A master’s degree in social work or a closely related field is required for admission.

Course requirements are 541, 543, 547, and two courses selected from 550, 551, 552, 555.
Departments
Comparative Medicine
Large Animal Clinical Sciences
Pathobiology
Small Animal Clinical Sciences

MAJOR DEGREE
Veterinary Medicine .......................................................... 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 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 which 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), Public Health. (Refer to other sections of this catalog for a full description of these programs.)

http://www.vet.utk.edu/
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.

Subject Area                                      Semester Hours
English ...........................................................................................................6
1Humanities and Social Sciences .................................................................18
Physics ..........................................................................................................8
General Chemistry ..........................................................................................8
Organic Chemistry ..........................................................................................8
2Biochemistry ..................................................................................................4
General Biology ..............................................................................................8
Genetics .........................................................................................................13
3Cellular Biology ............................................................................................3

Total 66

1May include, for example, courses in English literature, speech, music, art, philosophy, religion, language, history, economics, anthropology, political science, psychology, sociology and geography.
2Exclusive of laboratory.
3It 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. Forms and instructions for making application for admission may be obtained from the Office of the Associate Dean, The University of Tennessee, College of Veterinary Medicine, 2407 River Drive, Room A102, Knoxville, Tennessee 37996-4550.

The deadline for receipt of the completed application materials is November 1. Non-Tennessee applicants must have a minimum cumulative grade point average of 3.2 on a 4.0 scale for application to be considered.

Applications are accepted only from U.S. citizens or permanent 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 generally 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 emphasized in the first year. Courses consist mostly of pre-clinical subjects of anatomy (gross and microscopic), physiology, immunology, bacteriology, virology and parasitology. Also included in the first year are clinical subjects of physical diagnosis and epidemiology. 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 education in solving animal disease problems involving extensive clinical experience in the Veterinary Teaching Hospital. Each student will participate exclusively in clinical rotations in the Veterinary 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 semesters one through five; three weeks of dedicated clinical experiences in the Veterinary Teaching Hospital in semesters three through five; and elective course opportunities in semesters four, five and six which allow students to focus on individual educational/career goals. Students enrolled in the DVM program may register for up to 10 credit 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, concentration 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 students enrolled in the DVM curriculum and graduate veterinarians. This concentration is part of the Master of Public Health degree in the College of Education, Health, and Human Sciences. For more information, see Public Health in the Graduate Catalog. The College of Veterinary Medicine shares governance of the concentration 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.
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 a basic knowledge of computer utilization and statistics; an understanding of aerodynamic fundamentals, aircraft propulsion, and performance; and some understanding of economics.

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.
REQUIREMENTS

Core courses are required for the program. A basic science and/or applied science concentration must be selected at the first meeting of the student’s master’s committee.

- **Basic science concentration:** Students must take at least 4 credit hours in 500- or 600-level courses in basic mechanisms of disease and at least 6 credit hours of 500-level biochemistry or cell biology. See listings under the Biochemistry and Cellular and Molecular Biology program for information on these courses.

- **Applied science concentration:** Students must take at least 6 credit hours of 600-level epidemiology and at least 5 credit hours of 500- or 600-level statistics.

In addition, students must complete a minimum of 8 hours of coursework in a specified discipline, 5 or more hours of electives, and 6 hours of Thesis 500. 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 3 members) is chosen after the first 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 is given at the end 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

Core courses are required for the program. A basic science and/or applied science concentration must be selected at the first meeting of the student’s doctoral committee.

- **Basic science concentration:** Students must take at least 4 credit hours in 500- or 600-level courses in basic mechanisms of disease and at least 6 credit hours of 500-level biochemistry or cell biology. See listings under the Biochemistry and Cellular and Molecular Biology program for information on these courses.

- **Applied science concentration:** Students must take at least 6 credit hours of 600-level epidemiology and at least 5 credit hours of 500- or 600-level statistics.

In addition, students must complete a minimum of 8 hours of coursework in a specified discipline. Exceptions to accommodate students with specific interests must be approved by the Joint Graduate Coordinating Committee after application, in writing, to the director. Areas of emphasis may include hematology, oncology, comparative pathology, comparative pharmacology, toxicology, immunology, genetics, infectious disease or biochemistry of diseases.

At least 24 hours of coursework, including a minimum of 6 hours at the 600 level, and 24 hours of Dissertation 600 are required for a total of 48 hours. For students with professional degrees, a minimum of 18 hours of coursework beyond the professional degree is required for a total of 42 hours.

The doctoral committee (at least 4 members) is chosen during the first year. Three of the four members, including the chair, must be approved by the Graduate Council to direct doctoral research. 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 is given at the completion of coursework. A seminar and final oral defense of the dissertation culminate the program.
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 three research faculty, seven graduate students, and an extensive support staff in the areas of research, data analysis, project management, 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)

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.

The center offers four executive track Master of Business Administration degrees for working managers. Non-degree programs for the business community include programs in
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.
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:

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 Management
Ivan Racheff Chair of Excellence of Ornamental Horticulture
Ivan Racheff Chair of Excellence in Materials Science and Engineering
Forrest and Patsy Shumway Chair of Excellence in Romance Languages
Bernadotte E. Schmitt Chair of Excellence of History

Memphis
Maury W. Bronstein Chair of Excellence in Cardiovascular Physiology
Crippled Children’s Hospital Foundation Chair of Excellence in Biomedical Engineering
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
Senners-Murphey Chair of Excellence in Neurology
Mark S. Soloway Chair of Excellence in Urology
Harriet S. Van Vleet Chair of Excellence in Biochemistry
Harriet S. Van Vleet Chair of Excellence in Microbiology and Immunology
Harriet S. Van Vleet Chair of Excellence in Pharmacology
Harriet S. Van Vleet Chair of Excellence in Virology
The University of Tennessee Medical Group Chair in Obstetrics and Gynecology

UTSI
H. H. Arnold Chair of Excellence in Computational Mechanics
Boling Chair of Excellence in Space Propulsion

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. Narendra Dahotre, Chairman
Space Institute
B. H. Goethert Pkwy
Tullahoma, Tennessee 37388-8897
(931) 393-7474
(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
513 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
875 Monroe Avenue
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)

Center of Excellence for Science and Mathematics Education
Dr. Geraldine Farmer, Interim Director
UT Martin
145 Gooch Hall
Martin, Tennessee 38238
(731) 587-7166
(jgfarmer@utm.edu)

Molecular Resource Center of Excellence
Dr. Michael E. Dockter, Director
The University of Tennessee Health Science Center
62 S. Dunlap, Suite 400
Memphis, Tennessee 38163
(901) 448-7105
(mdockter@tennessee.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)

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Child Development Laboratories
(College of Education, Health, and Human Sciences)
http://web.utk.edu/~utkdcl/
Kathy Fitzgerald, Director

The Child Development Laboratories, operated by the Department of Child and Family Studies since 1927, currently offer 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 Child Development Laboratories serve three purposes: to promote the research and scholarship activities of the department and other university faculty and students through the 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 CDL 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, emergent literacy, making children’s and teachers’ learning visible) are ongoing at any time. Graduate assistants in the laboratories participate in teaching, assessment, administrative, supervisory and research activities while working with children and families under the guidance of faculty and staff. The Child Development Laboratories are accredited by the National Academy of Early Childhood Programs, a division of the National Association for the Education of Young Children.

For more information, check Web site at http://web.utk.edu/~utkdcl/.

Energy, Environment, and Resources Center
(Office of Research)
Jack N. Barkenbus, Executive Director

The Energy, Environment, and Resources Center, 600 Henley Street, Suite 311, was created in 1973 to encourage interdisciplinary research directed at solutions to problems related to energy and the environment. The center involves faculty and students in research and public service projects, manages research and development projects that involve several disciplines, and assists government and industry in specific problems related to energy, environmental, resource, and technology policy issues. The center has a close working relationship with the Joint Institute for Energy and Environment, and Oak Ridge organizations. Sponsors include federal and state agencies, industry, and foundations.

Current research includes sustainable development, solid and hazardous waste management, information systems, environmental education, global environmental problems, water, and cleaner production. The center operates the Waste Management Research and Education Institute, the Center for Clean Products and Clean Technologies, the Water Resource Research Center, the Center for Geography and Environmental Education, and the Technology Research and Development Program. Grants and contracts bring approximately $4 million in research to the university each year.
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, the Agricultural Extension Service, the College of Agricultural Sciences and Natural Resources, and the College of Veterinary Medicine.

AGRICULTURAL EXPERIMENT STATION
Thomas H. Klindt, 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 the branch experiment stations located across Tennessee and operated by the Experiment Station. The Experiment Station also supports graduate student assistantships.

UNIVERSITY OF TENNESSEE EXTENSION
Charles L. Norman, 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
http://www.lib.utk.edu/
Barbara I. Dewey, Dean
Aubrey H. Mitchell, Associate Dean
Jill Keally, Assistant Dean

Professors
Baker, G., MLS ............................................................. Alabama
Bayne, P., MSL .............................................................. North Carolina
Britten, W., MLS ......................................................... Clarion
Crowther, K., ML ....................................................... Emory
Dewey (Dean) B., MALS ........................................... Minnesota
Felder-Hoehne, F., MSL .............................................. Atlanta
Leach, S., ML ................................................................. Emory
Phillips, L., MLS .......................................................... Rutgers

Associate Professors
Atkins, D., ML ................................................................. Wisconsin
Berry, T., MLS ............................................................. Tennessee
Bridges, A., MLS ......................................................... Rhode Island
Deekelen, J., MSL ......................................................... North Texas State
Dixon, L., MSL ............................................................. Tennessee
Garrett, M., MLS ........................................................... Vanderbilt
Johnson, K., MLS .............................................................. Pittsburgh
Keally, J., MLS ................................................................. Tennessee
Mack, T., MLS ................................................................. Tennessee
Mitchell, A., MSL .......................................................... Tennessee
Prescod, J., MSL .......................................................... Western Michigan
Ratledge, D., MSL ......................................................... Tennessee
Row, J., MLS ................................................................. Tennessee
Royse, M., MSL ............................................................... North Carolina
Smith, R., MLS ............................................................. Illinois
Thomas, D., MLS ......................................................... George Peabody
Thomas, S., MSL .......................................................... Tennessee
Viera, A., MLS .............................................................. UCLA
Wallace, A., MLS ........................................................... Washington
Williams, S., MSL ........................................................ Simmons
Wise, N., MLS ............................................................... Tennessee

Assistant Professors
Beals, J., MLS ............................................................. Kent State
Behrendt, L., MLS .......................................................... Tennessee
Braquet, L., MSL .............................................................. Louisiana
Casado, M., MSL .......................................................... Tennessee
Davis, T., MLS ............................................................... North Carolina
Dolence, T., MSL ........................................................ Illinois (Urbana-Champaign)
The University of Tennessee Libraries own approximately 2.2 million volumes and subscribe to more than 14,000 periodicals and serial titles. A growing collection of electronic resources are available through the Libraries’ Web page at www.lib.utk.edu. 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.

Friendly experts at the reference desk in each library offer help and assistance in using the library. AskUs.Now (www.lib.utk.edu/refs/askusnow/) provides chat, e-mail, 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’ Web site. Interlibrary Services is available to help students find and retrieve materials that are not available in the UT Libraries. The services and facilities of the University Libraries are accessible to persons with disabilities.

The John C. Hodges Main Library (1015 Volunteer Boulevard) is a 350,000 square-foot building housing collections in all subject areas. The Hodges Library can accommodate more than 3,500 people, with space for group and individual study. The second floor CyberCafe is open for late night study, with networked computers, reading tables, and a coffee shop. Students may check out laptop computers equipped for connection to the Library’s wireless network. The Studio (located in the second floor Media Center) offers students a hands-on lab for creating and manipulating digital media. Workshops and classes are offered throughout the semester to help students learn how to get the most out of the Libraries’ services.

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, Cumberland Avenue and 15th Street) houses a large collection of sheet maps, atlases, journals, and books related to cartography. Materials in print, film, and digital formats are gathered from commercial sources as well as the Government Depository program.

The Music Library (301 Music Building) 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 a repository of rare books, manuscripts (including the papers of James Agee and Alex Haley), and historical ephemera. 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 (Suite 292, 193-E Polk Avenue, 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.

*Data describe the Knoxville campus, excluding the Law Library.

Maintenance and Reliability Center
College of Engineering
Thomas V. Byerley, 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 25 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.

The Maintenance and Reliability Center involves all departments in the College of Engineering. Interested and qualified students may affiliate as interns with the MRC program while pursuing a degree in any of the engineering departments. Maintenance and reliability engineering courses are available. Research opportunities and graduate assistantships are also available for qualified students.

Measurement and Control Engineering Center
College of Engineering
Kelsey Cook, Director

The Measurement and Control Engineering Center, 512 East Stadium Hall, is sponsored by the College of Engineering, the Oak Ridge National Laboratory, and the National Science Foundation. The Center’s program combines education, research, and technology transfer. Graduate assistantships are available through individual faculty research projects for qualified students. The research is funded by major U.S. industrial companies and focuses on theoretical and practical developments in measurement and control, concentrating on areas that will significantly improve the productivity, reliability, and safety of industrial systems.
and processes.

Center-sponsored research is carried out in the fields of process control, signal and image processing, and sensor development. Research in process control concentrates in the areas of process modeling, control system design, and real-time expert systems. Measurement research includes development of rheological, optical, and other sensors, and mass spectrometry, as tools for monitoring and control of chemical processes.

**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. These accounts may be used for e-mail, coursework, research, and personal Web pages. Information and on-line registration for computer accounts are available at http://oit.utk.edu/accounts.html. 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 direct Ethernet, dial-up, or wireless connections. All students can take advantage of UT Knoxville’s, new wireless infrastructure, which is now available in most of the academic and administrative buildings on the Knoxville campus.

To provide access to computing facilities on campus, OIT maintains seven staffed computing labs, several unstaffed labs, and supports computing installations in residence halls. The computing labs are equipped with more than 300 micro-computers including current models of Apple, Dell, and Gateway machines. In addition, laser printers, wireless printers, scanners, CD writers and zip drives are available. A variety of industry standard software applications are available for use on the machines in the computing laboratories. Please refer to http://oit.utk.edu/labs.html 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, please dial 974-9900. To contact the Help Desk, please dial 974-9900. You may also contact the Help Desk online by filling out the HelpDesk request form which can be found at http://oit.utk.edu/contact.html. For more information, please visit our 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 our Customer Service Center. These services include installing academic software free of charge on personally owned computers and helping students diagnose problems with their computers. We will also help clean up virus infected machines and reload/upgrade operating systems. The Customer Service Center is located on the corner of Cumberland and Volunteer in Rooms 103/104 Aconda Court and is open Monday through Friday, 9 a.m. until 4 p.m.

**Technology Training**: Several courses offered are aimed at improving skills with the technology available at UT Knoxville. **Life Preserver: An Introduction to University of Tennessee 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 JavaScript, Visual Basic, object-oriented techniques, and open systems. There are over 500 courses available. This training is free to University of Tennessee students. For registration and access to the CBT courses on the Web, go to http://oit.utk.edu/cbt/.

**Statistical Consulting Center**. Our mission is to help UT Knoxville students, faculty, and staff enhance the quality of their research by working together to effectively apply analytical methods, especially statistics. We can help you with determining sample sizes, designing surveys and deploying them on Web pages, scanning and scoring scale forms, acquiring and managing data, analyzing or mining data or text, visualizing data through interactive or presentation graphics, and interpreting the results. The costs for most of our services are often centrally funded for the first ten hours of assistance each semester. Assistance is available by appointment via the Help Desk at 974-9900, by walk-in at 200 Stokely Management Center and by e-mail at StatHelp@utk.edu. For details, see http://oit.utk.edu/scc/.

**The Innovative Technology Center**: The Innovative
The Center for Information Technology Research (ITR) at the University of Tennessee, Knoxville. The development of leading-edge information technology research (ITR) at the University of Tennessee, Knoxville. The mission of CITR is to build a thriving, well-funded community in basic and applied ITR at the University of Tennessee, Knoxville, in order to help the university capitalize on the rich supply of research opportunities that exist in this area.

**Psychological Clinic**  
*(College of Arts and Sciences)*  
*Leonard Handler, 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 Centers of Excellence**  
*http://www.tennessee.edu/research/coe.shtml*

In 2000, the University of Tennessee, Knoxville, created nine Research Centers of Excellence in a competitive process that sought to emphasize some of the strongest, most promising research taking place at the university. With financial support from the state of Tennessee, the nine centers have created vital research programs that promise to enhance the university’s teaching and research and to contribute positively to the state economy.

The five centers in Knoxville are in environmental biology, food safety, materials science, information technology, and structural biology. Memphis has four centers: genomics, neurology of brain diseases, diseases of connective tissue, and vascular biology. Several of the programs involve activities on the various university campuses and collaboration with Oak Ridge National Laboratory.

**Center for Genomics and Bioinformatics**  
*Daniel Goldowitz, Director*

The Center for Genomics and Bioinformatics, located at the University of Tennessee Health Science Center in Memphis, is committed to fostering an atmosphere conducive to scientific research and collaboration in the area of functional genomics, involving both basic science and clinical departments across the campuses of the University of Tennessee.

**Center for Information Technology Research (CITR)**  
*Jack Dongarra, Director*

The Center for Information Technology Research (CITR) was established in the spring of 2001 to drive the growth and development of leading-edge information technology research (ITR) at the University of Tennessee, Knoxville. The mission of CITR is to build a thriving, well-funded community in basic and applied ITR at the University of Tennessee, Knoxville, in order to help the university capitalize on the rich supply of research opportunities that exist in this area.

**Center of Excellence for the Neurobiology of Brain Disease**  
*William Pulsinelli, Director*

The Center for the Neurobiology of Brain Disease works to improve the diagnosis, treatment, and prevention of neurological and psychiatric disorders. The center combines state-of-the-art technologies for brain disease research and molecular biology to improve understanding of brain function and the underlying reasons for neurological disorders ranging from Parkinson’s and Huntington’s diseases to schizophrenia and drug addiction.

**Center for Environmental Biotechnology**  
*Gary Sayler, Director*

The Center for Environmental Biotechnology (CEB) was established in 1986 to foster a multidisciplinary approach toward training the next generation of environmental scientists and solving environmental problems through biotechnology. The CEB was given Research-Center-of-Excellence status by the University of Tennessee, Knoxville, in order to catalyze and advance a new research agenda that pushes the envelope of creative and pioneering research. This fundamental new research will revolutionize the ability to dissect, monitor and control processes at the molecular level to achieve real-time information and computational analysis in complex bioenvironmental systems.

**Food Safety Center**  
*Ann Draughon and Stephen Oliver, Directors*

The Food Safety Center of Excellence was established in December 2000. The center develops and evaluates strategies to destroy or control food-borne pathogens and reduce the occurrence of food-borne illnesses. Contributing to this work is a multidisciplinary team of researchers, consisting of members of UT’s Institute of Agriculture’s Department of Food Science and Technology as well as researchers from departments outside the institute. Specialists include scientists with expertise in biochemistry, reproductive biology, food service management, parasitology, infectious diseases and risk assessment.

**Vascular Biology Center of Excellence**  
*Lisa K. Jennings, Director*

The Vascular Biology Center of Excellence at the University of Tennessee Health Science Center (UTHSC) in Memphis was initiated in January 1999. The study of cellular and integrated vascular function under normal and pathologic conditions is the major research and clinical focus of the UT Vascular Biology Center of Excellence. The major collaborations formed by the participating faculty and trainees, along with the TAM (Tennessee, Arkansas, Mississippi) Cardiovascular Network of more than 70 cardiologists, creates an innovative and powerful research consortium.

**Center of Excellence for Diseases of Connective Tissue**  
*Andrew Kang, Director*

The Center for Diseases of Connective Tissue is located at the University of Tennessee Health Science Center in Memphis. Scientists at the center conduct basic research in five areas: autoimmune diseases, such as rheumatoid arthritis and lupus; degenerative diseases, such as osteoarthritis; inflammation and the basic science of how the body reacts to injury;
fibrotic diseases, such as heart failure and emphysema; and clinical research. The center also educates and trains pre-and postdoctoral fellows and conducts outreach programs.

**Tennessee Advanced Materials Laboratory (TAML)**
*Ward Plummer, Director*

The Tennessee Advanced Materials Laboratory (TAML) calls on experts in materials science and engineering, chemistry, chemical engineering, and physics at the University of Tennessee, Knoxville, and the Oak Ridge National Laboratory to explore the creation of new materials through computer-intensive modeling and experimental research.

**Center of Excellence for Structural Biology**
*Engin Serpersu, Director*

The mission of the University of Tennessee Center of Excellence for Structural Biology (CESB) is to expand the frontiers of knowledge in biomolecular structural and functional research. The center brings together a large group of structural molecular biologists working on a wide range of biological molecules, biomolecular assemblies and complexes. Its participants represent specialties in all of the current major techniques for high-resolution structure determination of large molecules, including X-ray crystallography, NMR spectroscopy and a battery of sophisticated biophysical tools including mass spectrometry and other spectroscopic techniques.

**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).

1. 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 88 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 Professor J. H. Poore, Department of Computer Science and ORAU Councilor for the University of Tennessee, Knoxville, at (865) 974-1407; or Monnie E. Champion, ORAU Corporate Secretary at (865) 576-3306; or visit the ORAU home page: http://www.orau.org.

2. SURA is a nonprofit consortium of 41 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).

3. URA, Inc. is a nonprofit corporation consisting of 86 major research-oriented universities in the United States, Canada, and Japan and 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.

For more information about ORAU and its programs, SURA, and URA, Inc., contact Professor J. H. Poore, council member at 865-974-6765; or contact Monnie E. Champion, ORAU Corporate Secretary at 865-576-3306. Additional information may also be found on World Wide Web sites at http://www.orau.gov and http://cebaf.gov/sura.

**Textiles and Nonwovens Development Center**
*Billie J. Collier, 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
Tourism Institute  
(College of Education, Health, and Human Sciences)

John Salazar, Director

The Tourism Institute at the University of Tennessee, Knoxville, uses a systems approach to enhance economic development in Tennessee and the Southeast Region. Centered in the Department of Consumer Services Management, the institute integrates faculty expertise from the hotel, restaurant, and tourism program, and the retail and consumer sciences program to address emerging issues and needs. The institute is also supported by the Department of Urban and Regional Planning and the College of Agricultural Sciences and Natural Resources.

Successful tourism requires attractions to draw tourists and supporting businesses that provide high quality food, lodging and related consumer goods and services. The mission is to deliver research, development, and training projects that will promote sustainable tourism in Tennessee and the southeast region. The institute pursues research studies to better understand the needs of the state’s and region’s visitors to enable the industry to provide the goods and services that will increase and diversify the tourist base. It works with agencies and businesses to develop strategies for creating and expanding tourism enterprises. It also provides management level personnel to the tourism industry through the degree programs in the department and assists the industry in workforce training.

The University of Tennessee Space Institute  
John E. Caruthers, 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. UTSI was established in 1964 and has evolved into an internationally recognized institution for graduate study and research in engineering, physics, and mathematics. The accredited academic programs and educational policies of the Space Institute have their origins in appropriate departments of the University of Tennessee. The more than 30 faculty members of the Institute carry out these accredited 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 MS and PhD degrees, those interested in continuing education for updating and broadening knowledge, and those who wish to pursue post-doctoral research.

Graduate degree programs are available with majors in aerospace engineering, aviation systems, chemical engineering, electrical engineering, engineering science, Industrial engineering (engineering management concentration), mathematics, mechanical engineering, and physics. In addition to the fundamental studies characteristic of each discipline, research opportunities are available in many areas including aerodynamics, fluid mechanics, advanced space propulsion, energy conversion processes, thermal sciences, coal combustion, magnetohydrodynamics, plasma physics, space systems, propulsion, computational fluid dynamics, and other aspects of atmospheric and space flight.

The Institute has an established Center of Excellence in Laser Applications and offers graduate studies and research opportunities in laser diagnostics, laser materials interactions, pico-second processes, and coherent and non-linear optics, and biophysical applications.

The Institute was established in part to increase the research and engineering resources of Tennessee through education and practice 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 UTSI are admitted to graduate study at the University of Tennessee. 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

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

Norvel Burkett, Interim Dean and Director
Robert Gibbs, Associate 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**

Nonel Burkett, Interim Dean and Director
Robert Gibbs, Associate 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. Arrangements can also be made to receive (downlink) programming or transmit (uplink) programming via satellite. 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.tennessee.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, with varying proficiency in English.

The curriculum consists of eight proficiency levels: 101-108, Introductory through Pre-Academic.

Classes meet three to five periods 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 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, Interim 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 seniors; 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
- 600 Henley Street
- 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: anywhere.tennessee.edu

Water Resources Research Center
(Office of Research)
http://eerc.ra.utk.edu/divisions/WRRC.html
Timothy R. Gangaware, Associate Director
Dr. Bruce A. Tschantz, 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 conduct training workshops on stormwater management and erosion prevention and sediment control for the state.
Courses of Instruction

ACCOUNTING (009)

451 Operational Auditing and Consulting (3) Approaches to evaluate an entity’s efficiency and effectiveness in a variety of settings and techniques used in consulting to provide entity competitive advantage.

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. May be repeated. Satisfactory/No Credit grading only.

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. Prereq: Admission to MAcc program or consent of instructor.

518 Professional Standards (3) Basic standards and contemporary issues relevant to assurance providers. Actual practice cases are used to illustrate application. Prereq: Admission to MAcc program or consent of instructor.

519 Seminar in Business Risk and Assurance Methodology (3) Business risk and emerging methodology used by assurance providers. Prereq: Admission to graduate programs or consent of instructor.

521 Advanced Management Accounting (3) Analysis of management accounting and cost management practices and models. Topics include cost behavior, strategies and models for decision making, and performance measurement issues. Prereq: Management Accounting, and either admission to a graduate business program or consent of instructor.

531 Tax Strategy, Tax Research, and Entity Taxation (3) Current issues in tax strategy including investment models, implicit taxes, tax arbitrage, organizational form, and other selected topics. Methods of researching tax issues within the U.S. federal tax system with emphasis on Web-based research tools. Income taxation of business entity operations. Prereq: Admission to MAcc program or consent of instructor.

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. Prereq: Admission to MAcc program or consent of instructor. Prereq/Coreq: 531.

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. Prereq: Admission to MAcc program or consent of instructor. Prereq/Coreq: 531.

534 Family Tax Planning (3) Methods used to value closely-held business, the law and planning strategies related to inter vivos and post-mortem property transfers and the taxation of estates, and financial planning techniques used to meet family tax planning objectives. Prereq: Admission to MAcc program or consent of instructor. Prereq/Coreq: 531.

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. Prereq: 531 and either admission to MAcc program or consent of instructor.
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. Prereq: Admission to MAcc program or consent of MAcc advisor.

593 Individual Research in Accounting (3) Directed research in topic of mutual interest. Prereq: Admission to MAcc program or consent of MAcc advisor. May be repeated. Maximum 6 hours.

600 Doctoral Research and Dissertation (3-15) P/NP only.

611-612 Doctoral Seminar in Accounting (3,3) Analysis of issues reflected in accounting literature. Prereq: Consent of PhD program advisor.

619 Doctoral Research in Accounting (3) Study of research methodology and application of various research methods in accounting literature. Prereq: Consent of PhD program advisor.

621-622 Accounting Colloquium (1,1) Research and discussion of contemporary issues in practice of accountancy. Prereq: Consent of PhD program advisor. May be repeated. Satisfactory/No Credit grading only.

693 Independent Study (3) Directed research in topic of mutual interest. Prereq: Admission to doctoral program with concentration in accounting. May be repeated. Maximum 6 hours.

ADVERTISING (012)

490 Special Topics (3) Topics vary: advanced media strategy, advanced creative strategy, direct marketing, and advertising and social issues.

500 Thesis (1-15) P/NP only.

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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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. Prereq: Consent of instructor or admission to program.

530 Advertising and Public Relations Research (3) Nature, scope, and application of research function to advertising and public relations decisions. Prereq: 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. Prereq: Consent of instructor or admission to program.

590 Project (3) Capstone project under guidance of faculty. Application of principles from previous coursework. Satisfactory/No Credit grading only.

597 Independent Study (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

AEROSPACE ENGINEERING (018)

NOTE: 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, compressibility effects. Subsonic, transonic, and supersonic airfoils. Prereq: 351, 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. Prereq: 351. Coreq: Mechanical Engineering 331.


429 Aerospace System Design (3) Synthesis and design of complete aerospace system. Participation in team design effort: formal presentations and design report. Prereq: 422, 425, 426.


494-495 Selected Topics in Aerospace Engineering (1-4,1-4) Problems and topics related to developments and practice in aerospace engineering. Prereq: Consent of instructor.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

509 Multidisciplinary Project (1) (See Industrial Engineering 509.)

511 Inviscid Flow (3) Kinematics and dynamics of inviscid fluids; potential flow about body, conformal mapping. Prereq: 422 or 541, Mathematics 425 or equivalent.

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. Prereq: 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. Prereq: 423 or 541.

515-516 Air Vehicle Aerodynamics and Performance (3,3) 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 attitude, propulsion systems, vehicle performance characteristics, and trajectory optimization. Prereq: 422; 515 for 516.

521-522 Aerodynamics of Compressible Fluids (3,3) One-dimensional internal and external flow; waves; small perturbation theory; slender body theory; similarity rules; method of characteristics. Prereq: 422 for 521; 521 for 522.

525 Hypersonic Flow (3) Slender body flow; similitude; Newtonian theory; blunt body flow; viscous interactions; free molecule and rarefied gas flow. Prereq: 512.
527-528 Aerospace Ground Test Facilities (3,3) 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. Prereq: 521, 541 and Mechanical Engineering 522.

529 Rarefied Gasdynamics (3) Binary elastic collisions; kinetic theory; flow regimes; Boltzmann and model equations, transfer equation, gas-surface interactions; slip boundary conditions, free molecule, slip and transition flow; Monte Carlo simulation; experimental techniques; introduction to hypersonic real gas flows. Prereq: 522, Mechanical Engineering 522.

531 Magnetohydrodynamics (3) Electromagnetic field theory; chemical kinetics; thermodynamic and thermophysical properties of gas plasmas; governing equations and applications. Prereq: 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. Prereq: 511-512.

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. Prereq: 522. Recommended prereq: 512.

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. Prereq: 522.


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. Prereq: 423, 551.

555 Human Vibrations Analysis and Protection (3) (See Biomedical Engineering 555.)

556 Vertical or Short Take Off and Landing Aircraft (3) Performance, stability, control of rotary wing, tilt wing, vectored lift and jet vertical riser type aircraft. Vertical and transition flight modes. High lift airfoils. Automatic controls. Simulation facility types and flight testing. Prereq: 555.


559 Advanced Mechanics of Materials I (3) (See Mechanical Engineering 559.)

561 Fundamentals of Aeroacoustics (3) Generation, propagation and absorption of sound in static and moving media. Prereq: Consent of instructor.

564 Spacecraft Attitude Dynamics and Control (3) Rotational attitude dynamics of space vehicles. Gyroscopic instruments; passive and active attitude control devices. Linear control theory and attitude stabilization. Prereq: 551, Mathematics 471.

571 Finite Elements for Engineering Applications (3) (See Engineering Science 551.)

572 Computational Fluid Dynamics (3) (See Engineering Science 552.)

573 Computational Solid Mechanics (3) (See Engineering Science 553)

574 Space Engineering: Satellite Technology (3) Satellites and rockets (orbit, launch vehicles and launching), spacecraft structure, power systems, attitude control system, telemetry/tracking/command, and communication systems, spacecraft testing, reliability, and application of satellites (communication, weather, Earth observation, and future applications). Prereq: 425, Mathematics 471, 404.

590 Selected Engineering Problems (2-6) Enrollment limited to students in problems program. Prereq: Consent of advisor. May be repeated. Maximum 6 hours.

595 Seminar (1) All phases of aerospace engineering, reports on current research at the University of Tennessee, Knoxville, and UTSAI. May be repeated. Satisfactory/No Credit grading only.

599 Special Topics in Aerospace Engineering (1-3) May be repeated. Maximum 6 hours.

600 Doctoral Research and Dissertation (3-15) P/NP only.

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. Prereq: 522, Mechanical Engineering 522.

645 Theory of Turbulence (3) (See Engineering Science 645.)

659 Advanced Mechanics of Materials II (3) (See Mechanical Engineering 659.)

661-662 Advanced Topics in Computational Fluid Dynamics (3,3) (See Engineering Science 651-652.)

663-664 Advanced Topics in Computational Solid Mechanics (3,3) (See Engineering Science 653-654.)


690 Advanced Topics in Aerospace Engineering (3) Prereq: Consent of instructor. May be repeated. Maximum 9 hours.

AFRICAN AND AFRICAN-AMERICAN STUDIES (022)


443 Topics in Black Literature (3) (See English 443.)

450 Issues and Topics in African-American Studies (3) Topics vary but include a variety of problems, issues, and individuals from the field of African-American studies. May be repeated. Maximum 6 hours.

452 Black African Politics (3) (See Political Science 452.)

461 Art of Southern and Eastern Africa (3) (See Art History 461.)

462 Art and Archaeology of Ancient Africa (3) (See Art History 462.)

463 Arts of the African Diaspora (3) (See Art History 463.)

483 African-American Women in American Society (3) Historical and contemporary socio-eco-political factors in American society as related to black women. (Same as Women’s Studies 483.)

510 Special Topics (3) May be repeated. Maximum 6 hours.

AGRICULTURAL AND EXTENSION EDUCATION (042)

440 Communication Techniques in Agriculture (3) Elements of effective use of mass media in Agricultural and Extension Education. Effective technical writing and presentation strategies for agricultural audiences. Prerequisite for undergraduate students: English 101 and 102, junior standing. Prerequisite for graduate students: none.

450 Agricultural Leadership Development (3) Identification of styles required in working with organizations and youth groups, methods of resolving conflict, of communicating, of guiding and evaluating; ethical considerations for leaders. Prerequisite for undergraduate students: Junior standing. Prerequisite for graduate students: none.

500 Thesis (1-15) P/NP only.

501 Creative Component in Lieu of Thesis (3) Capstone experience completed under supervision of major professor and committee. Individual project: literature survey; development of teaching software; development of curriculum materials; development of white paper; or other suitable project. Prerequisite: Consent of major professor. Non-thesis majors only. 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

511 Extension History, Philosophy and Objectives (3) Historical and philosophical foundation of adult education in American agriculture, key figures, issues, legislative movement, farmer organizations and programs. Cooperative Extension Service, origin, legislation and growth, and nature of present-day objectives and programs. Prerequisite: 211 or consent of instructor.

521 Extension Program Planning and Evaluation (3) Theories and models of program development and evaluation and their use in extension education: planning and conducting needs assessments; planning, organizing, implementing and evaluating extension educational program content and learning activities; development and interaction of county, state and federal extension plans of work; and principles, techniques and instruments used to identify, gather and analyze information to evaluate extension programs. Prerequisite: 211, 511, or consent of instructor.

522 Educational Technology in Agricultural and Extension Education (3) Advanced concepts and methods relevant to both formal and non-formal instructional methodologies. Processes by which professional change agents influence the introduction, adoption, and diffusion of technological change. Prerequisite: 435, 436, or consent of instructor.

524 Research Methodology (3) Social science research methods related 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 interpretation of appropriate inferential tests of significance. Prerequisite: 436, 511, or consent of instructor.

525 Curriculum Development in Agricultural and Extension Education (3) Models, principles, and procedures for developing curricula in agriculture and extension education programs and scheduling learning activities used to implement these planned programs. Prerequisite: 435, 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. Prerequisite: 435, 436.

527 Adult Education Strategies in Agricultural and Extension Education (3) Methods of developing and implementing educational programs for adults in agricultural and extension education and related contexts: different learning of adults and children (androgy vs. pedagogy); understanding 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. Prerequisite: 211, 511, or 346 or consent of instructor.

530 Special Topics in Agricultural and Extension Education (1-3) Current issues. Prerequisite: Consent of instructor. May be repeated. Maximum 9 hours.

532 Managing Organizations, Programs and Personnel (3) Theory and principles of management for individual and organizational effectiveness of agricultural organizations. Prerequisite: 511, 521, or consent of instructor.

592 Internship in Agricultural and Extension Education (1-3) Practical field experience in selected setting under supervision of local practitioner and departmental representative. Prerequisite: Consent of instructor. Maximum 3 hours. Satisfactory/No Credit grading only.

593 Special Problems in Agricultural and Extension Education (1-4) Special research and/or special reports based on supervised independent study. Prerequisite: Consent of instructor. May be repeated. Maximum 6 hours.

AGRICULTURAL ECONOMICS (047)

412 Agricultural Finance (3) Macro-finance, financial objectives, acquisition of debt and equity funds, capital investments, capital allocation, credit analysis, borrower and lender loan application analysis, insurance strategies, computer applications, kinds and sources of agricultural credit, and financial intermediation. Prerequisite: 212, Economics 201.

420 International Agricultural Trade and Marketing (3) Real and monetary aspects of international trade and effect on agricultural commodity flows; partial equilibrium analysis of international trade in agricultural products; institutional aspects of international marketing of agricultural products. Prerequisite: 320 or consent of instructor.

430 Agricultural Policy (3) Values, goals and policy process. Economic rationale and effects of policy. Historical development and current characteristics of commodity, credit, food, and trade policy. Prerequisite: 320 or consent of instructor.

442 Agribusiness Management (3) Applications of advanced decision analysis concepts and tools to analyze management decision problems in farm and non-farm agribusiness settings. Case study work on strategic planning; assessing cost structure using budgeting and break-even analysis; evaluating profitability, liquidity, and solvency using financial statements; analyzing investments using capital budgeting. Prerequisite: 342 or consent of instructor.
450 Agricultural Industry Analysis and Forecasting (3) Analytical tools for decision making in agricultural sector; analysis of commodity supply and demand conditions; economic modeling; market forecasting; analysis of temporal and spatial patterns. Prereq: 320, Statistics 201, or consent of instructor.

470 Natural Resource Economics (3) Nature of natural resources; economic 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 environmental quality. Prereq: Economics 201.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

503 Managerial Economics for Agribusiness (3) Practical application of economic concepts to agribusiness management and marketing decisions. 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 uncertainty. Students will use Microsoft Excel to analyze managerial economic questions.

505 Microeconomic Analysis (3) Theory of utility maximization and demand, production, cost, firm behavior, and supply; price in product and factor markets; efficiency and welfare. Prereq: Calculus, Intermediate Microeconomics, or equivalent.

520 Research Methods in Agricultural Economics (1) An overview of the logic and process of economic inquiry. Topics covered include the relationship between theory and applied research, problem formulation, definition of research problems, development of research problem statements with goals and objectives, and presentation and interpretation of results. Prereq: Graduate standing or consent of instructor.

524 Econometric Methods in Agricultural Economics (3) Application of statistical methods to agricultural economic models; estimation of supply, demand and production functions; microeconomic forecasting models; interpretation of results. Prereq: Regression and Correlation Methods or consent of instructor.

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. Prereq: Basic Calculus, 524.

530 Agricultural Policy Analysis (3) Evaluation of public policy as related to agricultural industry and rural areas. Prereq: 505 and Economics 513 or consent of instructor.

542 Advanced Agribusiness Production Decisions (3) Decision theory concepts and tools for analyzing agribusiness decision problems; modeling choices using decision trees and sensitivity analysis; incorporating uncertainty into decision models using probability theory and simulation; modeling preferences using utility theory and risk attitudes. Prereq 505 or equivalent.

550 Advanced Agribusiness Marketing (3) Use of economic concepts in agribusiness marketing decisions. Analysis of agricultural markets; buyer behavior 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. Prereq: 505 or equivalent.

570 Advanced Natural Resource Economics (3) Analysis of natural resource allocation issues; applied welfare economics, external effects and evaluation of public policy. Prereq: 470, Economics 511, or consent of instructor.

593 Special Topics in Agricultural Economics (1-3) Topics to be assigned. Prereq: Consent of instructor. May be repeated. Maximum 9 hours. Satisfactory/No Credit grading only.

595 Professional Internship (6) Supervised internship experience with appropriate agribusiness firm.

670 Advanced Topics in Natural Resource Economics (3) Applications of microeconomic theory to the use, allocation and control of scarce, exhaustible, and renewable natural resources, including soil, water, minerals, forests, and fish, in both static and dynamic contexts. Optimal control theory, dynamic programming, supply of, and demand for, natural resources, social versus private decisions, market and non-market considerations, regulation, uncertainty, property rights, equity considerations, and landscape pattern and change. Prereq: 505 or equivalent, or consent of instructor.

Agriculture and Natural Resources (088)

491 International Experience in Agriculture and Natural Resources (1-15) 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. Satisfactory/No Credit or letter grade.

507 Professional Development Seminar (1) Planning and executing graduate research programs; ethics and professionalism; graduate program procedures and resources. Satisfactory/No Credit grading only. (Same as Animal Science 507; Entomology and Plant Pathology 507; Food Science and Technology 507; Plant Sciences 507.)

512 Teaching Internship in Agriculture and Natural Resources (1) Supervised experience in teaching: test preparation and evaluation of agriculture students. May be repeated. Maximum 2 hours for MS students; 4 hours for PhD students.

American Studies (099)

423 Geography of American Popular Culture (3) (See Geography 423.)

510 Special Topics (3) 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. 1 hour and 2 labs. Prereq: 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. 2 hours and 1 lab. Prereq: 330 or equivalent and 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. 2 hours and 1 lab. Prereq: 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 improvement programs. Management evaluated in terms of production responses and economic returns. 2 hours and 1 lab. Prereq: Completion of 300-level core courses or equivalent or consent of instructor.

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 programs. Management evaluated in terms of production responses and economic returns. 2 hours and 1 lab. Prereq: Completion of 300-level core courses or equivalent 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. 2 hours and 1 lab. Prereq: Completion of 300-level core courses or equivalent or consent of instructor.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

507 Professional Development Seminar (1) (See Agriculture and Natural Resources 507.)

511 Special Problems in Animal Science (1-4) Prereq: Consent of instructor and department head. May be repeated. Maximum 9 hours.


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. Prereq: Animal Nutrition, Feeds, and Ration Formulation or consent of instructor.

535 Ruminology (2) Anatomy, physiology, and microbiology of rumin ecosystem: microbial fermentation and metabolism of polysaccharides, lipids and nitrogen. Prereq: 530 or consent of instructor.

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. Prereq: Plant Sciences 471 or equivalent; knowledge of software package on micro- or mainframe computer. (Same as Plant Sciences 571.)

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. 2 hours and 1 lab. Prereq: 571 or equivalent.

596 Seminar on Advanced Topics in Animal Science (1) Required of all first- and second-year MS students. May be repeated. Maximum 2 hours.

600 Doctoral Research and Dissertation (3-15) P/NP only.

621 Advanced Topics in Animal Physiology (1-4) Recent advances and concepts, research techniques, current problems. May be repeated. Maximum 6 hours.

631 Advanced Topics in Animal Nutrition (1-4) Recent advances and concepts, research techniques, current problems. May be repeated. Maximum 6 hours.

651 Advanced Topics in Animal Anatomy (1-4) Current and future research methodology, laboratory situation, recent advances in quantitative techniques for gross and microscopic anatomy. Prereq: Consent of instructor. May be repeated. Maximum 6 hours. (Same as Comparative and Experimental Medicine–Veterinary Medicine 651.)

652 Disorders of the Endocrine System (2) Pathological and physiological aspects of diseases; endocrine glands of various animal species. Prereq: 520 or consent of instructor. (Same as Comparative and Experimental Medicine–Veterinary Medicine 652.)

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. May be repeated. Maximum 6 hours.

696 Seminar (1) Advanced topics in animal science. Required of all first- and second-year PhD students. 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. Prereq: 130.

411 Linguistic Anthropology (3) Basic linguistic concepts applied to research in cultural anthropology; investigation of relationships between language and culture. Prereq: 130 or Linguistics 200. (Same as Linguistics 411.)

412 Folklore in Anthropology (3) Introduction to anthropological study of folklore, using folklore and folk life materials from various tribal, peasant, and complex societies. Prereq: 130 or consent of instructor.

413 Dynamics of Culture (3) Major forms of culture change, ranging from evolution and diffusion to religious revitalization and political revolt. Continuity and change in diverse cultural settings through use of archaeological, ethnohistoric, and contemporary cases. Prereq: 130 or consent of instructor.

414 Political Anthropology (3) 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. Relationship between actors (individuals) and structures. Encapsulation of traditional political forms and systems within modern states. Prereq: 130 or 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. Prereq: 130 or consent of instructor.

431 Ethnographic Research (3) Conceptual and practical exploration of methods and techniques cultural anthropologists use in fieldwork. Prereq: 130 or 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 prereq: 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. Paleolithic and Mesolithic chronology and lifeways. Prereq: 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. Mesolithic, Neolithic, and Metal Age Lifeways in Africa, Europe, and Asia. Prereq: 120 or consent of instructor.

464 Principles of Zooarchaeology (3) Basic osteological studies of major vertebrate groups; aboriginal use of animals in subsistence and culture. Identification and interpretation of archaeologically derived molluscan and vertebrate remains; introduction to laboratory use of comparative collections. Prereq: 120 or consent of instructor.

465 Urban Archaeology (3) Field archaeology and interpretation of archaeological remains on historic urban sites in U.S. Lectures and field and laboratory research on urban sites in East Tennessee. Recommended prereq: 361.

480 Human Osteology (4) Intensive examination of human skeleton. Prereq: 110 or consent of instructor. 3 hours and 1 lab.

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.)


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. Prereq: 110 or consent of instructor.

500 Thesis (1-15) P/NP only.

501 Graduate Research (1-9) Independent investigation of special problems in anthropology. 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. May be repeated. Satisfactory/No Credit grading only.

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. Prereq: 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. Prereq: Consent of instructor. May be repeated. Maximum 9 hours.

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. Prereq: Consent of instructor.

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. 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. 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. May be repeated. Maximum 9 hours.

530 Fieldwork in Archaeology (3-9) Practicum in surveying, excavating, processing, and analysis of archaeological data. Prereq: Consent of instructor. May be repeated. Maximum 9 hours.

550 Contemporary Issues in Anthropology (1-3) Review of recent directions in method and theory in anthropology. 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. 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.

582 Paleanthropology (4) Fossil record from origin of hominids to appearance of anatomically modern humans. Functional morphology and phylogenetic relationships of fossil humans. Prereq: 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. Prereq: 480.

585 Laboratory Studies in Biological Anthropology (3) Topical coverage of laboratory methods in biological anthropology. Prereq: Consent of instructor. May be repeated. Maximum 9 hours.

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. Prereq: Consent of instructor.

591 Foreign Study (1-15) See College of Arts and Sciences.

592 Off-Campus Study (1-15) See College of Arts and Sciences.

593 Independent Study (1-15) See College of Arts and Sciences.

600 Doctoral Research and Dissertation (3-15) P/NP only.

601 Advanced Graduate Research (1-6) Independent investigation of special problems in anthropology by advanced graduate students. May be repeated. Maximum 12 hours. Only 3 hours may count toward 600-level requirement.

611 Advanced Seminar in Cultural Anthropology (3) Critical evaluation of current issues in theory and data interpretation. May be repeated. Maximum 6 hours.

660 Advanced Seminar in Archaeology (3) Selected topics in prehistoric and historic archaeology. May be repeated. Maximum 6 hours.

690 Selected Topics in Physical Anthropology (3) For doctoral students in biological anthropology. May be repeated. Maximum 6 hours.

691 Selected Topics in Paleanthropology (3) May be repeated. Maximum 6 hours.

695 Gross Human Anatomy (9) Skeleton, muscles, and cardiovascular system. Dissection of cadavers. 5 hours and 5 labs. Prereq: 480 or Human Biology.

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. Prereq: 403.

406 Ideas in Architecture (3) Historical and critical review of major ideas of architecture through the ages. 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 through lectures, readings, essays, and sketch studies. 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. Pre-historic times to present throughout world. Fertile Crescent; 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.

417 The International Style (3) Survey of architecture of early modern movement, primarily in Europe and America, 1900-1940.

420 History of American Architecture (3) Consideration of architecture and city planning in the United States from the pre-Columbian period until the mid-twentieth century.

425 Special Topics in Architecture (1-6) Faculty initiated courses. Topics vary. Prereq: Consent of instructor. May be repeated. Maximum 12 hours.

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. Prereq: 231 or consent of instructor.

433 Computer Applications in Design III (3) Integration of three-dimensional modeling and technical analysis using computer to augment building design. Independent studies under faculty direction. Prereq: Consent of instructor.

445 Advanced Lighting (3) In-depth analysis and innovative concepts in design of lighting. Prereq: 342.

463 Architectural Development (3) Principles and practice of architect as developer. Impact of economics, finance and urban policy on design and development of real estate. Open to all students.

473 Architectural Photography (3) Photography as design, research, and presentation medium. Application of photographic techniques, printing and processing. Color and black and white.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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.

504 Issues in Preservation (3) Architectural issues: preservation, restoration and conservation of historic structures. Prereq: Consent of instructor.

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. Prereq: 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.

525 Special Topics in Architecture (1-3) Student- or instructor-initiated course. May be repeated. Maximum 9 hours. Satisfactory/No Credit or letter grade.

526 Directed Readings in Architecture (3) Readings on topics of interest: primary texts, history, theory, urban issues, technology and professional practice. Prereq: Consent of instructor. May be repeated. Maximum 9 hours.

528 Topics in Architectural History and Theory (3) Historical topics, ideas, and theories in architecture. Prereq: Consent of instructor.

532 Computer Applications for Architecture (3) Advanced use of computers in architecture. Prereq: Consent of instructor.

545 Principles of Environmental Control I (3) Introduction to heating, ventilating, air conditioning, solar energy, plumbing, and fire-protection systems. Prereq: 180 and Master of Architecture admission.

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. Prereq: 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 functions within professional firms; legal and ethical concerns facing practitioners today; and introduction to special obligations and privileges of design professional.


591 Foreign Study (1-9)
592 Off-Campus Study (1-9)
593 Independent Study (1-9)

ART (140)

481 Museum Studies I: Museums, Purpose and Function (3) Development of museums of art, history, and 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. Prereq: 481 or consent of instructor. (Same as Anthropology 482.)

484 Museum Studies III: Field Projects (1-12) Special field projects: restoration, preservation, registration, and other related research on or off campus. Prereq: 481 and 482, and consent of instructor. May be repeated. Maximum 12 hours. (Same as Anthropology 484.)

499 Special Topics (3) Student- or instructor-initiated course offered at convenience of department. 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

507 Professional Practices: Teaching Internship (1) Individual study in development of skills and methodology in teaching studio courses. For students who are not GTAs. Prereq: Consent of instructor. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

591 Foreign Study (1-15) See College of Arts and Sciences.
592 Off-Campus Study (1-15) See College of Arts and Sciences.
593 Independent Study (1-15) See College of Arts and Sciences. Prereq: Consent of instructor.

595 Visiting Artist Seminar (2) Contemporary art issues by different visiting artists. May not be used toward art history requirement. May be repeated. Maximum 8 hours.

ART CERAMICS (135)


429 Ceramics: Special Topics (3) Student- or instructor-initiated course offered at convenience of department. Prereq: Consent of instructor. May be repeated. Maximum 12 hours.

521 Graduate Ceramics I (2-5) May be repeated. Maximum 10 hours.

525 Graduate Ceramics II (2-5) May be repeated. Maximum 10 hours.

593 Independent Study (1-15) See College of Arts and Sciences. Prereq: Consent of instructor.

595 Visiting Artist Seminar (2) Contemporary art issues by different visiting artists. May not be used toward art history requirement. May be repeated. Maximum 8 hours.
599 Projects in Lieu of Thesis (10) Prereq: All graduate course work and successful second year evaluation by graduate faculty. May be repeated. Maximum 20 hours. Satisfactory/No Credit grading only.

ART DESIGN/GRAPHIC (136)

405 Computer Enhanced Graphic Design (3) Exploration of new technologies and their significance to graphic design. Prereq: 351, 356 with a grade of C or better and consent of instructor. May be repeated. Maximum 12 hours.

451 Advanced Graphic Design (3) Theory and techniques of visual problem-solving as applied to advanced applications of graphic design. Prereq: 352 with a grade of C or better.

452 Graphic Design Seminar (3) Discussion of design and professional issues: politics, economics, and ethics for graphic designer. Culminates in student-initiated project. Prereq: 451 with a grade of C or better.

453 Independent Study (1-15) Prereq: Consent of instructor. May be repeated. Maximum 10 hours.

454 Editorial Illustration (3) Media and techniques as applied to advertising illustration. Prereq: 254 and successful completion of any portfolio review.

456 Graphic Design Practicum (1-12) Practical work experience in graphic design field. Only by prearrangement with department. Prereq: Consent of instructor. May be repeated. Maximum 12 hours.

458 Special Topics in Graphic Design (3) Student- or instructor-initiated course offered at convenience of department. Prereq: Consent of instructor. May be repeated. Maximum 12 hours.

510 History and Philosophy of Art Education (3) United States from 1800’s to present. Prereq: Consent of instructor.

520 Studies in Art Education (3) Issues and topics current to the field of art education. Prereq: Consent of instructor.

530 Production and Critical Analysis of Art (3) Relationship of production and critical analysis of works of art to discipline-based art education.

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. Aesthetics and use of photography as medium for artistic expression.

411 Art of South and Southeast Asia (3) Survey of art and architecture of Indian subcontinent and Southeast Asia from 2000 B.C. to 20th century. Major achievements of each period in religious, political, and social contexts.

415 Art of China (3) Survey of art and architecture of China from Neolithic period to 20th century. Major achievements of each period in religious, political, and social contexts.

416 Chinese Art of the 20th and 21st Centuries (3) Survey of Chinese art from the late nineteenth century through the present. Hong Kong, Taiwanese, and expatriate artists are also considered.

419 Art of Japan (3) Survey of art and architecture of Japan from Neolithic period to 20th century. Major achievements of each period in 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. Writing-emphasis course. (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. Writing-emphasis course. (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 Durer; early printmakers. Writing-emphasis course. (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. Writing-emphasis course.

451 Art of Italy, 1250-1450 (3) Development of exploration of naturalism. Revival of antiquity and development of theories of perspective in Early Renaissance. Duccio, Giotto, Masaccio, Donatello, Botticelli. Writing emphasis course. (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: Velazquez. Writing-emphasis course.
454 Renaissance and Baroque Theory (3) Theory of Western art in early modern period: development and evolution in European Art during Renaissance and Baroque periods. Prereq: 172, 173, or consent of instructor.

461 Art of Southern and Eastern Africa (3) Art traditions of eastern and southern regions of Africa. Sculpture, painting, pottery, textiles, architecture and human adornment. Some ancient Stone and Iron Age traditions. Diverse ethnic and regional art traditions practiced in the area from 19th century to present. (Same as African and African-American Studies 461.)

462 Art and Archeology of Ancient Africa (3) Historical art traditions of sub-Saharan Africa. Prehistoric rock paintings; art from archaeological sites and ancient kingdoms. First and second millennia B.C. for early terracotta sculpture and rock paintings; 11th through 19th centuries A.D. for later ancient kingdoms. (Same as African and African-American Studies 462.)

463 Arts of the African Diaspora (3) Aesthetic, philosophical and religious patterns of African descendants of Brazil, Surinam, Caribbean and United States. Full range of art forms: sculptural and performance traditions, architecture, textile, basketry and pottery art forms. (Same as African and African-American Studies 463.)

464 Oceanic Art (3) Concentrated study of selected sculpture, textiles, architecture 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.

471 History of North American Art (3) Landmarks in painting, architecture, sculpture, and design from prehistory to 1900.

472 History of 20th-Century American Art (3) Developments in architecture, painting, and design from 1900.

473 19th-Century American Painting (3) From West and Copley to emergence of “The Eight.”

474 Theory of 20th-Century Art in Europe and America (3) Theoretical basis for modern movement. Analysis and discussion of individual works of art in light of contemporary writings by artists and theorists. Prereq: 172, 173, or consent of instructor.


476 History of 20th-Century Painting and Sculpture in Europe (3) Development of Modern and Post-Modern movements in Europe. Investigation of progression of abstraction through more recent conceptual trends. Analysis of work of individual artists such as Picasso, Matisse, and others.

479 Special Topics in Art History (3) Student- or instructor-initiated course offered at convenience of department. May be repeated. Maximum 12 hours.

483 History of American Sculpture (3) American sculpture from prehistory to 1960s.


489 Studies in Art History (3) Concentration in individually selected area. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

571 Studies in Medieval Art (3) Art and architecture of Middle Ages: major monuments from Byzantium or western Europe. Prereq: MFA candidate or consent of instructor. May be repeated with consent of department. Maximum 6 hours.

572 Studies in Italian Renaissance Art (3) Art and architecture of 14th, 15th, and/or 16th centuries in Italy. Early or High Renaissance or Mannerist periods. Prereq: MFA candidate or consent of instructor. May be repeated with consent of department. Maximum 6 hours.

573 Studies in Baroque Art (3) 17th-century art and architecture: major artists and works from southern or northern Europe. Prereq: MFA candidate or consent of instructor. May be repeated with consent of department. Maximum 6 hours.

574 Studies in Modern Western Art (3) Selected topics in 19th- and 20th-century western art. Prereq: MFA candidate or consent of instructor. May be repeated with consent of department. Maximum 6 hours.

575 Studies in Modern American Art (3) Selected topics in 19th- and 20th-century American art. Prereq: MFA candidate or consent of instructor. May be repeated with consent of department. Maximum 6 hours.

576 Studies in Asian Art (3) Selected topics in Japanese or Chinese Art. Prereq: MFA candidate or consent of instructor. May be repeated with consent of department. Maximum 6 hours.

579 Special Topics in Art History (3) Student- or instructor-initiated course offered at convenience of department. Prereq: MFA candidate or consent of instructor. May be repeated with consent of department. Maximum 9 hours.

ART MEDIA ARTS (134)


433 History of Film and Modern Art (3) Study of development and interaction between cinematic arts and visual arts within context of modern art history. Available for Art History credit. (Same as Cinema Studies 433.)

435 Cinematography as Art (3) Continued development of concepts and techniques for creation of film as art form: individual projects. Prereq: 235, 330, or consent of instructor. May be repeated. Maximum 9 hours.

436 Video Art (3) Continued development of concepts and techniques for creation of video works as art form: individual projects. Prereq: 236, 330, or consent of instructor. May be repeated. Maximum 9 hours.

439 Special Topics in Media Arts (3) Student- or instructor-initiated course offered at convenience of department. May be repeated. Maximum 12 hours.

441 Digital Photography II (4) Continuation of exploration and implications of use of computer in photography. Prereq: 330, 341, and consent of instructor.

442 Large Format Photography II (4) Studio course that continues exploration of use of large format camera in photography. Prereq: 330, 342, and consent of instructor.

531 Photography I (2-6) May be repeated. Maximum 10 hours.

532 Photography II (2-6) May be repeated. Maximum 10 hours.

535 Media Arts I (2-6) May be repeated. Maximum 10 hours.

536 Media Arts II (2-6) May be repeated. Maximum 10 hours.

577 Studies in Media as Art (3) Selected topics in theory and history of media as art form. May be repeated. Maximum 9 hours.

593 Independent Study (1-15) See College of Arts and Sciences. Prereq: Consent of instructor.
595 Visiting Artist Seminar (3) Contemporary art issues by different visiting artists. May not be used toward art history requirement. May be repeated. Maximum 12 hours.

599 Projects in Lieu of Thesis (10) Prereq: All graduate course work and successful second year evaluation by graduate faculty. May be repeated. Maximum 20 hours. Satisfactory/No Credit grading only.

ART PAINTING (138)

413 Painting IV (6) Advanced painting, individual concepts and personal expression with varied media. Prereq: 313. May be repeated. Maximum 12 hours.


419 Special Topics in Drawing and Painting (3) Student- or instructor-initiated course offered at convenience of department. Prereq: Consent of instructor. May be repeated. Maximum 12 hours.

513 Graduate Painting I (2-6) May be repeated. Maximum 10 hours.

514 Graduate Painting II (2-6) May be repeated. Maximum 10 hours.

515 Graduate Watercolor I (2-6) May be repeated. Maximum 10 hours.

516 Graduate Watercolor II (2-6) May be repeated. Maximum 10 hours.

593 Independent Study (1-15) See College of Arts and Sciences. Prereq: Consent of instructor. May be repeated. Maximum 12 hours.

595 Visiting Artist Seminar (3) Student- or instructor-initiated course offered at convenience of department. Prereq: Consent of instructor. May be repeated. Maximum 12 hours.

599 Projects in Lieu of Thesis (10) Prereq: All graduate course work and successful second year evaluation by graduate faculty. May be repeated. Maximum 20 hours. Satisfactory/No Credit grading only.

ART PRINTMAKING (132)

461 Advanced Print Workshop (1-6) Individual and collaborative studio work encompassing theory and practice in intaglio, lithography, relief printing, screenprinting, monoprint, papermaking, book arts, and/or photo-print processes. Prereq: 361 or consent of instructor. May be repeated. Maximum 12 hours.

469 Special Topics in Printmaking (3-6) Student- or instructor-initiated course offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 12 hours.

561 Printmaking I (2-6) Directed exploration of any or all matrix-based imaging: intaglio, relief, lithography, screen printing, photo-print methods, and monoprint. Prereq: 561. May be repeated. Maximum 10 hours.

562 Printmaking II (2-6) Directed exploration of any or all matrix-based imaging: intaglio, relief, lithography, screen printing, photo-print methods, and monoprint. Prereq: 561. May be repeated. Maximum 10 hours.

563 Printmaking III (2-6) Directed exploration of any or all matrix-based imaging: intaglio, relief, lithography, screen printing, photo-print methods, and monoprint. Prereq: 561, 562, 563.

564 Printmaking IV (2-6) Directed exploration of any or all matrix-based imaging: intaglio, relief, lithography, screen printing, photo-print methods, and monoprint. Prereq: 561, 562, 563.

593 Independent Study (1-15) See College of Arts and Sciences. Prereq: Consent of instructor.

595 Visiting Artist Seminar (2) Contemporary art issues by different visiting artists. May not be used toward art history requirement. May be repeated. Maximum 8 hours.

599 Projects in Lieu of Thesis (10) Prereq: All graduate course work and successful second year evaluation by graduate faculty. May be repeated. Maximum 20 hours. Satisfactory/No Credit grading only.

ART SCULPTURE (143)

441 Advanced Sculpture (3-6) Individual development of sculptural problems and techniques. Students work independently while participating in group projects, critique, and discussion. Prereq: 6 hours of 300 level sculpture. May be repeated. Maximum 12 hours.

449 Special Topics in Sculpture (3) Student- or instructor-initiated course offered at convenience of department. Prereq: Successful completion of any portfolio review. May be repeated. Maximum 12 hours.

541 Graduate Sculpture I (2-6) May be repeated. Maximum 10 hours.

542 Graduate Sculpture II (2-6) May be repeated. Maximum 10 hours.

593 Independent Study (1-15) See College of Arts and Sciences. Prereq: Consent of instructor. May be repeated. Maximum 12 hours.

595 Visiting Artist Seminar (2) Contemporary art issues by different visiting artists. May not be used toward art history requirement. May be repeated. Maximum 8 hours.

599 Projects in Lieu of Thesis (10) Prereq: All graduate course work and successful second year evaluation by graduate faculty. May be repeated. Maximum 20 hours. Satisfactory/No Credit grading only.

ASIAN LANGUAGES (144)

431 Readings in Chinese Literature (3) Prereq: Mastery of intermediate-level Chinese or consent of instructor. May be repeated. Maximum 9 hours. (Same as Chinese 431.)

451 Readings in Pre-Modern Japanese Literature (3) Prereq: Mastery of intermediate-level Japanese or consent of instructor. (Same as Japanese 451.)

452 Readings in Modern Japanese Language Literature (3) Prereq: Mastery of intermediate-level Japanese or consent of instructor. (Same as Japanese 452.)

ASIAN STUDIES (145)

471 Selected Topics in Asian Studies (3) Content varies. May be repeated. Maximum 9 hours.

510 Special Topics (3) May be repeated. Maximum 6 hours.

ASTRONOMY (150)

411 Astrophysics (3) Development of analytical physical models of galactic structure of universe, stellar and interstellar matter, and planetary systems. Topical and interdisciplinary, consideration of quasars, pulsars, black holes and current developments in field. Acceptable for major credit in physics. Prereq: Physics 136 or 138 or 222 or 232, and 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. May be repeated with consent of department. Maximum 9 hours.
AUDIOLGY AND SPEECH PATHOLOGY (160)

431 Stuttering (3) Nature, appraisal and treatment. Prereq: 300 or consent of instructor.

433 Observation of Clinical Practice (1) Prereq: 320 or consent of instructor.

434 Clinical Practice in Speech-Language Pathology II (1-4) Prereq: 433 and consent of instructor. Enrollment for fewer than 2 hours must have prior departmental approval.

435 Introduction to Speech Sound Disorders (3) Etiology, diagnosis, and treatment of articulatory and phonological disorders. Prereq: 300, 305, or consent of instructor.


455 Problems in Speech Pathology (1-3) Prereq: Consent of instructor.

461 Introduction to Language Pathology in Children (3) Etiology, diagnosis, and treatment of speech and language disorders. Prereq: 300, 306, or consent of instructor.

473 Introduction to Audiologic Assessment (3) Basic principles of clinical audiometry; pure tone, speech, masking and overview of special auditory tests. Prereq: 300 and consent of instructor.

475 Appraisal of Speech and Language Disorders (3) Diagnostic procedures for children and adults with speech and language problems including observation and practice with diagnostic tests. Prereq: 300 and consent of instructor.

494 Introduction to Aural Habilitation/Rehabilitation of the Hearing Impaired (3) Psychosocial aspects, amplification components/characteristics, assistive devices, speech acoustics, speech perception, speech reading, parent-infant, preschool school years of children, communication impairments/handicaps/remediation of adults, effects of aging/remediation on the elderly, and case studies. Prereq: 305, 473, or equivalents or consent of instructor.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated.

Satisfactory/No Credit grading only.

506 Neural Bases of Speech and Language (3) Structure and function of central and peripheral nervous systems, role in speech and language. Prereq: 306.

507 Anatomy and Physiology of Hearing (3) Structure and function of the peripheral and central auditory systems, and their roles in mediating auditory processes. Prereq: 473 or equivalent or consent of instructor.

511 Introduction to Research in Speech and Hearing (3) Analysis of research techniques, fundamentals of statistics, application of statistics, and completion of a proposal and hypothetical pilot research project.

512 Clinical Practice in Audiology (1-4) Coreq: 546. May be repeated. Maximum 24 hours.

515 Practicum in Aural Rehabilitation (1-4) Prereq: 473 and 494 or equivalent. May be repeated. Maximum 9 hours.

516 Language Sample Analysis (3) Methods of characterizing and describing language behaviors. Prereq: 320 or equivalent.
544 Amplification for Adults with Hearing Impairment (3)  

545 Sound Measurement Techniques and Hearing Conservation (3)  
Techniques of measurement and analysis of sound: hearing conservation in schools and industry. Prereq: Consent of instructor.

546 Audiologic Assessment (3)  
Theoretical bases for behavioral audiometry and acoustic immittance measurement.

547 Special Problems in Audiology (1-3)  
Topics vary. Prereq: 473 or equivalent and consent of instructor. May be repeated. Maximum 6 hours.

552 Seminar in Speech Pathology (2-3)  
Current significant research in speech pathology. Topics vary. Prereq: 9 hours in speech pathology. May be repeated with consent of department. Maximum 9 hours.

555 Special Problems in Speech-Language Pathology (1-3)  
Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

556 Independent Study in Speech-Language Pathology (1-3)  
Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

558 Phonological Disorders (3)  
Current theories and approaches to assessment and intervention for individuals with difficulty acquiring or using speech sound system of English. Prereq: 435 or equivalent or consent of instructor.

561 Child Language Disorders (3)  
Current literature on assessment and intervention techniques for young language learners. Prereq: 461 or equivalent or consent of instructor.

563 Language Disorders: Birth to Three (3)  
Overview of family-focused, interdisciplinary intervention process. Assessment/treatment of infants, toddlers, and preschoolers. Description of disabilities and resulting communication disorder. Prereq: 461 or equivalent or consent of instructor.

574 Pediatric Audiology (3)  

576 Physiologic Assessment of the Auditory System I (3)  
Otoacoustic emissions, electrocochleography, and auditory brainstem responses. Anatomical origins, principles, and applications. Use of these responses in evaluation of auditory function and determination of site-of-lesion. Prereq: 507, 546 or equivalents, or consent of instructor.

577 Vestibular Disorders (3)  
Anatomy, physiology, and pathophysiology of vestibular system and other systems that contribute to balance. Practicum in electronystagmography. Prereq: 507, 542, 546, 576 or equivalents or consent of instructor.

581 Assessment of Central Auditory Processing (3)  
Overview of current central auditory processing disorder (CAPD) literature and assessment procedures, with emphasis on a holistic view by combining perceptual, electrophysiological, linguistic, and cognitive measurements. Prereq: 546, 574, 594 or equivalents or consent of instructor.

582 Speech and Language Services in School (3)  
Organization and implementation of speech and language programs in schools.

583 Physiologic Assessment of the Auditory System II (3)  
Middle-latency, long-latency, and event-related potentials. Neurophysiological mechanisms, principles, and applications. Use of these potentials in evaluation of neurological and cognitive function. Prereq: 576 or equivalent or consent of instructor.

584 Amplification for Children with Hearing-Impairment (3)  
Study of strategies for selecting and fitting amplification systems for children; outcome measures and service coordination. Prereq: 543, 544, 574 or equivalents or consent of instructor.

585 Cochlear Implants (3)  
Overview of cochlear implants, focusing on theory of auditory stimulation and cochlear implant systems; candidacy, surgical preparation, and follow-up/outcome measures; the rehabilitation process; and cochlear implant case presentations. Prereq: 507, 576, 583 or equivalents or consent of instructor.

586 Standards and Practice Issues in Audiology (3)  
Overview of professional practice standards, ethics, medical/legal issues, business practices, and reimbursement procedures in audiology. Prereq: 512 or equivalent or consent of instructor.

591 Foreign Study (1-15)  
See College of Arts and Sciences.

592 Off-Campus Study (1-15)  
See College of Arts and Sciences.

593 Independent Study (1-15)  
See College of Arts and Sciences.

594 Aural Habilitation/Rehabilitation of the Hearing-Impaired (3)  
Study of grieving process, counseling, group and individual amplification systems, classroom/speech acoustics, central auditory problems, therapy methods for habilitation and rehabilitation, speech reading, school-based programs, programs for adults and the elderly; student research reports/case studies. Prereq: 473, 494 or equivalents or consent of instructor.

595 The Verbotonal System: Auditory/Speech Perception (3)  
Innovative theory, therapy procedures, and SUVAG amplification/filters for diagnosis/evaluation/remediation of spoken language/listening skills of hearing-impaired children/adults: use of rhythms, movements, and suprasegmentals; special audiometric tests, acoustic filters, correcting misarticulations through optimal listening; central auditory treatment; second (foreign) language through listening/spoken language; relationship of concepts to conventional concepts/practice; student research reports. Prereq: 305, 473, 494 or equivalents or consent of instructor.

600 Doctoral Research and Dissertation (3-15)  
P/NP only.

601 Experimental Phonetics (3)  
Acoustical and perceptual analyses of speech production and overall oral communication. Prereq: 517 or consent of instructor.

602 Psychoacoustics (3)  
Auditory perception and reception of acoustic stimuli. Prereq: 507 or equivalent 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. Prereq: 507 or equivalent or consent of instructor.

605 Speech Perception and Hearing Impairment (3)  
Study of perception of speech stimuli, with particular emphasis on the effects of hearing impairment on perception.

607 Advanced Anatomy and Physiology of the Ear (3)  

611 Experimental Design in Speech and Hearing (3)  
Analysis of experimental design in theses and related journals. Generation of experimental designs. Prereq: Consent of instructor.

613 Externship in Audiology (1-9)  
Off-campus clinical training experience. Prereq: Consent of academic advisor. May be repeated. Maximum 36 hours.

626 Advanced Seminar in Neurologically-based Communication Disorders (3)  
Topics vary. Prereq: 520, 539, 524 or consent of instructor. May be repeated. Maximum 6 hours.

650 Advanced Seminar in Audiology (3-6)  
Topics vary. Prereq: Consent of instructor. May be repeated. Maximum 9 hours.
652 Advanced Seminar in Speech and Language (2) Topics vary: aberrations of voice, articulation, speaking time and rhythm, language development or use, and language symbolization. Prereq: Consent of instructor. May be repeated. Maximum 8 hours.

655 Practicum in College Teaching (1-3) Supervised experience in college teaching. Prereq: Consent of instructor. May be repeated. Maximum 6 hours. Satisfactory/No Credit grading only.

656 Directed Research (1-4) Participation in ongoing or dissertation research. Prereq: Consent of instructor. May be repeated. Maximum 9 hours.

657 Directed Study in Speech Pathology (1-3) Prereq: Consent of instructor. May be repeated. Maximum 9 hours.

658 Directed Study in Audiology (1-3) Prereq: Consent of instructor. May be repeated. Maximum 9 hours.

659 Directed Study in Speech Science (1-3) Prereq: Consent of instructor. May be repeated. Maximum 9 hours.

660 Directed Study in Hearing Science (1-3) Prereq: Consent of instructor. May be repeated. Maximum 9 hours.

661 Advanced Seminar: Language Disorders in Children (3) Topics vary. Prereq: 561 or consent of instructor. May be repeated. Maximum 6 hours.

662 Advanced Seminar in Audiologic Assessment (3) Synthesis of information on audiologic and vestibular assessment and application of clinical cases. Prereq: 542, 546, 574, 576, and 577, or equivalents or consent of instructor.

663 Advanced Seminar in Aural Habilitation/Rehabilitation (3) Synthesis of information on audiological habilitation and rehabilitation cases. Prereq: 543, 544, 584, 594, or equivalents 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. Prereq: 543, 544, 584, 594, or equivalents or consent of instructor.

**AVIATION SYSTEMS (169)**

500 Thesis (1-15) P/NP only.

501 Aviation Systems: An Overview (3) Aviation systems, present and future. Socioeconomic base, 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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. Prereq: 501.


505 Governmental Policies for Aviation (3) Theoretical and legal basis for economic and governmental regulation of aviation. Historical and legislative development of aviation regulatory agencies, organizational structure, administrative and enforcement procedures. Prereq: 501.

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, fuselages and frames, wings and ribs; laminated composite structures; elementary aeroelasticity.

510 Special Topics in Aviation Systems (3) Current problems. Prereq: Consent of instructor. May be repeated with consent.

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. Instrumentation and data reduction techniques.

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, performances, motivation, 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.


550 Project in Aviation Systems (3) Enrollment limited to aviation system students in non-thesis program. May be repeated. Maximum 3 hours allowed toward degree.

**BIOCHEMISTRY AND CELLULAR AND MOLECULAR BIOLOGY (188)**

401-402 Biochemistry-Molecular Biology I, II (4,4) 401—Amino acid structure and chemistry, protein structure and chemistry, protein folding, enzyme behavior and function, reaction mechanisms, catabolism and energy transfer, synthetic metabolism including photosynthesis, and protein transport. 402—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. Prereq: Biology 240, Chemistry 350, 360, 369.


404 Plant Molecular Biology (4) Introduction to current research approaches and methodologies in plant developmental biology and molecular genetics. Laboratory and lecture. Prereq: Biology 140 and 240 or equivalent.


421 Cell and Tissue Structure and Function (4) Study of animal cells and tissues at light and electron microscope levels. 2 hours and 2 labs. Prereq: Biology 140.

429 Cell Biology Laboratory (3) Series of open-ended, discovery-based exercises developed to design and test new drugs using modern cell biology and computer technologies. Experimental modules: techniques used in cell isolation, purification, culturing, fluorescent microscopy, receptor binding and signal transduction, apoptosis, cell cycle analysis, protein and steroid secretion, computer modeling, and state-of-the-art electron microscopy. Experiment design, execution, data analysis, and peer evaluation. Prereq/Coreq: 401 or 410.


465 Human Genetics (3) Genetic and molecular principles and problems of human inheritance. Prereq: Biology 240.

471-481 Biophysical Chemistry (3,3) Physicochemical principles with applications to biological systems. 471—Thermodynamics; chemical equilibrium; solution chemistry; transport; electrochemistry; kinetics; enzyme catalyzed reactions. 481—Elementary quantum chemistry; interactions of light with biological molecules; optical and magnetic spectroscopy; light scattering; case studies of selected macromolecules. Prereq: Chemistry 350, 360; Mathematics 125; General Biology or consent of instructor. (Same as Chemistry 471-481.)

480 Physiology of Exercise (3) (See Exercise Science 480.)

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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. Prereq: Prior knowledge of cell biology and biochemistry and/or 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. Prereq: 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. Prereq: 511.

515 Experimental Techniques I (2-4) Introduction to modern experimental methodology and instrumentation in biochemistry, molecular biology and cell biology, including cell culture; spectroscopy; microscopy; nucleic acid purification and analysis; protein assays; enzyme purification; electrophysiology; computer analysis of nucleic acid and protein sequences. Team-taught lecture/demonstration format. Primarily for departmental graduate students. May be repeated. Maximum 6 hours.

516 Experimental Techniques II (2-4) Laboratory rotations. Students work in laboratory of faculty member on clearly defined project. Written proposal and oral report. Primarily for departmental graduate students. Prereq: 515. May be repeated. Maximum 8 hours.

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. Prereq: 511 or consent of instructor.

520 Special Topics (1-3) Selected directed readings or special course in topics of current interest. Consult departmental listing for offerings. May be repeated with consent of instructor. Maximum 6 hours. Satisfactory/No Credit grading only.


525 Graduate Research Participation (3-12) Tutorial laboratory experience. 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. Prereq: Consent of instructors.

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. Prereq: Consent of instructor. May be repeated.

552 Physiology of Hormones (3) Cellular and organismal action of hormones in invertebrate and vertebrate animals. 2 hours and 1 lab. Prereq: Consent of instructor. Recommended prereq: 410.

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. Prereq: Consent of instructor. May be repeated.

561 Environmental Toxicology (3) (See Ecology and Evolutionary Biology 561.)

562 Introduction to Electron Microscopy - Transmission Electron Microscope (4) Practical application to techniques for preparation of biological samples for viewing in transmission electron microscopy. Use of microscope and ancillary equipment, darkroom techniques, preparation of materials for publication and special project. Two 3 hour labs. Admission limited only to departmentally approved graduate students.

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. 2 hours and 1 lab. Prereq: 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. Prereq: Consent of instructor. May be repeated.

578 Advanced Concepts in Genetics/Developmental Biology (3) Concepts related to genetics/developmental biology with information taken from current literature. Predominantly lecture format with student participation. Specific subject area to be announced. Prereq: Consent of instructor. May be repeated.

591 Foreign Study (1-15) See College of Arts and Sciences

592 Off-Campus Study (1-15) See College of Arts and Sciences

593 Independent Study (1-15) See College of Arts and Sciences

600 Doctoral Research and Dissertation (3-15) P/NP only.

601 Departmental Seminar (1) Invited speakers. Topics posted in advance. Required every semester in residence. Satisfactory/No Credit grading only.

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. Required every semester in residence. Satisfactory/No Credit grading only.

605 Journal Club in Neurophysiology/Physiology (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hours. Satisfactory/No Credit grading only.

606 Journal Club in Structural Biology/Biochemistry (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hours. Satisfactory/No Credit grading only.

607 Journal Club in Cellular/Molecular Biology (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hours. Satisfactory/No Credit grading only.

608 Journal Club in Genetics/Developmental Biology (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hours. Satisfactory/No Credit grading only.

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. Prereq: Consent of instructor. May be repeated. Maximum 4 hours.

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. Prereq: 511, 512 or consent of instructor. May be repeated. Maximum 9 hours.

BIOMEDICAL ENGINEERING (192)


430 Biomedical Engineering Laboratory (4) Experience with unique problems associated with making measurements and interpreting data in living systems; experiments: mechanical testing of biological materials, imaging and physiological measurements. Prereq: 310, 346 or consent of instructor.


494-495 Special Project in Biomedical Engineering (1-3,1-3) Problems related to recent developments and practice. May be repeated. Maximum 6 hours. Prereq: Junior or senior standing, consent of instructor.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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 excitable and excitable cells, lumped parameter and distributed-parameter cell models, linear electric properties of cells, and voltage gated ion channels. Prereq: 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. Prereq: Mechanical Engineering 231. (Same as Mechanical Engineering 531.)

541 Fluid Mechanics I (3) (See Mechanical Engineering 541.)

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. Prereq: Mechanical Engineering 231, Mechanical Engineering 321, or equivalent.

571 Biomechanics of Hard and Soft Tissue (3) (See Engineering Science 571.)

572 Biomedical Fluid Mechanics (3) (See Engineering Science 572.)

577 Neural Networks in Engineering (3) (See Nuclear Engineering 557.)

587 Dynamic Modeling and Simulation (3) (See Mechanical Engineering 587.)

590 Selected Biomedical Engineering Problems (2-6) Enrollment limited to students in non-thesis program. Prereq: Consent of advisor. May be repeated. Maximum 6 hours. Satisfactory/No Credit grading only.

598 Seminar (1) All phases of biomedical engineering, reports on current research at UTK and UTSl. May be repeated. Satisfactory/No Credit grading only.

599 Special Topics in Biomedical Engineering (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

600 Doctoral Research and Dissertation (3-15) P/NP only.

610 Advanced Topics in BME (3) Current research topics of interest in biomedical engineering. 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. Electrophoretic, electroosmotic flows, and diffusion-reaction. Electromechanical 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. Prereq: 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 multi-body 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. Prereq: 531. (Same as Mechanical Engineering 631.)

659 Advanced Mechanics of Materials II (3) (See Mechanical Engineering 659.)

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. Off-road vehicles and bioprocessing systems. 2 hours and 1 lab. Prereq: Mechanical Engineering 231, 321. Coreq: 321.

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. Prereq: Civil Engineering 390 or Aerospace Engineering 341.

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. 2 hours and 1 lab. Prereq: 321.

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. Laboratory experiments and design projects. 3 hours and 1 lab. Prereq: Electrical Engineering 301.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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. 2 hours and 1 lab. Prereq: Graduate standing in engineering.
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. May be repeated. Maximum 6 hours.

532 On-Site Domestic Wastewater Treatment, Dispersal and Reuse (3) Design and management of domestic on-site wastewater treatment and dispersal systems, use of the soil as a medium for final treatment and for wastewater dispersal, concepts of the decentralization of domestic wastewater management, and reuse of treated water for irrigation. 2 hours and 1 lab. Prereq: Civil Engineering 395 or consent of instructor. (Same as Biosystems Engineering Technology 532.)

541 Principles of Compost Engineering (3) Comprehensive study of composting: survey of installed systems; thermodynamics of composting; biology of composting; kinetics of heat inactivation; feed conditioning; aeration; substrate characteristics; process kinetics; and odor control. Design component. Prereq: Thermodynamics, heat and mass transfer.

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. 2 hours and 1 lab. Prereq: 451 or Electronics and Computer Circuits or equivalent. (Same as Environmental Engineering 543.)

545 Monitoring Hydrologic Phenomena (3) Application of instrumentation theory to monitoring hydrologic phenomena; strengths and weaknesses of current equipment and strategies; equipment operation and solution of environmental monitoring problems. 2 hours and 1 lab. Prereq: 416 (Same as Environmental Engineering 545.)

550 Selected Topics (1-3) Lecture/group discussion on specialized topics. May be repeated. Maximum 6 hours.

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. 2 hours and 1 lab. Prereq: Graduate standing in engineering, biological or physical sciences. (Same as Biosystems Engineering Technology 555.)

575 Applied Microbiology and Bioengineering (3) (See Chemical Engineering 575; Environmental Engineering 575; Microbiology 575.)

591 Environmentally-Sensitive Spray 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. Prereq: Consent of instructor.

600 Doctoral Research and Dissertation (3-15) P/NP only

603 Seminar (1) (See Environmental and Soil Sciences 603.)

619 Mathematical Modeling for Engineers (3) Describing physical and biological settings 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. Prereq: 519 and a course in differential equations, or consent of instructor.

636 Geospatial Methods for Environmental Research (3) Sampling and displaying the multidimensionality of environmental variables. Spatial and temporal sensing of the environment. Geostatistical mapping and interpretation; sampling theory; precision geomatic techniques for the environmental scientist and engineer. 2 hours and 1 lab. Prereq: 555 or equivalent.

650 Selected Topics (1-3) Lecture, group discussion, and individual study on specialized developments. 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. 2 hours and 1 lab. Prereq: Physics 101 or 221.

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 analysis, 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. 2 hours and 1 lab. Prereq: Mathematics 123, 125 or consent of instructor.

442 Agricultural Waste Management and Pollution Control (3) Waste renovation fundamentals; characteristics of animal manure; techniques for collection, transporting, storing, and utilizing livestock waste. 2 hours and 1 lab. Prereq: Mathematics 123, 125 or equivalent.

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. 2 hours and 1 lab. Prereq: Mathematics 123 or 125 or equivalent or consent of instructor.

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. 2 hours and 1 lab. Prereq: Mathematics 123 or 125 or equivalent or consent of instructor.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

503 Seminar (1) (See Environmental and Soil Sciences 503.)

506 Physical Phenomena (3) Properties of materials, fundamentals of hydraulics, principles of electricity, thermal phenomena, applications in biological systems. 2 hours and 1 lab. Prereq: Consent of instructor.

508 Special Problems in Biosystems Engineering Technology (1-3) Individual studies of current problems. 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. 2D applications with limited exposure to 3D applications. Computer intensive course. Hands-on experience. Two 2 hour labs. Prereq: Computer proficiency and admission to graduate program. (Students cannot receive credit for both 414 CAD Applications to Biosystems Engineering and 514.)

522 Processing and Environmental Systems (3) Environmental systems in plant and animal production; application of electric power, mechanical equipment, structures, crop processing and materials handling. 2 hours and 1 lab. Prereq: 506.

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. 2 hours and 1 lab. Prereq: 326 or GIS experience, graduate standing, or consent of instructor. Students cannot receive credit for both 434 and 534.

542 Simulation of Agricultural Systems (3) Synthesis and analysis of agricultural systems using computer simulation, philosophy of system simulation, critical path, discrete and continuous systems. 2 hours and 1 lab. Prereq: 506 and scientific computer programming.

546 Automation Devices and Applications (3) Basic electronics as applied to simple automation systems, programmable controllers, data acquisition, digital logic and transducers. 2 hours and 1 lab. Prereq: 506 or consent of instructor.

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. 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. 2 hours and 1 lab. Prereq: Environmental and Soil Sciences 324, Statistics 201, Mathematics 152 or consent of instructor. (Students cannot receive credit for both 474 and 574.)

BUSINESS ADMINISTRATION (205)

501 MBA Career Development (1) Career opportunities available in each concentration. Prereq: Admission to MBA program or consent of Assistant Dean of MBA Program. Satisfactory/No Credit grading only.


511 MBA Core I (3) Essential skills of manager: basic information technology skills, teambuilding, and written and oral communication skills. Finance and accounting fundamentals. Introduction to integrated value chain. Prereq: Admission to MBA program or consent of Assistant Dean of MBA Program. Satisfactory/No Credit grading only.

512 MBA Core II (15) Development of roles and responsibilities of business managers. Functional fundamentals: marketing, operations, human resource management. Continuous systems improvement and delivery of customer value. Role of firm in society: stakeholder value, economics, and ethical and legal environment of firm. Personal leadership skills, and assessment of students’ leadership abilities. Integration of value chain: demand management, operations management, process design and management, and logistics management. Prereq: 511 or consent of Assistant Dean of MBA Program.

513 MBA Core III (9) Continuation of the functional fundamentals from 512. Integration of value chain: supply management and resource management. Capstone integrated experience using information technology. Prereq: 511, 512 or consent of Assistant Dean of MBA Program.


561 Management Project I (3) Company project. Preliminary investigation of significant strategic issue (new initiative, program or significant organizational change to enhance organizational effectiveness) in sponsoring organization. Work within firm under guidance of faculty to develop proposal which defines issue and scope of project. Proposal to be approved by company and faculty. Prereq: Admission to executive program of MBA and cooperation of sponsoring organization. Coreq: 551.


591 International Travel (1) This one-hour course provides one-hour credit/enrollment for purposes of international travel and cultural exchange programs that are sponsored by the MBA program. Prereq: Admission to MBA program or consent of Assistant Dean of the MBA Program.

593 Directed Independent Study (3) Cross-disciplinary topic of mutual interest to student and faculty. Available only by prearrangement with supervising faculty member. May require approval of Dean of the MBA Program. May be repeated. Maximum 6 hours. Satisfactory/No Credit or letter grade.

599 Executive-In-Residence (3) Interaction with corporate executives from wide spectrum of business disciplines and discussion of domestic and international strategic planning as applied in major corporations. Prereq: MBA core and consent of instructor.

611 Seminar in Theoretical Foundations (3) Theoretical foundations and frameworks common to business research. Historical and philosophical science perspectives.

612 Seminar in Research Methods (3) Research processes: philosophical foundations, problem formulation, grounded theory, qualitative methods and analysis, measurement, sources of error, experimental design and analysis, survey design and analysis.

693 Independent Study (3) Prereq: Consent of Instructor. May be repeated. Maximum 6 hours.

699 Special Topics (3) Seminars that integrate content from various business functions: international business, management information systems.

BUSINESS LAW (216)

511 Business Law and Professional Responsibility (3) Legal framework and ethical implications of business transactions. Principles and practices in law of contracts, commercial transactions, real property, trusts, estates, and professional responsibility. Prereq: 301 and admission to MAcc program or consent of instructor. Not available for students with credit for 401.

CHEMICAL ENGINEERING (226)


467 Honors: Engineering Internship in Process Control (4) Selected students work in small groups on industrial problems in process dynamics and control. Directed by faculty and engineers from host company. Prereq: 360 and consent of instructor.

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 used to design automation solutions: human-machine-interfaces. Workstations with modern industrial equipment, interactive graphics, and visualization environment. Prereq: 360, 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) P/NP only.

501 Graduate Seminar (1) Prereq: Admission to graduate program. May be repeated. 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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 matrices, 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. Prereq: Graduate standing or consent of instructor. (Same as Biomedical Engineering 507; Electrical and Computer 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.

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 Environmental Engineering 575; Biosystems Engineering 575; Microbiology 575.)


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. Prereq: Graduate standing in engineering or consent of instructor. (Same as Environmental Engineering 581; Engineering Science 583.)

585 Process System Reliability and Safety (3) (See Nuclear Engineering 585.)

590 Special Topics in Chemical Engineering (3) May be repeated. Maximum 6 hours.

594 Culminating Integrated Project Report (3) (See Mechanical Engineering 594.)

600 Doctoral Research and Dissertation (3-15) P/NP only.

631 Advanced Topics in Statistical Thermodynamics and Molecular Dynamics (3) Statistical thermodynamics, molecular based computer simulations, Monte Carlo and molecular dynamic calculations; applications to supercritical fluids, macromolecules and biological systems. Prereq: 532.


642 Advanced Topics in Polymer Processing (3) (See Materials Science and Engineering 642.)

647 Advanced Transport Phenomena (3) Theory of mass, momentum, and energy transport in reactive and non-reactive systems. Formulation of transport models useful for application to analysis and design of separation processes, and chemical and biochemical reactors. Prereq: 505; 547.


661 Advanced Topics in Process Dynamics and Control (3) May be repeated. Maximum 6 hours.

675 Microbial Systems Analysis (3) Identification and analysis of complex microbial systems using perturbation-response methods. Structuring of important mechanistic processes, interactions, and regulation at several systems levels (reactor or macro, ecological, cellular/physiological and molecular). Experimental methods for data gathering, signal resolution and processing, mathematical signal analysis, model development (deterministic, stochastic, phenomenological), and utility and limitations of approach. Prereq: 575 or consent of instructor.

691 Advanced Topics in Chemical Engineering (3) May be repeated. Maximum 6 hours.

CHEMISTRY (235)

430 Advanced Inorganic Chemistry (3) Atomic and molecular structure, bonding theories, descriptive chemistry of elements, kinetics and mechanism of inorganic reactions, applications of modern techniques for characterization, coordination and organometallic chemistry. Prereq: 230.


471-481 Biophysical Chemistry (3,3) (See Biochemistry and Cellular and Molecular Biology 471-481.)

473-483 Physical Chemistry (3,3) Students may not receive credit for both 471 and 473 nor for both 481 and 483. 473 - Properties of gases; first, second and third laws of thermodynamics; chemical equilibria; simple phase equilibria; properties of solutions. 483 - Introduction to statistical thermodynamics; kinetics of chemical reactions; introduction to quantum mechanics and applications to electronic structure of atoms and molecules; molecular spectroscopy. Prereq: 130 or 138; Physics 136 or 138 or 222 or 231; and Mathematics 241, 247.

479-489 Physical Chemistry Laboratory (2,2) Experiments on topics discussed in 471-481 or 473-483. 1 lab. Prereq/Coreq: Corresponding courses 471 or 473 for 479 and 481 or 483 for 489.

500 Thesis (1-15) P/NP only.

501 Chemistry Seminar (1) Lectures and discussion on current research. May be repeated. Continuous registration required for resident graduate students. 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

505 Special Problems (3) Specially assigned theoretical or experimental work on problems not covered in other courses. Prereq: Consent of department. May be repeated. Maximum 6 hours Satisfactory/No Credit grading only.

510 Analytical Spectrometry (3) Principles and practice of optical and mass spectrometric techniques in quantitative chemical analysis. Required background: Two semesters of physical chemistry.

511 Analytical Separations (3) Principles and practice of chemical separations based on extraction, chromatographic, and electrophoretic phenomena. Required background: Two semesters of physical chemistry.

512 Electroanalytical Chemistry (3) Fundamentals of electrode processes; principles and practice of electroanalytical techniques in quantitative chemical analysis and applied to study of chemical systems. Required background: Two semesters of physical chemistry.

530 Chemical Bonding (3) Wave mechanical atom, group theory, quantum approach to molecular orbital theory, covalent, ionic, and metallic bonding, ligand field theories, solid state. Required background: One semester of inorganic chemistry.

531 Characteristics of Inorganic Compounds (3) Descriptive chemistry of elements; structure, reactions, kinetics, mechanisms, equilibria, and spectra of coordination, organometallic, bioinorganic compounds. Required background: One semester of inorganic chemistry.

532 Experimental Methods of Inorganic Chemistry (3) Electronic, infrared, Raman, microwave, NMR, ESR, nuclear quadrupole, Mossbauer, mass, and photoelectron spectroscopies for characterization of inorganic compounds. Required background: One semester of inorganic chemistry.

533 Chemistry of the Transition Metals (3) Theoretical and experimental foundations of modern coordination, organometallic, and bioinorganic chemistry of transition metals; transition metal mediated catalysis, materials chemistry, isolobal theory, kinetics and mechanism of reactions of transition metals, and applications in organic synthesis. Required background: One semester of inorganic chemistry.

550 Structure and Reactivity in Organic Chemistry (3) Structure and bonding in organic compounds; molecular orbital theory, stereochemistry, conformational analysis, and molecular mechanics; substituent effects on acidity and reactivity; introduction to reaction mechanisms. Required background: Two semesters of organic chemistry.

552 Organic Reaction Mechanisms (3) Techniques and principles in study of organic reaction mechanisms; applications and interpretations in polar, radical, and pericyclic reactions; reactive intermediates. Prereq: 550.


554 Organic Spectroscopy Laboratory (1) Use of IR, UV, MS and multinuclear FTNMR spectrometers. Development of problem-solving ability in area of spectroscopic characterization of organic molecules. Prereq: 360 or equivalent. Coreq: 553.

570 Quantum Chemistry and Spectroscopy (3) Basic principles of quantum mechanics and their applications to molecular orbital theory, molecular structure, and spectroscopy; introduction to group theory. Required background: Two semesters of physical chemistry.

571 Advanced Quantum Chemistry and Spectroscopy (3) Prereq: 570 or consent of instructor.

572 Thermodynamics and Statistical Mechanics (3) Macroscopic and microscopic description of equilibrium systems. Basic principles of thermodynamics and statistical mechanics, and application to selected chemical systems. Required background: Two semesters of physical chemistry.

573 Chemical Kinetics and Transport (3) Time-dependent phenomena in chemistry: chemical kinetics, chemical dynamics, transport theory. Required background: Two semesters of physical chemistry.

590 Polymer Chemistry (3) Fundamentals of polymer synthesis and characterization through application of organic and physical chemical principles. Required background: Two semesters of organic and physical chemistry.


595 Physical Chemistry of Polymers (3) Conformation of macromolecules, solution and bulk properties, rubber elasticity, kinetics of polymerization, polymer thermodynamics. Prereq: 590 or equivalent.

600 Doctoral Research and Dissertation (3-15) P/NP only.

601 Chemistry Research Proposal (2) Preparation and oral defense of original written research proposal based on thorough survey of chemical literature. Prereq: Consent of department head. Satisfactory/No Credit grading only.

610 Selected Topics in Analytical Chemistry (3) Topics of current significance. Prereq: 510, 511, 512 or consent of instructor. May be repeated. Maximum 12 hours.

630 Selected Topics in Inorganic Chemistry (3) Topics of current significance. Prereq: 530, 531, 532 or consent of instructor. May be repeated. Maximum 12 hours.

650 Selected Topics in Organic Chemistry (3) Topics of current significance. Prereq: Two of 550, 551, 552 or consent of instructor. May be repeated. Maximum 12 hours.

670 Selected Topics in Physical Chemistry (3) Topics of current significance. Prereq: 570, 572, 573 or consent of instructor. May be repeated. Maximum 12 hours.

690 Selected Topics in Polymer Chemistry (3) Topics of current significance. Prereq: Consent of instructor. May be repeated. Maximum 12 hours.

691 Selected Topics in Thermal Analysis of Polymeric Materials (3) Topics of current significance. Prereq: Consent of instructor. May be repeated. Maximum 9 hours. Maximum 3 hours may be applied toward degree in chemistry.

CHILD AND FAMILY STUDIES (245)

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

505 Development of Interpersonal and Supervision Skills (3) Refinement of interpersonal skills needed to work with families and other professionals. Supervisory training in others’ skill development, active listening, self-disclosure, relationship building, and negotiation. Skills adapted for use among family members.

510 Theory in Human Development (3) Theoretical models of human development: cognitive, social learning, and ecological theory; analysis, synthesis, and discussion of historical and contemporary relevance of models; application of theory to research, prevention, intervention, and education; critical reading and evaluation of theory-based research on human developmental processes.

511 Survey of Research in Child Development (3) Survey of human development research from conception through adolescence. Classic and contemporary empirical literature in domains of physical, cognitive, language, social, emotional, and moral development; biological basis of development; cross-cultural perspectives.

512 Survey of Research in Early Childhood Education (3) Current literature and issues in early childhood education. Prereq: 510 or equivalent or consent of instructor.

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) Contrast and comparison 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.


550 Theory and Research in Family Studies (3) Research in various major topics in family studies and application of theoretical models to understanding research.


564 Practicum in Human Development or Family Studies I (3) School and community programs. Education for human development and family living. Prereq: Consent of instructor. Satisfactory/No Credit grading only.

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. 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. Prereq: 562. (Same as Counselor Education 566.)

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. Prereq: 550.


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. Coreq: 575.

575 Professional Internship in Teaching (1-8) Intensive teaching and teaching-related experiences in professional settings in public schools. Enrollment limited to post-baccalaureate students in professional year program. Prereq: Admission to Teacher Education program. May be repeated. Maximum 12 hours. Satisfactory/No Credit grading only.

580 Special Topics in Human Development or Family Studies (1-3) Research, theory and current issues in child development or family studies: divorce, handicapped children, symbolic interaction, work and family, Piaget, mainstreaming children, theory and research in human sexuality, cognition. Prereq: Six graduate hours in major or consent of instructor. May be repeated with different topics. Maximum 9 hours.

581 Directed Study in Human Development or Family Studies (1-3) Individual learning experiences in specific topics in child development and early childhood education or family studies. Prereq: 6 graduate hours or consent of instructor. May be repeated with different topics. Maximum 6 hours.

591 Clinical Studies (1-4) 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. Coreq: 575.

600 Doctoral Research and Dissertation (3-15) P/NP only.

610 Advanced Special Topics in Human Development or Family Studies (1-3) Study of research and theory related to current issues. Prereq: 12 graduate hours in major or consent of instructor. May be repeated with different topics. Maximum 6 hours.

620 Advanced Directed Study in Human Development or Family Studies (1-3) Advanced, in-depth individualized learning experiences in specific topics in child development, early childhood education, or family studies. May be repeated with different topics. Maximum 6 hours.


633 Survey Design and Analysis (3) (See Sociology 633.)

634 Advanced Survey of Family Theory and Research (3) Conceptualization, analysis, and critical assessment of pertinent conceptual and empirical literatures at advanced level for variety of contemporary family issues. Prereq: 570, master’s core. Required background: Six hours graduate-level statistics.

640 Advanced Theory in Human Development (3) Original conceptualizations of and current theoretical perspectives influencing field of human development and empirical evaluations of these perspectives. Prereq: 550, 510, 511 or consent of instructor.

650 Advanced Qualitative Research Methods (3) Techniques and data analysis in qualitative research in human development and family studies. Use of methods: in-depth interviewing, participant observation, and case studies. Prereq: Communication 642 or Psychology 613.


660 Experimental Design and Observation Methods (3) Experimental and quasi-experimental designs (group and time-series single-case) in natural and contrived settings as used in child and family research; observation methods used with these designs. Prereq: 570.

670 Secondary Analysis of Survey Data (3) Applied seminar in secondary analysis of survey data. Identification of data archives, accessing data, evaluation, and analysis of social science survey data. Nationally representative data sets relevant to study of families, youth, or children. SPSS analytic software. Prereq: 570 or equivalent; Statistics 532, 537 or equivalent.

680-681 Knox Area Family and Child Study (KAFACS) Research Practica I, II (3, 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. Two semesters, 3 credits per semester. Prereq: 570.
691 Analytic Reasoning (3) Analysis of quantitative methods and measures used in human development and family research: validity, reliability, causality, and generalizability. Prereq: 570. Required background: Nine hours graduate coursework in child and family studies, and six hours graduate-level statistics.

CHINESE (249)

431 Readings in Chinese Literature (3) (See Asian Languages 431.)

CINEMA STUDIES (251)

400 Special Topics (3) May be repeated. Maximum 6 hours.

420 French Cinema (3) (See French 420.)

421 Topics in Italian Literature and Cinema (3) (See Italian 421.)

433 History of Film and Modern Art (3) (See Art Media Arts 433.)

434 Hispanic Culture Through Film (3) (See Spanish 434.)

465 Latin American Film and Culture (3) (See Spanish 465.)

469 Sexuality and Cinema (4) (See Women’s Studies 469.)

489 Special Topics in Film (3) (See English 489.)

510 Special Topics (3) May be repeated. Maximum 6 hours.

CIVIL ENGINEERING (254)

451 Highway Engineering (3) Design, construction, operation, and maintenance of highway facilities; application of various engineering principles and techniques to process of planning, locating and design of highway facilities; both geometric and pavement design. Prereq: 352.

452 Traffic Engineering (3) Characteristics of driver, vehicle, and roadway and their interrelationship; traffic studies; basic considerations of traffic circulation and control, lighting, capacity analysis, roadway safety analysis and design. Prereq: 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. Prereq: 352.

472 Steel Design (3) Design of plate girders and composite beams; consideration of members subjected to combined stresses; design of typical framed building connections. Prereq: 471.

474 Reinforced Concrete Design (3) Design of continuous beams, floor slabs, and columns with combined axial loads and bending, footings; and design for torsion. Prereq: 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. Prereq: 390, and 395 or 416.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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. Prereq: Graduate standing or consent of instructor.


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. Prerequisite: 321.


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. Prereq: 330 or consent of instructor.

533 Advanced Laboratory and In Situ Testing of Soil (3) Instruments for measurement of electrical signals, static and dynamic transducers, data acquisition and control, in situ measurement of stress, pore pressure, deformation, load deformation behavior (seismic methods, static methods), advanced laboratory shear strength and compressibility testing. 2 hours and 1 lab. Prereq: 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. Prereq: Introduction to Soil Behavior and Matrix Computation or equivalent. Taught concurrently with 561. Students may not receive credit for both 538 and 561.

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. Prereq: Graduate standing and consent of advisor. May not apply toward degree. May be repeated. Satisfactory/No Credit grading only.

540 Construction Management I (3) Management and organization of heavy and building construction projects. Prereq: 442.

541 Construction Management II (3) Management organization of heavy and building construction projects. Prereq: 442.

543 Construction Estimating (3) Project costs, estimating and takeoff techniques, market cost conditions, and feasibility of design to cost. Prereq: 442.
551 Traffic Engineering-Characteristics (3) Driver-vehicle-roadway system; traffic flow modeling; elements of transportation/highway safety. Prereq: Graduate standing.

552 Traffic Engineering-Operations (3) Signs, signals and marketing; short-term operations; controllers; signal timing/phasing; one-way reversible flow; system operations; identification and correction of high-accident locations and system deficiencies. Prereq: 551 or 452.

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 interchange and street intersections; and parking. Prereq: 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. Prereq: 452 or graduate standing.

557 Transportation Planning and Operations with Micro-Computer Applications (3) Transportation system management techniques and application of micro-computers to analysis of transportation actions. Prereq: 551 and 556.

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. Prereq: Graduate standing. (See Political Science 555.)

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. Prereq: Structural Analysis and Matrix Computation or equivalent. Taught concurrently with 538. Students may not receive credit for both 538 and 561.

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. Prereq: 471.

563 Statically Indeterminate Structures (3) Elastic analysis of indeterminate articlar and rigid frames with non-prismatic members using energy, slope deflection, and moment distribution methods; plastic analysis of rigid frames; and stability analysis of compression members and portal frames. Prereq: 361.

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. Prereq: 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. Prereq: 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. Prereq: 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. Prereq: 471.

576 Masonry Design (3) Clay and concrete masonry materials; unreinforced masonry design; reinforced masonry design; seismic behavior of masonry structures. Prereq: 471.

580 Risk Analysis in Civil and Environmental Engineering (3) Applications of probability theory and statistics in civil engineering disciplines: structures, geotechnology, water resources, transportation, and environmental engineering. Prereq: Calculus II or consent of instructor.

590 Special Problems in Civil Engineering (3) Enrollment limited to civil engineering students in non-thesis programs. May be repeated. Maximum 6 hours. Satisfactory/No Credit grading only.

595 Special Topics (1-4) Problems and topics related to current developments in field. May be repeated. Prereq: Consent of instructor.

600 Doctoral Research and Dissertation (3-15) P/NP only.

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. Prereq: 435.

651 Analysis Techniques for Transportation Systems I (3) Analysis of trip generation, trip distribution, modal split and traffic assignment, employing mathematical, statistical, and computer science techniques. State of the art and new modeling techniques. Prereq: 554 or 558.

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. Prereq: 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. Prereq: 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. Prereq: 574.

680 Reliability of Constructed Systems (3) Development of safety factors and probability based design codes; Monte Carlo methods; constructed system reliability; evaluation of existing infrastructures. Prereq: 580 or consent of instructor.

691 Special Topics in Civil Engineering (3) Selected advanced problems of current interest. Prereq: Consent of instructor. May be repeated.

CLASSICS (257)

401 Greek Poetry (3) Epic, lyric, drama. Authors vary. Prereq: 261. May be repeated. Maximum 9 hours.

402 Greek Prose (3) History, philosophy, and oratory. Authors vary. Prereq: 261. May be repeated. Maximum 9 hours.

405-406 Selected Readings from Greek Literature (3,3) For advanced students in Greek, plays, historical writings, poetry of ancient Greece in original Greek. Prereq: 401-402 or consent of instructor. May be repeated. Maximum 9 hours.

414 Cicero and Techniques of Latin Prose Composition (3) For advanced students in Latin, practice in prose composition, writings of Cicero the model. Prereq: 351-352 or consent of instructor.

431-432 Selected Readings from Latin Literature (3,3) For advanced students in Latin, oratory, historical writings, poetry of ancient Rome in original Latin. Prereq: 351-352 or consent of instructor. May be repeated. Maximum 9 hours.

435 Medieval Latin (3) Selected readings from Latin prose and poetry of medieval Europe. Prereq: 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 of ancient authors. May be repeated to study various Greek and Roman cities and sanctuaries. Prereq: Consent of instructor or admission to program. Satisfactory/No Credit grading only. May not be used toward degree requirements. May be repeated. Maximum 9 hours.

441 Special Topics in Classical Civilization (3)
Art, literature, religion, and society of Greece and Rome. 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 human to the rise of the Greek polis in the 8th century B.C. Highlights include Early Cycladic art, Minoan and Mycenaean complex societies, Thera, cultural interconnections with Egypt and the Near East, and the Trojan War. Emphasis on anthropological and modern art historical approaches. Writing-emphasis course. (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 B.C.). Developments in architecture, sculpture, and vase painting seen in the context of changes in society. Archaeological evidence for daily life, economy, and political institutions. Writing-emphasis course. (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 B.C.–A.D. 476). Highlights are the rise and decline of Etruscan culture, the development of Roman architecture, art, and urban planning, and architecture used for political propaganda, and Roman cosmopolitan culture during the Empire. Writing-emphasis course. (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. May be repeated. Maximum 9 hours. (Same as Anthropology 562.)

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. May be repeated. (Same as Anthropology 565.)

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. Prereq: Admission to program. P/NP only.

540 Communication Theory (3)
Overview of theory-building process and theories in communication. Prereq: Consent of instructor or admission to the program.

600 Doctoral Research and Dissertation (3-15)
P/NP only.

612 Fundamentals of Communication Research (3)
Universal research process from defining ideas and problems to reporting results. Causal inference and relative strengths of various research designs. Fundamentals and specific applications of most common data-gathering and measurement techniques in communications research: experimental, survey, content analysis, historical and qualitative. Prereq: Consent of instructor or admission to program.

620 Seminar in Communication and Information Education (3)
Role and scope of mass communication teaching unit, historical perspectives of curricular trends. Teaching methods and instructional objectives; classroom testing and measurement; design of professional curricula, research and extension; program evaluation; grants and contracts in research. Prereq: Consent of instructor or admission to program.

622 Quantitative Research (3)

632 Mass Communication History and Historiography (3)

640 Communication and Information Theory I (3)
Selected research hypotheses and theories in literature of mass communication theory. Prereq: Consent of instructor or admission to program.

641 Communication and Information Theory II (3)
Selected topics in theory. Critical evaluation of extant theory, derivation of hypotheses, and advanced theory construction. Prereq: 640.

642 Qualitative Research (3)
Theory and application of qualitative research methods to social science and communications research. Theoretical considerations underlying symbolic interactionism as translated into research strategies of participant observation, life history, interviewing, archival analysis, and case studies. Prereq: 612 or consent of instructor.

652 Mass Communication Law and Legal Research (3)
Legal restrictions under which mass media operate. Finding, interpreting and analyzing sources of legal information. Prereq: 612 or consent of instructor.

COMMUNICATION STUDIES (250)

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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.

560 Special Topics in Communication Studies (3)
Contemporary Topics. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

580 Survey of Public Communication (3)
Identifies and addresses theory and research in public discourse.

590 Project (3) Capstone project under guidance of faculty. Application of principles from previous coursework. Satisfactory/No Credit grading only.
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. 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. May be repeated. Maximum 6 hours.

593 Independent Study (1-6) Independent study by individual under direction of faculty member. Must obtain approval of faculty member and department prior to study.

COMPARATIVE AND EXPERIMENTAL MEDICINE—GRADUATE SCHOOL OF MEDICINE (262)

Participating departments include: Anesthesia, Medicine, Medical Genetics, Obstetrics and Gynecology, Pathology, Pediatrics, Radiology, and Surgery.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

508 Graduate Research Participation (3) Advanced research techniques while conducting individual biomedical research projects under supervision of faculty. Open to all graduate students. Prereq: Consent of instructor. May be repeated with consent of instructor. Maximum 9 hours. Satisfactory/No Credit grading only.

541 Molecular Basis for Human Diseases (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. Prereq: Biochemistry and Cellular and Molecular Biology 410-419 or equivalent.

545 Clinical Genetics (3) Human genetic disorders: new developments in cytogenetics, molecular genetics, clinical diagnoses and prevention. Prereq: Biology and genetics background or consent of instructor.

600 Doctoral Research and Dissertation (1-15) P/NP only.

602 Surgical Pathology (1-2) Examination of biopsy specimens and interpretation of observations. Preparation of specimens for sectioning. Prereq: Consent of instructor. May be repeated. Maximum 3 hours.

603 Correlative Post-Mortem Pathology (1-3) Gross and microscopic post-mortem examination of animals. Correlative interpretation of clinical diseases and lesions. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

604 Veterinary Pathology Seminar (1) Microscopic slides and transparencies of lesions from cases examined by pathologists, residents, and graduate students. Interpretation of observations. Prereq: Consent of instructor. May be repeated. Maximum 4 hours.

605 Pathobiology Seminar (1) Subjects of current interest in biomedical science. Students present one seminar per term enrolled. Prereq: Consent of instructor. May be repeated. Maximum 4 hours.

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. Prereq: 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. Prereq: Consent of instructor. 2 hours and 1 lab.

608 Descriptive and Applied Epidemiology (3) Principles of epidemiology and historic and modern application to diseases of animals. Host-agent relationships, measurement of disease frequency, animal production and disease, monitoring and control, field investigations, animal health economics. Prereq: Consent of instructor.

609 Mechanisms of Disease (4) Advanced topics in pathobiology 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. Prereq: 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

503 Predictive Toxicology (3) Principles and techniques of predictive toxicity: structure-activity relationships, expert systems, neural nets, and molecular similarity.

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.

506 Experimental Animal Surgery (3) Competence in performing humane surgical modifications of experimental animals. Techniques of anesthesia. Drug administration and postoperative care. Prereq: Embryology, parasitology, 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, pharmacologic effects, chemical and physical properties, metabolism, toxicities, important idiosyncrasies, and clinical applications. Prereq: Consent of instructor.

560 Doctoral Research and Dissertation (1-15) P/NP only.
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. Prereq: Consent of instructor. May be repeated. Maximum 12 hours.

651 Advanced Topics in Animal Anatomy (1-4) (See Animal Science 651.)

652 Disorders of the Endocrine System (2) (See Animal Science 652.)

COMPARATIVE LITERATURE (260)

401-402 Special Topics in Comparative Literature (3,3) Content varies. May be repeated. Maximum 9 hours.

452 Modern Drama, 1880-1945 (3) (See English 452.)

454 Twentieth-Century International Novel (3) (See English 454.)

510 Special Topics (3) May be repeated. Maximum 6 hours.

COMPUTER SCIENCE (266)

420 Advanced Topics in Machine Intelligence (3) Search, learning, expert systems, neural networks, pattern recognition, and natural language processing. Faculty research. Prereq: Completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hours.

430 Advanced Topics in Hardware Systems (3) Architecture, parallel processors, microprogramming, networks, and communications. Faculty research. Prereq: Completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hours.

460 Advanced Topics in Software Systems (3) Operating systems, compilers, parallel computation, software engineering, database systems, and programming languages. Faculty research. Prereq: Completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hours.

470 Advanced Topics in Scientific Computation (3) Numerical methods, supercomputers and computer modeling and simulation of physical systems. Faculty research. Prereq: Completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hours.

471 Numerical Analysis (3) (See Mathematics 471.)

472 Numerical Algebra (3) (See Mathematics 472.)

480 Advanced Topics in Theoretical Computer Science (3) Theory of computation, complexity theory, formal languages and graph theory and its applications. Faculty research. Prereq: Completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hours.

494 Special Topics in Computer Science (1-3) May be repeated. Maximum 9 hours.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

522 Cybernetics (3) Various functions in living systems and their actual or potential realization in computers. Prereq: 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. Prereq: 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. Prereq: 311.

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. Prereq: Discrete structures and probability or statistics.

552 Image Analysis (3) Enhancement and restoration of digital images. 2D transforms. Segmentation and description. Computational procedures for image reconstruction. Prereq: One year calculus and 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. Prereq: 360.

571-572 Numerical Mathematics (3) (See Mathematics 571-572.)

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. Prereq: Numerical linear algebra.

580 Foundations (3) Foundations of computer science, including Turing machines, computability and computational complexity. Prereq: Automata theory.

581 Algorithms (3) Analysis of algorithms and relevance of analysis to design of efficient computer algorithms. Sorting, searching, graph algorithms, pattern matching, dynamic programming, efficient approximation algorithms. Prereq: Fundamental algorithms.

592 Off-campus Study (1-6) See College of Arts and Sciences. May be repeated. Maximum 6 hours.

593 Independent Study (1-15) May be repeated.

594 Special Topics in Computer Science (1-3) May be repeated.

600 Doctoral Research and Dissertation (3-15) P/NP only.

620 Advanced Topics in Intelligent Systems (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

650 Advanced Topics in Pattern/Image Analysis (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

660 Advanced Topics in Software Systems (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

670 Advanced Topics in Scientific Computing (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

680 Advanced Topics in Theory and Foundations (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

690 Advanced Topics in Computer Science (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

COUNSELOR EDUCATION (255)

410 Sex Role Development: Implications for Education and Counseling (3) Theories and research: development of gender roles and their relevance to identity and behavior in socio-psychological, educational, and counseling settings. (Same as Women’s Studies 410.)
431 Personality and Mental Health (3) Various perspectives of mental health with application 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) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

503 Problems in Lieu of Thesis (2-3) May be repeated. Maximum 9 hours. Satisfactory/No Credit grading only.

504 Special Topics (1-3) Instructor-initiated course offered at convenience of academic unit on topics of current interest. May be repeated. Maximum 15 hours. Satisfactory/No Credit or letter grade.

518 Educational Specialist Research and Thesis (3) May be repeated. P/NP only.

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. Prereq: Admission to 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.

553 Career and Educational Information Systems and Resources (3) Use of print and non-print materials: computer-based systems, for career and educational planning. Prereq: 552 or consent of instructor and Internet access account.

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. Prereq: Admission to program, 431, 525, 551 and consent of instructor. May be repeated. Maximum 9 hours. *(Same as Psychology 569.)*

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. Prereq: 550 and consent of instructor. May be repeated. Maximum 12 hours. Satisfactory/No Credit grading only.

559 Internship in Mental Health Counseling (1-6) Supervised postpracticum employment at academic unit approved human services agency. Prereq: Admission to mental health counseling program, 555 and consent of instructor. May be repeated. Maximum 12 hours. Satisfactory/No Credit grading only.

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. Prereq: 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. Prereq: 551, 554, or consent of instructor.

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. *(See 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) May be repeated. Satisfactory/No Credit or letter grade.

600 Doctoral Research and Dissertation (3-15) P/NP only.

601 Professional Seminar (3) *(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. May be repeated. Maximum 12 hours. Satisfactory/No Credit grading only.

604 Special Topics (1-3) Instructor-initiated courses offered at convenience of academic unit on topics of interest. May be repeated. Maximum 15 hours. Satisfactory/No Credit or letter grade.

625 Advanced Study in Personality (3) *(See Psychology 625.)*

635 Ethical, Legal, and Professional Issues in Psychology (3) *(See Psychology 635.)*

650 Seminar in Counselor Education (3) Professional issues related to role and function of counselor educator. Prereq: Admission to doctoral program in counselor education.

651 Reality Therapy and Brief Counseling (3) Seminar in theory and practice of reality therapy and brief counseling for advanced graduate study. Prereq: 551 or permission of instructor.

655 Practicum in Counselor Education (3) Supervised practice and application of counseling skills with clients. Prereq: Admission to counselor education program and consent of instructor. May be repeated. Maximum 6 hours.

659 Internship in Counselor Education (1-6) Supervised experience in departmentally approved counseling, teaching, supervision, or consultation internship sites. Prereq: Admission to counselor education doctoral program and consent of the instructor. May be repeated. Maximum 12 hours. Satisfactory/No Credit grading only.

660 Advanced Theory and Practice of Counseling (3) An in-depth exploration of theories of human nature and the practice of counseling. Prereq: Admission to the PhD program or permission of instructor.
665 Group and Systems Theory and Interventions (3) Exploration of group and family systems theory, preparation as practitioners in facilitation of counseling and task groups, and examination of counseling and psychotherapy interventions applicable to group dynamics. Prereq: Admission to the PhD program or permission of instructor.

670 Theory and Practice of Counseling Supervision and Consultation (3) Theory of counseling supervision and consultation, supervision of entry-level counselors, and agency consultation. Prereq: Admission to the PhD program or permission of instructor.

671 Personality and Vocational Assessment (3) (See Psychology 667.)

675 Theory and Practice of University Teaching In Counselor Education (3) Emphasis on teaching and learning theories and classroom applications in the preparation of future mental health, school, and rehabilitation counselors. Prereq: Admission to the PhD program or permission of instructor.

693 Independent Study (1-3) May be repeated. Satisfactory/No Credit or letter grade.

CULTURAL STUDIES IN EDUCATION (271)


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.

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, Quintilian, Comenius, Rosseau, Pestalozzi, Froebel, Dewey. Prereq: Graduate status and consent of instructor.

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. Open to juniors, seniors, and graduate students.

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.

549 Topics in International Education (3) Historical, philosophic, and sociological foundations; selected nations and their cultures. May be repeated.

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. Prereq: 560 or equivalent.

590 Cultural Studies Seminar (2) Two-semester sequence (fall and spring); ongoing discussion about cultural studies: popular culture, interdisciplinary work, social justice issues. Presentations, videos, readings. May be repeated. Maximum 4 hours. Satisfactory/No Credit grading only.

591 Issues in Cultural Studies (3) 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.

592 Justice, Schools, and Sports (3) Social justice issues: education and sport practices. Social justice, moral commitments to others in educational and sport settings, and equal opportunity to acquire social goods and benefits. Prereq: Admission to doctoral program with concentration in cultural studies in education.

607 Advanced Seminar in the Social Foundations of Education (3) 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 general core for PhD program. Prereq: Doctoral student in Education.

608 Seminar in Philosophy of Education (3) Selected philosophical issues in education. Prereq: 2 courses in history or philosophy of education. May be repeated with consent of instructor.

609 Feminist Theories and Education (3) Theoretical research currently presented by feminist scholars questioning traditional (male) theories; application of these feminist theories to current feminist work in education.

625 Seminar in History of Education (3) Selected historical issues in education. Prereq: 2 courses in history or philosophy of education. May be repeated with consent of instructor.


CURRICULUM, EDUCATIONAL RESEARCH, AND EVALUATION (256)

520 Techniques of Research in Education (3) Study and application.

532 Instructional Research: Analysis and Application (3) Analysis of research on instruction. Translation and application of research findings into instructional performance.

534 Program Evaluation in Education (3) Issues and practices in planning and conducting program and curriculum evaluation in variety of settings. Fundamentals of design, measurement, philosophy, ethics, and underlying values; proper role and use of evaluation in educational organizations. Prereq: Consent of instructor. (Same as Educational Administration 534; Higher Education Administration 553.)

541 The High School Curriculum (3) Identification of problems associated with curriculum study, Tennessee curriculum framework, assessment of trends in programs of local, regional, and national significance.

552 School Law for Educators (3) Case and statutory material for public school educators; problems concerning law and public education.

557 The Junior High and Middle School Curriculum (3) Curriculum and instructional design for junior high and middle school. Characteristics of students, curriculum designs, instructional patterns, and organization and structure of junior high and middle school.

558 Curriculum Planning and Development (3) Foundations and principles of curriculum planning and development. Historical analysis of curriculum theory, principles of planning and development, and classroom applications for improved learning.
560 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.

580 Techniques for Research in Curriculum and Instruction (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.

588 Instructional Theory and Design (3) Relationship of curriculum to instruction; examination of instructional and related learning theories; instructional models and teaching styles.

604 Seminar in Curriculum and Instruction (1) Required 2 consecutive semesters. Satisfactory/No Credit grading only.

623 Using Research for Curriculum Improvement (3) Research methodology; application to descriptive/survey curriculum materials. Critical reading of research, methodological development in descriptive and survey areas.

630 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. Prereq: Consent of instructor.

631 Application of Assessment/Evaluation (3) Systems designs, instruments, procedures, reporting formats used in personnel and program evaluation and student assessment; analysis, synthesis, and interpretation of data sets. Prereq: 630.

672 Interpretation and Application of Curriculum and Instruction Research (3) Analysis of research in curriculum and instruction, newer methodologies and strategies. Utilization of research to improve curriculum and instruction practice, application of research principles in context of specific professional assignments. Prereq: Consent of instructor.

674 Designing and Implementing Personnel Assessments (3) Models and methods for assessing performance of educators and other professionals. Critique of systems currently in use and design of evaluation system.

675 Curriculum Evaluation: Theory and Application (3) Evaluation trends and issues. Theoretical frameworks to design evaluation studies for various educational programs.


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. Mini-teaching experience.

480 Dance Through the 19th Century (3) Dance of various societies and culture from pre-history through 19th century.

490 Dance in the 20th Century (3) History and philosophy of dance.

495 Dance Pedagogy (3) Principles and methods of teaching dance with practical application in mini-teaching experience. Prereq: Upper-class or graduate standing and consent of instructor. 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. Prereq: Consent of instructor. May be repeated. Maximum 8 hours.

520 Jazz: Level IV (2) Instruction and practice in advanced jazz styles and techniques. Prereq: Consent of instructor. May be repeated. Maximum 8 hours.

530 Modern: Level IV (2) Instruction and practice in advanced modern dance techniques. Prereq: Consent of instructor. May be repeated. Maximum 8 hours.

550 Dance Composition IV (3) Independent study applying choreographic and production skills, culminating in presentation of two works. Prereq: 440 Composition I and 445 Composition II or consent of instructor.

593 Independent Study (1-3) May be repeated.

ECOLOGY AND EVOLUTIONARY BIOLOGY (278)

410 Plant Evolutionary Morphology (4) Morphology, development, natural history, and evolution of fungi, cyanobacteria, nonvascular plants (algae and bryophytes), and vascular plants (ferns, fern allies, gymnosperms, and flowering plants). Prereq: Biology 102 or 110 or 130 or equivalent.

411-412 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. Prereq: As announced. May be repeated. Maximum 4 hours. May apply 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. Prereq: Biology 111-112 or Biology 130-140 or equivalent.

419 Science as Method (3) Dynamic process of scientific discovery. Comparisons of science, nonscience, pseudoscience, successful and unsuccessful science. Ethics of scientific research, philosophical aspects of scientific enterprise, and implications for teaching and writing about science. Prereq: Introductory science or philosophy course, or consent of instructor. (Same as Philosophy 419.)

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. Periodic field trips or laboratories. Prereq: Biology 250 or equivalent.

433 Plant Ecology (3) Interactions between individuals, species, communities and their environments. Circulation of energy and matter in ecosystems. Weekly field trips or laboratory periods, and at least two weekend field trips. Prereq: 330 or equivalent.

446 Introduction to Oceanography (4) Basic oceanography: physical, chemical, geological and biological processes and patterns. Oceanic subsystems: upwellings, polar oceans, hydrothermal vents, gyres, coral reefs, estuaries, and coastal regions. Field trip to coast required. Prereq: General Biology and Chemistry 120-130; Biology 250 recommended.

450 Comparative Animal Behavior (3) Principles and methods of ethology: ecological, developmental, physiological, and evolutionary aspects. (See Psychology 450.)

459 Comparative Animal Behavior Laboratory (3) Introduction to observational and experimental research in ethology. Coreq: 450. (See Psychology 459.)

460 Evolution (4) Principles, facts, and theories regarding biological evolution. Concepts, processes, and product in development of organic diversity. Historical development of ideas concerning biological evolution. 3 hours and 2 hours lab/discussion. Prereq: 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. Prereq: Biology 250 or consent of instructor. May be repeated if topic differs. Maximum 12 hours.
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. 2 hours and 2 labs. Prereq: Biology 250 or consent of instructor, Physics 221 recommended.

470 Aquatic Ecology (3) Introduction to the physiochemical nature of inland waters with description of biotic communities and their interrelationships. 2 hours and 1 lab. Prereq: Chemistry 120-130, Biology 250.

474 Ichthyology (4) Evolution, classification, collection and identification, distribution and biology of fishes: freshwater fauna of Eastern North America. 2 hours and 2 labs. Prereq: 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. Prereq: Biology 240, 250.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

503 Ecology and Evolutionary Biology Seminar (1) Advanced topics in ecology, behavior, and evolutionary biology. Senior departmental majors encouraged. Required of all first- and second-year graduate students. May be repeated. Maximum 4 hours. Satisfactory/No Credit grading only.

504 Special Topics (1-3) Selected directed readings or special course in topics of current interest. Consult departmental listing for offerings. May be repeated with consent of instructor. Maximum 9 hours. Satisfactory/No Credit grading only.

508 Introduction to Faculty Research (1) Orientation of new graduate students to current research of departmental graduate faculty. Prereq: Admission to program in Ecology and Evolutionary Biology. Required of all first-year students. Satisfactory/No Credit grading only.

509 Foundations: Readings in Ecology (1-2) Readings and discussion of classic papers in field.

511 Foundations: Readings in Evolution (1-2) Readings and discussion of classic papers in field.

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.

524 Physiological Ecology of Animals (3) Adaptive physiological response of animals to natural changes in or extremes of physical and biotic environment. Terrestrial vertebrates. Prereq: Undergraduate courses in animal physiology and ecology, Biochemistry and Cellular and Molecular Biology 440 and Biology 250 or equivalent.

530 Advanced Taxonomy of Flowering Plants (3) Evolution and classification of families of angiosperms, local flora. 2 hours lecture and 1 lab. Prereq: 330 or equivalent.

535 Ecology and Development in the Amazon (3) Natural history, ecosystem diversity and function, and opportunities for sustainable economic development in the Amazon Basin. Includes field trip of 7-10 days to Manaus, Brazil.

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. 4 hours combined lecture and lab. Prereq: Consent of instructor.

541 Insect Taxonomy II: Minor Orders (3) Survey of classification of minor orders of insects, with practical experience in identification of insects at family level. 4 hours combined lecture and lab. Prereq: 540 or consent of instructor.

542 Insect Structure and Function (3) Integrated study of morphology and physiology at tissue and cellular level of insects. Prereq: Consent of instructor.

543 Aquatic Insects (3) Taxonomy and biology of aquatic insects; immature forms. 2 hours and 1 lab. Prereq: Consent of instructor.

544 Fresh Water Invertebrate Zoology (3) Ecology and taxonomy of fresh water invertebrates exclusive of insects. 3 hours lab and field study. Prereq: Comparative Invertebrate Biology or equivalent and consent of instructor.

545 Advanced Animal Behavior (3) Second-level course in ethology, stressing evolution, genetics, physiology, ecology, and human behavior. Prereq: 450 or equivalent. (Same as Psychology 543.)

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. (Same as Geology 556.)

557 Quaternary Ecology (3) Perturbation, process, and pattern within Quaternary ecosystems; climatic change and vegetational response during last 2.5 million years. Prereq: Consent of instructor. (Same as Geology 557.)

560 Biometry (3) Statistical applications in biological research. Prereq: Statistics course or consent of instructor.

561 Environmental Toxicology (3) Basic concepts in toxicology; molecular toxicology and detoxification; reproductive toxicology; mutagenesis, teratogenesis, carcinogenesis, pathologic changes and environmental impact. Prereq: Biochemistry and Cellular and Molecular Biology 410, Organic Chemistry or consent of instructor. (Same as Biochemistry and Cellular and Molecular Biology 561.)

575 Ecological Genetics (3) Genetics of natural populations, using both single-locus and quantitative genetical approaches. Prereq: 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. Prereq: Biology 250 or equivalent or consent of instructor.

581-582 Mathematical Ecology (3) (See Mathematics 581-582.)

583 Zoogeography (3) Processes determining geographic distribution of animals and distribution and composition of animal communities. Prereq: Ecology course or consent of instructor.

585 Mathematical Evolutionary Theory (3) (See Mathematics 583.)

591 Foreign Study (1-15) See College of Arts and Sciences.

592 Off-Campus Study (1-15) See College of Arts and Sciences.

593 Independent Study (1-15) See College of Arts and Sciences.
359 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. Prereq: General biology and general ecology; one or more courses on organismal biology (ecology, evolution) at the upper-undergraduate level or consent of instructor. Students cannot receive credit for both 495 and 595.

600 Doctoral Research and Dissertation (3-15) P/NP only.

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. 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. 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. May be repeated with consent of department. Maximum 9 hours.

607 Seminar in Ecology and Evolutionary Biology (1) Readings and discussion based on current literature. May be repeated. Maximum 12 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. 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. 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. 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. May be repeated with consent of department. Maximum 9 hours. (Same as Biochemistry and Cellular and Molecular Biology 612.)

635 Environmental Assessment and Sustainable Development in Third World Countries (3) Concepts and methods of environmental impact assessment and risk assessment. Sustainable development concepts and issues in developing countries. The role of risk and impact assessment in achieving sustainable development. Prereq: Biology 250 or equivalent.

662 Seminar in the History of Botany (2) History of botanical exploration and advances from early civilized to modern periods. May be repeated. Maximum 4 hours.

681-682 Advanced Mathematical Ecology (3,3) (See Mathematics 681-682.)

ECONOMICS (283)

400 Special Topics (3) Topics vary. Prerequisites determined by department each time course is offered. Numerical grade is given to law students. May be repeated when topic varies. Maximum 9 hours.

413 Macroeconomic Fluctuations (3) Analysis of historical data, methods of analyzing macroeconomic fluctuations, theoretical explanations of cycles, and the role of monetary and fiscal policies in the aggregate economy. Prereq: 313 or consent of instructor. Writing-emphasis course.


462 Economics of Resources and Environmental Policy (3) Economic analysis of environmental policy and allocation of resources. Benefits and costs of development of natural resources and impacts of growth on environment. Major writing requirement. Prereq: 201.

471 Public Finance: Optimal Government Functions and Expenditure Analysis (3) Problems of collective consumption, external effects, public investment, social decision making. Major writing requirement. Prereq: 201.

472 Public Finance: Taxation and Intergovernmental Relations (3) Analysis of individual taxes and of tax systems, non-tax sources of revenue, fiscal federalism. Major writing requirement. Prereq: 201.

482 Introduction to Mathematical Economics (3) Application of basic mathematical tools: calculus, matrix algebra, etc. to major topics of economic theory. Prereq: Intermediate Microeconomics with B or better and Calculus.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

511-512 Microeconomic Theory (3,3) 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.

513-514 Macroeconomic Theory (3,3) 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.

515 History of Economics (3) Purpose and methods of history of economics. Background for and origins, concerns, methods, development and conclusions of classical political economy; From Adam Smith through J.S. Mill and K. Marx. Anticipators of neoclassicism: J. Dupuit and H.H. Gossen.

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.


600 Doctoral Research and Dissertation (3-15) P/NP only.

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. Prereq: 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. Prereq: 512 and 514.

623 Economic Development: Theories and Policies (3) Principal theories explaining economic behavior in developing countries and policies and strategies used to promote development. Prereq: Undergraduate degree in economics or consent of instructor.

631 Industrial Organization I (3) Standard models of imperfect competition, oligopoly, and asymmetric information. Topics include pricing with market power and strategic decision making. Prereq: 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. Prereq: Consent of instructor.

633 Economic Development: Theories and Policies II (3) Principal theories explaining economic behavior in developing countries and policies and strategies used to promote development. Prereq: Undergraduate degree in economics or consent of instructor.

634 Monetary Policy and Antitrust (3) Study of money, credit, and liquidity as related to real output determination, interest rates, employment, and prices. Prereq: 513.

651 Monetary Theory (3) Study of money, credit, and liquidity as related to real output determination, interest rates, employment, and prices. Prereq: 513.

652 Topics in Monetary Theory (3) Advanced monetary models, issues in monetary policy, open economy monetary theory and policy. Student participation. Prereq: 651.

661 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.

662 Methods of Regional and Urban Analysis (3) Theory of regional/urban economic structure and growth. Regional income and product accounts, shift and share analysis, economic base studies, and regional/urban input-output models. Theory and problem solution.


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. Exploration 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 duration models. Prereq: 582-583 or equivalent.

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. Prereq: 582-583 or equivalent.

690 Workshop (3) Advanced topics in economics. Student participation. Prereq: Consent of instructor. May be repeated. Maximum 9 hours.

693 Independent Study (1-3) Directed research on topic of mutual interest to faculty and student. Variable title for transcript purposes. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

EDUCATION (289)

540 Topics in Improvement of Instruction (1-3) Special conferences, workshops, and in-service programs. May be repeated. Maximum of 6 hours. Satisfactory/No Credit or letter grade.

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. Coreq: 575.

575 Professional Internship in Teaching (1-8) Intensive teaching and teaching-related experiences in professional settings in public schools. Enrollment limited to postbaccalaureate students in professional year program. Prereq: Admission to Teacher Education program. May be repeated. Maximum 12 hours. Satisfactory/No Credit grading only.

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. May not be used for probationary licensure year. May not be used toward degree requirements. May be repeated. Maximum 12 hours. Satisfactory/No Credit grading only.

589 Field Experience (1-3) Application of curricular and instructional principles, methods, and materials in schools. Prereq: Program prerequisites and consent of instructor. May be repeated. Maximum 9 hours. Satisfactory/No Credit grading only.

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. Coreq: 575.

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 describe language development problems.

416 Language Development of Deaf/Hard of Hearing II (3) Developmental and remedial systems of teaching language to hearing impaired children. Comprehension and production differences, idiomatic and figurative structures. Prereq: 415 or consent of instructor.
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) Basic principles of audiology: 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 hearing impaired. Overview of 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. May be repeated. Maximum 9 hours. Satisfactory/No Credit or letter grade. (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) Prereq: Admission to graduate program. May be repeated. Maximum 9 hours. Satisfactory/No Credit or letter grade.

EDUCATIONAL ADMINISTRATION (293)

513 Administrative and Organizational Theory (3) Introduction to theoretical administrative and organizational foundations of management and leadership of educational programs and institutions. (Same as Higher Education Administration.)

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 background to read and understand technical professional literature. Introduction to inferential statistics, needs assessments, and evaluation procedures. (Same as Higher Education Administration.)

518 Educational Specialist Research and Thesis (3) May be repeated. P/NP only.

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, ethical, cultural, and racial environments in which schools operate.

534 Program Evaluation in Education (3) (See Curriculum, Educational Research, and Evaluation 534.)

535 Administrative Applications of Micro Computers (3) DOS, word processing, data based management, spread sheets, 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. 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) May be repeated. Maximum 6 hours.

596 Seminar in School Leadership, K-12 (3) On-site study of quality school processes throughout region. 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 enrollment for 2 years, on-campus. May be repeated. Maximum 12 hours. Satisfactory/No Credit grading only. (Same as Higher Education Administration.)

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. May be repeated at discretion of student’s committee. Maximum 12 hours. Satisfactory/No Credit grading only.

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. Prereq: 614 (Same as Higher Education Administration 616.)

617 Case Study Methods in Educational Research (3) Methods, techniques and strategies consistent with case study approaches to inquiry in educational and related settings. Prereq: 615 (Same as Higher Education Administration 617.)

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 wages 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)

431-432 American Sign Language III, IV (3,3) Fluency of expressive and receptive sign communication skills. Use of language in context. Grammatical structures of ASL and cultural implications of deaf community. Must be taken in sequence. Prereq for 431: 226 or consent of instructor. Prereq for 432: 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. Course conducted in ASL. Prereq: 431 or consent of instructor. Satisfactory/No Credit or letter grade.

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. Prereq: Introductory course in psychology or consent of instructor. Satisfactory/No Credit or letter grade.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

503 Problems in Lieu of Thesis (2-3) May be repeated. Maximum 9 hours. Satisfactory/No Credit grading only.

504 Special Topics (1-3) Instructor-initiated course offered at convenience of unit on topics of current interest. May be repeated. Maximum 15 hours. Satisfactory/No Credit or letter grade.

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.

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. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

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) Prereq: Consent of supervising instructor. Approval form must be completed in office of unit head. May be repeated. Maximum 6 hours.

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) May be repeated. P/NP only.

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. Prereq: 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. Prereq: 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. Prereq: Consent of instructor.

524 Continuing Professional Education (3) Theories and concepts supporting design and management of educational programs for adults in professions. Prereq: 520 or equivalent.

525 Characteristics of Adult Learners (3) Key characteristics of adult learners, current theory and research on adult learning, and implications for teaching and learning concepts.

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 of 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 Collaborative Inquiry (3) Philosophical and theoretical frameworks for designing and conducting collaborative inquiry projects. Practice in conducting research.

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. Prereq: Admission to school psychology program or consent of instructor, and Counselor Education 525 or equivalent. May be repeated. Maximum 6 hours.

542 Practicum in Psychoeducational Assessment (3) Application of assessment skills to clients in learning environments. Coreq: 541 or consent of instructor. May be repeated. Maximum 6 hours. Satisfactory/No Credit grading only.

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 (3) Application of consulting skills to educational settings. Prereq: 545.

549 Internship in School Psychology (1-6) Supervised employment in unit approved school psychology internship sites. Prereq: Enrollment in school psychology program and consent of instructor. May be repeated. Maximum 12 hours. Satisfactory/No Credit grading only.

550 Statistics and Research Design: Conceptual (3) Consumer-oriented, conceptual treatment of statistics, research design, and quantitative basis of testing

560 Discipline and Conflict Resolution (3) Applications of major models of discipline and conflict resolution strategies in development of constructive atmosphere for classroom learning.

569 Internship in Educational Psychology (3) Supervised employment in unit approved educational psychology internship sites. May be repeated. Maximum 12 hours. Satisfactory/No Credit grading only.

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. Prereq: One year of college mathematics, an elementary course in statistics, or consent of instructor. (Same as Educational Administration 577.)

585 Seminar in Gerontology (1) (See Health 585.)

593 Independent Study (1-3) May be repeated. Satisfactory/No Credit or letter grade.

600 Doctoral Research and Dissertation (3-15) P/NP only.

601 Professional Seminar (1) An introduction to doctoral study in Educational Psychology and Counseling that explores research requirements, the meaning of scholarship in academe, resources, survival strategies for students, and related topics. Prereq: Admission to a doctoral program in the Educational Psychology and Counseling Department. May not be used to meet the Educational Psychology 600 or Counselor Education 600 requirement. Satisfactory/No Credit grading only. (Same as Counselor Education 601.)

602 Directed Research (1-3) Instructor- or student-initiated group investigation of empirical and theoretical problems in educational and counseling psychology. May be repeated. Maximum 12 hours. Satisfactory/No Credit grading only.

604 Special Topics (1-3) Instructor-initiated courses offered at convenience of unit on topics of interest. May be repeated. Maximum 15 hours. Satisfactory/No Credit or letter grade.

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. Prereq: 520 or equivalent.

621 Advanced Seminar in Program Planning (3) Concepts, principles, and theories related to program planning in adult education. Prereq: 521 or equivalent.

622 Advanced Seminar in Adult Development and Learning (3) Adult development and adult learning theory and research. Prereq: 522, 525, or equivalent.

630 Doctoral Seminar in Collaborative Learning (3) Issues, theories, concepts and research in collaborative learning. Prereq: Admission to EdD in Educational Psychology and Counseling: collaborative learning concentration. May be repeated. Maximum 12 hours. Satisfactory/No Credit or letter grade.

635 Ethical, Legal, and Professional Issues in Psychology (3) (See Psychology 635 and Counselor Education 635.)

640 Seminar in Applied Educational Psychology (2) Issues, theories, concepts and research in applied educational psychology. Prereq: Admission to PhD in Education. May be repeated. Maximum 12 hours. Satisfactory/No Credit grading only.

649 Advanced Internship in School Psychology (1-9) Supervised experience as school psychologist in unit-approved internship site for doctoral level students. Prereq: Enrollment in doctoral level school psychology program and consent of instructor. May be repeated. Maximum 9 hours. Satisfactory/No Credit grading only.
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. May be repeated. Maximum 9 hours. Satisfactory/No Credit grading only.

655 Research in Psychoeducational Studies (1) Data analyses, collection, and interpretation. May be repeated. Maximum 9 hours. Satisfactory/No Credit grading only.


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. Prereq: Counselor Education 525, and two-course sequence in statistical analysis.

665 Analysis of Research in Instructional Technology (3) Research on human learning, design of learning environments. Analysis of teacher behavior, text development, computer software design and video presentations.

668 Practicum in Instructional Planning (3) Development and management of course or program of instruction in educational psychology. Prereq: 665, or consent of instructor.

669 Internship in Educational Psychology (1-6) Supervised employment in unit approved educational psychology internship sites. May be repeated. Maximum 12 hours. Satisfactory/No Credit grading only.

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. Prereq: 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. Prereq: 513 and 671 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. Prereq: 577.

690 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.

693 Independent Study (1-3) May be repeated. Satisfactory/No Credit or letter grade.

ELECTRICAL AND COMPUTER ENGINEERING (319)

Note: Courses cannot be used to fulfill requirements in the electrical engineering undergraduate curriculum. The 400-level course may be used toward a graduate degree in electrical engineering except when required by the program.

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 engineering. Includes Level 3 design projects which require laboratory work. Prereq: 316, 335, 342, 355.


421 Electric Energy Systems (3) Structure and operation of electrical energy grid; load flow; economic loading; planning; control; reliability. Balanced and unbalanced faults; system protection; system stability. Level 1 design projects. Prereq: 316, 325.


423 Electric Machines (3) Principles of electromechanical energy conversion. Design procedures for AC and DC machine windings; construction and performance constraints. Effects of machine parameters on steady state and dynamic performances; the d-q model; reference frames. Level 1 design projects. Prereq: 316, 325.

431 Operational Amplifier Circuits (3) Linear and non-linear active circuits using commercial operational amplifiers. 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. Applications: modulator interfacing. Level 1 design projects which require laboratory work. Prereq: 316, 332, 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. Prereq: 431.

441 Digital Communication (3) Quantization and pulse code modulation. Binary and Mary signaling, spectra of line codes, link budget analysis, binary communication in presence of noise, matched filtering and equalization, bandpass digital transmission, introduction to multiple access techniques. Level 1 design projects. Prereq: 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. Prereq: 441.

443 Antennas and Propagation (3) Introduction to antenna theory: fundamental antenna concepts and parameters (directivity, gain, patterns, etc.) and signal propagation. Theory and design of linear and loop antennas, arrays, and other simple antennas. Level 1 design projects. Prereq: 316, 341, 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. Level 1 design projects that require laboratory work. Prereq: 316, 341, 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, interfacing. Level 1 design projects that require laboratory work. Prereq: 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. Prereq: 206.

471 Introduction to Pattern Recognition (3) Statistical decision theory, adaptive classifiers, and supervised and unsupervised learning. Application of techniques in areas of current interest: face recognition, speech processing, remote sensing, data mining and bioinformatics. Level 1 design projects. Prereq: 316. Non-majors require 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. Level 1 design projects and laboratory work. Prereq: 316, 325, 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. Prereq: 481.

491 Special Topics (3) Basic design and current practice. May not be repeated to satisfy senior requirements for graduation. Prereq: Completion of all junior Electrical and Computer Engineering courses or consent of instructor. Level 1 or 2 design projects that may require laboratory work.

495 Senior Seminar (1) Current topics. Prereq: Completion of all junior Electrical and Computer Engineering courses or consent of instructor. Satisfactory/No Credit or letter grade.

500 Thesis (1-15) P/NP only.

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 white paper or journal paper, or other suitable project. Prereq: Consent of graduate committee. May be repeated. Maximum 6 hours.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any when student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.


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. Coreq: 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. Prereq: 511.

521 Power Systems Analysis I (3) Matrix-vector representations of power networks, sequence modelling of power system components, unbalanced shunt and series faults. Formulating and solving problems in matrix-vector form with application to large scale power systems. Prereq: 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. Prereq: 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 machine.

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, J-FETs, and MOS-FETs. Small-signal equivalent circuits and noise models of active devices. Project laboratory. Prereq: 431, 432, or consent of instructor.


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 non-linear systems are included. Monte Carlo techniques, semi-analytic techniques and variance reduction methods are covered.


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 swept oscillators, transit time devices, parametric devices, mixers, switches.

551 Digital System Design I (3)
Design considerations for combinational and sequential circuits. Iterative networks. Fault diagnostics of logic circuits.

552 Digital System Design II (3)

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. Prerequisites: none.

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. Prereq: 461, 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. Prereq: 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. Prereq: 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. Prereq: 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. Prereq: 471 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. Prereq: 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 form current literature. Prereq: 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. May be repeated. Maximum 6 hours. Satisfactory/No Credit or letter grade.

599 Special Topics (1-3)
May be repeated. Maximum 9 hours.

600 Doctoral Research and Dissertation (3-15)
P/NP only.

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. Prereq: 511 or equivalent.

614 Optimal Control (3)
Deterministic and stochastic dynamic programming in continuous and discrete time, minimum principle and matrix minimum principle, computational methods in optimal control. Prereq: 611.

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. Prereq: 511 and consent of instructor. May be repeated. Maximum 6 hours.

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. Prereq: 617 and consent of instructor. May be repeated. Maximum 6 hours.

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. Prereq: 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. Prereq: 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. Prereq: 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,
electromechanical and quantum-mechanical devices. Prereq: 531-
32 and consent of instructor.

632 Advanced Topics in Electronic Instrumentation II (3) Physical
operation of modern discrete, monolithic, and hybrid electronic struc-
tures and their application in signal processors. Resolution, sensitivity,
response time, and noise considerations in signal processors used in

642 Wireless Communications (3) Fundamental theory and design of
wireless communications systems; mobile radio propagation; mod-
ulation techniques; coding, diversity and equalization. Wireless sys-
tems and standards. Prereq: Satisfactory completion of 441 and 504.

643 Detection and Estimation Theory (3) Detection theory; cod-
ing theory; system identification. Signals with unknown parameters;
optimal filter synthesis; adaptive systems; sequential detection; sub-
optimal detection. Prereq: 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: deter-
mministic, stochastic, and hierarchical methods. Prereq: 643.

651 Computer-Aided Design of VLSI Systems I (3) Fabrication of
microwave electronics; computer architecture design; algorithmic
state machines; partitioning; structured design methodology. Prereq:
551-552 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. Prereq: 651.

653 Advanced Computer Networks (3) Topics of current interest to
students and faculty: high-speed Internet switch/router architec-
tures, routing algorithms and protocols, network performance
analysis and packet scheduling algorithms. Coursework will include
theoretical as well as practical (simulation-based) assignments.
Prereq: 553 and 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 memo-
ry, data coherence, multiprocessors, multicomputers, dataflow
machines, special purpose processors. Prereq: 557.

658 Computer and Telecommunications Systems Performance
Evaluation (3) Introduction to the basic tools of computer and com-
munications systems analysis and evaluation. Deterministic and stoch-
astic modeling concepts are presented. Queuing theory and dis-
crete event (DES) simulation methods are studied with application
to a variety of examples drawn from the computer and communica-
tions 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. Prereq: 504.

659 Digital Systems Verification (3) Three critical issues for robust
digital systems are design errors, manufacturing faults, and failures
during operation. This course covers digital system verification, test-
ing, and reliability for both timing and logic, in order to prepare stu-
dents 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. Prereq: 551, 557.

663 Advanced Plasma Physics I (3) Basic concepts of high temper-
ature plasma physics. Magnetohydrodynamics and kinetic descrip-
tions of plasma, plasma transport, plasma waves, equilibrium, and
stability. Prereq: Physics 541-542, 461-462 or 563-564, or consent
of instructor.

664 Advanced Plasma Physics II (3) Plasma heating and radiation
phenomena. Advanced topics of current interest. Must be taken in
sequence. Prereq: 663.

671 Image Processing and Robotics I (3) Three-dimensional scene
modeling and recognition, multi-sensor systems. Prereq: 572 or 573
or consent of instructor.

672 Image Processing and Robotics II (3) Stereovision, shape theory.
Prereq: 671.

673 Image Processing and Robotics III (3) Time-varying imagery,
path planning and navigation. Prereq: 672.

691 Advanced Graduate Seminar (1) Research in department.
May be repeated. Satisfactory/No Credit or letter grade.

692 Special Topics (1-3) Advanced topics of current interest to PhD
students in Electrical Engineering. May be repeated. Maximum 9
hours.

ELEMENTARY EDUCATION (322)

421 Elementary and Middle School Science and Social Studies
Instruction (3) Methods and materials for teaching science and
social studies. Development of functional relationships and entities
of two fields. Not open to students with recent course or background
in teaching science and/or social studies. Prereq: Admission to
teacher education.

429 Language Arts/Reading Instruction in Elementary and Middle
Schools (3) Language and language development as applied to teach-
ing of oracy (listening-speaking) and aspects of literacy (reading
process/readiness and writing). Not open to students with recent course
in language arts methods. Prereq: Admission to teacher education.

445 Early Childhood Education: Program Development and
Teaching in Kindergarten (3) Curriculum planning, classroom
organization and management practices for teaching young chil-
dren; relationship of kindergarten to total elementary school. Prereq:
Admission to teacher education.

504 Studies and Theory in Language Development (3) Studies
and theory of language development in children. Prereq: 1 elemen-
tary 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. Prereq: Elementary and Middle School Teaching
Methods I. Coreq: 575.

515 Seminar (1-3) Curriculum, instructional technology, elemen-
tary education, secondary education, or social foundations as relat-
ted to goals of students’ programs. May be repeated. Maximum 6
hours. Satisfactory/No Credit grading only.

524 Teaching for Creative Thinking and Expression (3) Creativity
of teacher and development of student creativity. Development of cre-
ative potential across academic curriculum. Creative problem solving
and methods for development of creative potential.

527 Elementary School Curriculum (3) Examination, evaluation
and application of curriculum designs in elementary school. Trends
and issues which affect elementary education. Prereq: Consent of
instructor.

528 Teaching Language Arts Elementary and Middle School (3)
Recent trends and current materials and methods in teaching ele-
mentary language arts (except reading). Prereq: Course in language
arts or consent of instructor.
529 Practicum in Diagnosis and Remediation of Difficulties in Learning Mathematics (3) Assessment and practicum experience with children having difficulties in learning elementary school mathematics. Prereq: 523 or consent of instructor.

550 Assessment and Correction of Language Arts Difficulties (3) Procedures and materials for diagnosing and correcting language arts difficulties; analysis of children’s work. Prereq: At least one language arts course or consent of instructor.

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. Prereq: Consent of instructor. May be repeated. Maximum 9 hours.

567 Application of Theory in Early Childhood Education (K-3) Principles and practices from selected theoretical orientations. Prereq: Course in early childhood education or consent of instructor. 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. Prereq: Course in early childhood education. May be repeated. Maximum 6 hours.

606 Research in Elementary Education (3) Analysis of research in elementary education with application to classroom teaching. Prereq: Research course.

650 Advanced Studies in Early Childhood Education (3) Prereq: 2 graduate courses in early childhood education and consent of instructor. May be repeated. Maximum 6 hours. Satisfactory/No Credit grading only.

651 Advanced Studies in Elementary School Language Arts (3) Selected issues in elementary school language arts. Prereq: 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. Prereq: Enrollment in engineering management. May be repeated. Maximum 6 hours. 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. May not be used toward degree requirements. Prereq: Enrollment in graduate studies and student projects. Prereq: 500 or consent of instructor.

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. Prereq: 539 and Industrial Engineering 518.

536 Project Management (3) Development and management of engineering and technology projects. Project proposal 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. Prereq: 537 or consent of instructor.

537 Analytical Methods for Engineering Managers (3) Survey of management analysis and control systems through IE techniques. Qualitative and quantitative systems: methods analysis, work measurement, incentive systems, wage and salary development, production and inventory control, facility layout, linear programming, and applied operations research techniques. Not for credit for students 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. Prereq: 539.

539 Strategic Management in Technical Organizations (3) Strategic planning process 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. Prereq: 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) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.


528 Ceramic Matrix Composites: Material and Mechanics (3) Micromechanics and microstructural design; fabrication of ceramic matrix composites; interface characterization and mechanics; electron microscopy examination; nondestructive evaluation; fracture; fatigue; applications. Prereq: Consent of instructor. (Same as Materials Science and Engineering 528.)

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. Prereq: Consent of instructor. (Same as Materials Science and Engineering 529.)

530 Continuum Mechanics (3) Cartesian tensors, transformation equations systems. Examples from diverse technical fields; fluid mechanics, heat/mass transfer, elasticity, electromagnetics, reacting systems. Computer projects. Prereq: Bachelor’s degree in engineering or natural science. (Same as Aerospace Engineering 530; Biomedical Engineering 530; Mechanical Engineering 530.)

531 Dynamics (3) See Mechanical Engineering 531.)

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) Computational procedures for differential equation statements in engineering and sciences. Approximation, boundary conditions, error extremization/estimation, finite element implementations; comparison to legacy finite difference methods. Applications in 1, 2, and 3 dimensions, non-linearity, unsteady problems, coupled equation systems. Examples from diverse technical fields; fluid mechanics, heat/mass transfer, elasticity, electromagnetics, reacting systems. Computer projects. Prereq: Bachelor’s degree in engineering or natural science. (Same as Aerospace Engineering 551; Biomedical Engineering 551; Mechanical Engineering 551.)

552 Computational Fluid Dynamics (3) Modern discrete approximation procedures for incompressible-thermal flows: Navier-Stokes equations, turbulence, heat transfer, Boussinesq form. Fundamentals of weak form methods, error extremization, trial and test function spaces, stability. Discrete implementations, finite element, finite volume; numerical linear algebra. Developments for steady boundary layers, unsteady flows using vorticity-stream function, pressure projection and pseudo-compressibility constructions. Comparisons to legacy methods, SIMPLE, PISO; theoretical error estimates, efficiency. Computer projects. Prereq: 551. (Same as Aerospace Engineering 552; Biomedical Engineering 552; Mechanical Engineering 552.)

553 Computational Solid Mechanics (3) Finite element techniques in structural mechanics and linear elasticity. Two and three-dimensional formulations; isoparametric elements, numerical quadrature. Equation solving, matrix iteration techniques. Applications in beams, plates and shells; use of representative computer programs in PC and networked Unix-CAD-solids modeler. Prereq: 321 Mechanics of Materials I or equivalent. (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. Prereq: 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 issue, biological fluid flows. Flow properties of blood, rheology of blood in micro vessels; 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. Prereq: 541. (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.)

581 Special Topics in Engineering Mechanics (3) Mechanics problems related to recent developments. Prereq: Consent of instructor. May be repeated with consent of department.

585 Green Engineering (3) See Chemical Engineering 581.)

590 Selected Engineering Problems (2-6) Enrollment limited to students in problems program. Prereq: Consent of advisor. May be repeated. Maximum 6 hours. Satisfactory/No Credit grading only.

595 Seminar (1) All phases of engineering science, reports on current research at UTK and UTSI. May be repeated. Satisfactory/No Credit grading only.

600 Doctoral Research and Dissertation (3-15) P/NP only.


645 Theory of Turbulence (3) Mathematical descriptions of turbulence; isotropic turbulence, energy spectra, Kolmogorov’s hypothesis, large and small eddy structure for turbulent flows; turbulent diffusion by continuous movement; applications to turbulent jets, wakes, pipe flow, and boundary layers. Prereq: 542. (Same as Aerospace Engineering 645.)
651-652 Advanced Topics in Computational Fluid Dynamics (3,3) Modern approximation theory for non-linear Navier-Stokes systems. Algorithm constructions; finite element, finite volume; accuracy, convergence, stability; smooth and non-smooth solutions; shocks, artificial dissipation mechanisms. Two- and three-dimensional, compressible viscous and inviscid flows; potential, Euler and complete Navier-Stokes descriptions: turbulence closure models, reacting flows; mixed subsonic-supersonic. Computer projects, production software. Prereq: 551, 552. (Same as Aerospace Engineering 651-652; Mechanical Engineering 661-662.)

653-654 Advanced Topics in Computational Solid Mechanics (3,3) Fracture mechanics; singularity solutions; non-linear constitutive problems, variable stiffness, initial strain-stress methods, plasticity, creep; geometrically non-linear problems, large deflection, stability, shell structures, solids; accuracy, convergence, adaptive grids; systems of nonlinear equations, solvers. Use of production-level finite element software. Computer projects. Prereq: 553. (Same as Aerospace Engineering 663-664; Mechanical Engineering 653-654.)

657 Computational Mechanics Seminar (1) Current developments in computational fluid/thermal/structural mechanics. For departmental thesis students only. May be repeated.

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. Prereq: Consent of instructor. May be repeated with consent of department.500 Thesis (1-15) P/NP only.

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 selected medieval literary masterpieces in modern English.

402 Chaucer (3) Reading and analysis of Canterbury Tales and Troilus and Criseyde in Middle English.

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 through reading of representative plays by Shakespeare’s contemporaries: Marlowe, Webster, Jonson.

409 Spenser and his Contemporaries (3) Principal achievements in prose and poetry of 16th-century authors; Spenser, Wyatt, Marlowe, More, Sidney, and Bacon.

410 Milton, Donne and their Contemporaries (3) Principal achievements in prose and poetry of first two-thirds of 17th century: poetry of Milton, Donne, Marvell; and prose of Browne, Bacon, Walton.

411 Literature of 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) A major genre or literary mode: drama, novel, poetry, non-fiction prose, satire, romance, or epic, written between 1660 and 1800. May be repeated.

414 Romantic Poetry and Prose I (3) Wordsworth, Coleridge, and Blake; readings from Lamb, De Quincey, and other prose writers.

415 Romantic Poetry and Prose II (3) Keats, Shelley and Byron; readings from Hazlitt, Peacock, and other prose writers.

416 Early Victorian Literature (3) May include poetry by Tennyson and the Brownings; prose by Carlyle, Newman, and Mill.

419 Later Victoriam 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 Nineteenth-Century British Novel (3) Scott to Hardy.

421 Modern British Novel (3) Works from authors such as Joyce and Woolf through contemporary British fiction writers.

422 Women Writers in Britain (3) Literary consciousness and works of women writers in Britain. Content will vary: Marie de France, Margery Kempe, Aemilia Lanyer, Elizabeth Cary, Apha Behn, Frances Burney, Mary Wollstonecraft, Mary Shelley, George Eliot, Virginia Woolf, and Doris Lessing. Writing-emphasis course. May be repeated. Maximum 6 hours. (Same as Women’s Studies 422.)

423 Colonial and Postcolonial Literature (3) Emphasis on historical and theoretical methodologies for reading colonial and post-colonial literature. May be repeated once with instructor’s consent.

431 Early American Literature (3) From earliest texts to 1830: exploration and discovery, Native American, colonial, revolutionary, and early national works.

432 American Romanticism and Transcendentalism (3) Prose and poetry of American Renaissance: from c. 1830 to end of the Civil War: Cooper, Poe, Hawthorne, Melville, Emerson, Thoreau, Stowe, Douglass, Whitman, and Dickinson.

433 American Realism and Naturalism (3) Literature from time of the Civil War to World War I: Twain, Howells, James, Jewett, Freeman, Crane, and Norris.

434 Modern American Literature (3) World War I to present.

435 American Novel before 1900 (3) From earliest sentimental novels through Brown and Cooper, and major figures to 1900: Hawthorne, Melville, Stowe, Clemens, and James.


441 Southern Literature (3) Southern writing from colonial period into 20th century: frontier humorists, local color writers, and Southern literary renaissance.

442 American Humor (3) Early 19th century into 20th century: Mark Twain.

443 Topics in Black Literature (3) Contents vary: particular genres, authors, or theories from 1845 to present: Langston Hughes and Harlem Renaissance, Richard Wright and Gwendolyn Brooks, writing by Black women, international Black literature in English, and Black American autobiography. (Same as African and African-American Studies 443.)

451 Modern British and American Poetry (3) From Yeats and Frost to Auden, Stevens, and more recent poets.

452 Modern Drama, 1880-1945 (3) Survey of British, American, and international drama from the advent of modern drama to the end of World War II. (Same as Comparative Literature 452.)

453 Contemporary Drama (3) Survey of British, American, and international drama since World War II.
454 Twentieth-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) Writing and analyzing persuasive texts in private, public, and academic contexts. Prereq: 355 or consent of instructor.

456 Contemporary/Postmodern Literature (3) Studies in literature written after World War II. Content will vary. May be repeated with consent of instructor. Maximum 6 hours.

460 Technical Editing (3) Editing technical material for publication. Principles of style, format, graphics, layout, and production management. Prereq: 360 or consent of instructor.

462 Writing for Publication (3) Principles and practices of writing for publication. Dissertation, theses, articles, and reports in science and technology. Prereq: 360 or consent of instructor.

463 Advanced Poetry Writing (3) Further development of skills acquired in basic writing poetry course. Prereq: 363 or consent of instructor.

464 Advanced Fiction Writing (3) Further development of skills acquired in basic writing fiction course. Prereq: 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 professional portfolio. Prereq: 360 or consent of instructor.

470 Special Topics in Rhetoric (3) Topics vary. Prereq: 355 or consent of instructor. May be repeated with consent of department. Maximum 6 hours.

471 Sociolinguistics (3) Study of language in relation to society. Empirical and theoretical focus. Large-scale units: tribes, nations, social groups. Prereq: 371 or 372 or Linguistics 200 or consent of instructor. (Same as Linguistics 471.)

472 American English (3) Phonological, morphological, and syntactic characteristics of major social and regional varieties of American English: origins, functions, and implications for cultural pluralism. Prereq: 371 or 372 or Linguistics 200 or consent of instructor. (Same as Linguistics 472.)

474 Teaching English as a Second or Foreign Language I (3) Major issues surrounding teaching ESL/EFL: 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. Prereq: Second year of foreign language or consent of instructor. (Same as Linguistics 474.)

476 Second Language Acquisition (3) How humans learn second languages. Theoretical models and research: differences between first and second language acquisition; learner variables; socio-cultural factors; and implications for second foreign 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. Basic and complex sentence structures; noun and article system; and verb 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. May be repeated with different topic. Maximum 6 hours.

482 Major Authors (3) Content varies. 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.

483 Special Topics in Literature (3) Topics vary. May be repeated. Maximum 6 hours.

484 Special Topics in Writing (3) Original writing integrated with reading, usually taught by professional author. Topics vary. May be repeated. Maximum 6 hours.

485 Special Topics in Language (3) May be repeated. Maximum 6 hours with consent of department. (Same as Linguistics 485.)

486 Special Topics in Criticism (3) Content varies. Theoretical and practical approaches to British and American literature. May be repeated with consent of department. Maximum 6 hours.

489 Special Topics in Film (3) Content varies. Particular directors, film genres, national cinema movements, or other topics. May be repeated with consent of department. Maximum 6 hours. (Same as Cinema Studies 489.)

490 Language and Law (3) Language in Anglo-American legal process: focus on differences between spoken and written language; lexical and syntactic ambiguity; pragmatics; speech act analysis; and language rights of linguistic minorities. Prereq: 371 or 372 or consent of instructor. (Same as Legal Studies 490; Linguistics 490.)

495 Introduction to Rhetoric and Composition (3) Historical, theoretical, and empirical modes of inquiry in rhetoric and composition and implications for teaching of composition. Prereq: 355 or consent of instructor.

496 Rhetoric of Legal Discourse (3) Application of basic principles of persuasive writing to legal materials. Issue identification and argument through written position papers, briefs, and memoranda. Critical reading and discussion. Introductory research techniques. No prior legal knowledge necessary. Prereq: 355 or consent of instructor. (Same as Legal Studies 496.)

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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: collecting of information, evaluation of material, and transmitting 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. 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.

513-514 Readings in Medieval Literature (3,3) Reading and analysis of selected masterpieces of Old and Middle English literature and their continental sources in modern English. May be repeated. Maximum 9 hours each.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites</th>
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</thead>
<tbody>
<tr>
<td>520-521</td>
<td>Readings and Analysis in Selected Areas of 16th- and 17th-Century Prose, Poetry, and Drama (3,3)</td>
<td>Content varies: genre, theme, literary movement, or other coherent emphasis. May be repeated. Maximum 9 hours each.</td>
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<tr>
<td>530-531</td>
<td>Readings in English Literature of the Restoration and 18th Century (3,3)</td>
<td>Topics vary. Genre: poetry, prose, fiction, drama; or period: Restoration, earlier eighteenth century, later eighteenth century. May be repeated. Maximum 9 hours each.</td>
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<tr>
<td>540-541</td>
<td>Readings in English Literature of the 19th Century I and II (3,3)</td>
<td>Content varies: genre, theme, literary movement, or other coherent emphasis. May be repeated. Maximum 9 hours each.</td>
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<tr>
<td>550-551</td>
<td>Readings in American Literature (3,3)</td>
<td>Content varies: genre, theme, literary movement, or other coherent emphasis. May be repeated. Maximum 9 hours each.</td>
</tr>
<tr>
<td>552</td>
<td>Readings in Black American Literature (3)</td>
<td>Content varies: genre, theme, literary movement, or other coherent emphasis. May be repeated. Maximum 9 hours.</td>
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<tr>
<td>560-561</td>
<td>Readings in 20th-Century Literature (3,3)</td>
<td>Content varies: genre, theme, literary movement, or other coherent emphasis. May be repeated. Maximum 9 hours each.</td>
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<tr>
<td>575</td>
<td>Issues in Second/Foreign Language Rhetoric and Composition (3)</td>
<td>Examination of cross-linguistic and cross-cultural issues in the development of academic writing proficiency in a second/foreign language. (Same as Linguistics 575.)</td>
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<tr>
<td>576</td>
<td>Introduction to Contemporary Criticism (3)</td>
<td>Introductory survey of twentieth-century literary criticism from New Criticism to present.</td>
</tr>
<tr>
<td>580</td>
<td>Fiction Writing (3)</td>
<td>Advanced fiction projects under supervision of instructor and time for independent study. Prereq: Extensive background in reading and writing fiction. May be repeated. Maximum 6 hours.</td>
</tr>
<tr>
<td>581</td>
<td>Colloquium in Poetry Writing (3)</td>
<td>Major poetic project or continuation of project begun in 463. Individual consultation with instructor supplements class analysis; readings in contemporary poetry and theory. Prereq: 463 or consent of instructor. May be repeated. Maximum 6 hours.</td>
</tr>
<tr>
<td>582</td>
<td>Special Topics in Writing (1-3)</td>
<td>Topics vary. May be repeated. Maximum 6 hours. Enrollment by consent of director of graduate studies only.</td>
</tr>
<tr>
<td>583</td>
<td>Special Topics in Literature (3)</td>
<td>Topics vary: genres, modes, and other literary subjects not in standard period divisions. May be repeated. Maximum 6 hours.</td>
</tr>
<tr>
<td>584</td>
<td>Topics in Feminist Studies (3)</td>
<td>Topics vary. May be repeated. Maximum 9 hours.</td>
</tr>
<tr>
<td>585</td>
<td>Issues in Invention, Style, and Audience (3)</td>
<td>Theoretical perspectives on contemporary research in rhetoric and composition.</td>
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<tr>
<td>586</td>
<td>History of Rhetoric I (3)</td>
<td>Survey of rhetoric from Sophists to Ramus.</td>
</tr>
<tr>
<td>587</td>
<td>History of Rhetoric II (3)</td>
<td>Survey of rhetoric from Bacon to present.</td>
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<tr>
<td>588</td>
<td>Readings in Applied Rhetoric (3)</td>
<td>Content varies: Writing across curriculum, writing centers, technical communication, text linguistics. May be repeated. Maximum 6 hours.</td>
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<tr>
<td>589</td>
<td>Special Topics in Language (3)</td>
<td>Topics vary. May be repeated. Maximum 6 hours.</td>
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<td>590</td>
<td>Topics in Critical Theory (3)</td>
<td>Topics vary. May be repeated. Maximum 9 hours.</td>
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<td>591</td>
<td>Foreign Study (1-15)</td>
<td>See College of Arts and Sciences.</td>
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<td>592</td>
<td>Off-Campus Study (1-15)</td>
<td>See College of Arts and Sciences.</td>
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<td>593</td>
<td>Independent Study (1-15)</td>
<td>See College of Arts and Sciences.</td>
</tr>
<tr>
<td>594</td>
<td>Film History, Form, and Analysis (3)</td>
<td>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.</td>
</tr>
<tr>
<td>600</td>
<td>Doctoral Research and Dissertation (3-15)</td>
<td>P/NP only.</td>
</tr>
<tr>
<td>610</td>
<td>Studies in Old English Language and Literature (3)</td>
<td>Old English grammar with readings in prose and poetry.</td>
</tr>
<tr>
<td>611</td>
<td>Studies in Beowulf (3)</td>
<td>Translation and critical study of Beowulf. Prereq: English 610 or consent of instructor.</td>
</tr>
<tr>
<td>620</td>
<td>Studies in Medieval English Literature (3)</td>
<td>Seminar in literature and literary genres of Medieval English literature, read in Old and Middle English. Subject matter varies from year to year. May be repeated. Maximum 9 hours.</td>
</tr>
<tr>
<td>621</td>
<td>Studies in Chaucer (3)</td>
<td>Seminar in text, interpretation, and criticism of Chaucer’s writings. Prereq: Previous course in Chaucer. May be repeated. Maximum 6 hours.</td>
</tr>
<tr>
<td>630-631</td>
<td>Studies in Renaissance Literature (3,3)</td>
<td>Seminars: Spenser, Milton. 17th-century prose and poetry, Shakespeare, 16th-century prose and poetry, non-Shakespearean drama. May be repeated. Maximum 9 hours each.</td>
</tr>
<tr>
<td>640-641</td>
<td>Studies in Restoration and Eighteenth-Century Literature (3,3)</td>
<td>Topics vary: Swift, satire, restoration literature, Johnson and Boswell, Addison and Steele, restoration drama, Dryden. May be repeated. Maximum 9 hours each.</td>
</tr>
<tr>
<td>650</td>
<td>Studies in English Romanticism (3)</td>
<td>Seminar content varies: particular literary figure or figures, genres, theme, or other coherent focus. May be repeated. Maximum 9 hours.</td>
</tr>
<tr>
<td>651-652</td>
<td>Studies in Victorian Literature (3,3)</td>
<td>Seminar content varies: particular literary figure or figures, genres, theme, or other coherent focus. May be repeated. Maximum 9 hours each.</td>
</tr>
<tr>
<td>660-661-662</td>
<td>Studies in American Literature (3,3,3)</td>
<td>Southern literature before 1830, frontier, regionalism, women’s literature, Irving, Cooper, Poe, Emerson, Thoreau, Hawthorne, Melville, Whitman, Dickinson, James, and Twain. May be repeated. Maximum 9 hours each.</td>
</tr>
<tr>
<td>670-671-672</td>
<td>Studies in 20th-Century Literature (3,3,3)</td>
<td>Seminar content varies: particular literary figure or figures, genres, theme, or other coherent focus. May be repeated. Maximum 9 hours each.</td>
</tr>
<tr>
<td>680</td>
<td>Topics in English Language (3)</td>
<td>May be repeated with consent of director of graduate studies. Maximum 9 hours.</td>
</tr>
<tr>
<td>682</td>
<td>Studies in Rhetoric and Composition (3)</td>
<td>Content varies. Advanced work in theory and/or history of rhetoric and composition. Issues in invention, textuality, literacy, historiography, style and ethics. May be repeated. Maximum 9 hours.</td>
</tr>
<tr>
<td>686</td>
<td>Studies in Creative Writing (3)</td>
<td>Content varies. Connection between theory and practice in writing. May be repeated. Maximum 9 hours.</td>
</tr>
<tr>
<td>688</td>
<td>Studies in Literary Criticism (3)</td>
<td>Content varies. Advanced work in theory and history of literary criticism. May be repeated. Maximum 9 hours.</td>
</tr>
<tr>
<td>690</td>
<td>Special Topics (3)</td>
<td>Content varies. History of ideas, humor, biography, autobiography, extra-literary disciplines. May be repeated. Maximum 9 hours.</td>
</tr>
<tr>
<td>694</td>
<td>Studies in Film (3)</td>
<td>Content varies. Advanced work in film history and analyses. May be repeated. Maximum 6 hours.</td>
</tr>
</tbody>
</table>

**ENGLISH EDUCATION (340)**

460 Teaching Reading and Literature in the Secondary School (3) Approaches for teaching basic reading skills and ways of teaching 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.

521 Interdisciplinary Aesthetics (3) Discussions, visual and audio presentations concerned with aesthetic considerations of areas of study: geography, history, physics, literature, languages, music, visual arts and drama.

590 Seminar in Teaching English in Secondary Schools (3) Content varies. Theoretical and practical approaches to teaching English in secondary school. May be repeated.

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.

598 Developing Speaking and Listening Skills, Grades 7-12 (3) Teaching approaches to nonverbal communication, interpersonal and group communication, public address and listening. Review of tests and materials.

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. Prereq: 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. Lecture and lab. Prereq: 110-120 or Biology 130-140 or equivalent and Chemistry 120-130 or equivalent. Recommended: 310, 321, 412; Microbiology 310 or 319; Plant Sciences 330. (Same as Plant Sciences 451.)

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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. 2 hours and 1 lab. Prereq: Biology 111-112 or Biology 130-140. Students cannot receive credit for both 405 and 505.

507 Professional Development Seminar (1) (See Agriculture and Natural Resources 507.)

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. MS students only. Students who receive credit for 612, may not enroll in 512. Prereq: 313 or consent of instructor.

513 Plant Pathogenic Fungi (2) Morphology, taxonomy, and biology of fungal plant pathogens. 2 hours and 2 labs weekly for 7 weeks. Prereq: 313 or consent of instructor. (Same as Plant Sciences 513.)

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. 3 hours and 1 lab for 7 weeks. Prereq: 313 or consent of instructor.

515 Physiology of Plant Disease (3) Biochemical and physiological events involved in host-pathogen interactions. Mechanisms of disease resistance. Master’s students only. Prereq: Introductory plant physiology and pathology or consent of instructor. Students taking 515 cannot receive credit for 615.

520 Plant Parasitic Nematodes (2) Morphology, physiology, taxonomy, ecology, and management of plant parasitic nematodes, host-parasite relationships. 2 hours and 2 labs weekly for 7 weeks. Prereq: 6 hours biological science or consent of instructor.

521 Plant Virology (3) 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. 2 hours and 1 lab. Prereq: 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. 1 hour and 1 lab. Prereq: 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. 2 hours and 1 lab. Prereq: 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. Prereq: 321, or consent of instructor. (Same as Plant Sciences 530.)

531 Special Problems in Entomology (1-3) Comprehensive individual study of current problems. May be repeated. Maximum 6 hours.

532 Special Problems in Plant Pathology (1-4) Comprehensive individual study of current problems. 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. Prereq: 321 or basic entomology course. May be repeated. Maximum 6 hours.

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. Master’s students only. May be repeated. Maximum 6 hours.

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 enzymes (isozyme) analyses. 1 hour and 4 labs weekly for 5 weeks. Prereq: 8 hours biological/botanical sciences, 8 hours chemistry, consent of instructor. (Same as Plant Sciences 544.)

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. 1 hour and 4 labs weekly for 5 weeks. Prereq: 8 hours biological/botanical sciences and consent of instructor. (Same as Plant Sciences 545.)
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. Prereq: Consent of instructor. Students cannot receive credit for both 448 and 548.

550 Molecular Epidemiology and Mycology (3) An overview of molecular tools for exploring population biology 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. The course is open to upper-level undergraduate (junior or senior), master’s, and PhD students. Prereq: Consent of instructor.

600 Doctoral Research and Dissertation (3-15) Doctoral Research and Dissertation. P/NP only.

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. 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 pathogenesis, plant pathogenic bacteria, soil- and seed-borne pathogens, and virology. May be repeated. Maximum 12 hours.

606 Advanced Topics in Bioactive Natural Products (1-3) Bioactive pesticides, ethnobotany and paleoethnobotany, ethnomedicine, biocontrol of plant pathogens, bioprospecting, natural product diversity, alternative bioactive crops, organic agriculture, allelopathy in agriculture, regulatory issues in natural product development, and bioactivity-guided isolation. 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: transgenics 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. Prerequisite: 530 or consent of instructor. May be repeated. Maximum 12 hours.

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. PhD students only. Students who have received credit for 512, may not enroll in 612. Prereq: 313 or consent of instructor.

615 Physiology of Plant Disease (3) Biochemical and physiological events involved in host-pathogen interactions. Mechanisms of disease resistance. PhD students only. Prereq: Introductory plant physiology and plant pathology or consent of instructor. Students who have taken 515 cannot receive credit for 615.

640 Seminar (1) Review of literature and current research in entomology and plant pathology. May be repeated. Maximum 2 hours. 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. 1 hours and 4 labs weekly for 7 weeks. Prereq: 12 hours biological sciences, 8 hours chemistry, written consent of instructor. (Same as Plant Sciences 643.)

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: 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. Prereq: 210; Chemistry 110 or 350.

442 Soil Genesis and Classification (3) Soil genesis and formation; observing and describing morphology of agricultural and forest soils; chemical and physical properties, classification. 3 weekend field trips. 2 hours and 1 lab. Prereq: 210.

444 Transport Processes in Soil (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. Prereq: 210 and Physics 221 or equivalent.

462 Environmental Climatology (3) Study of atmosphere as environment. Physical, chemical and biological factors affecting climates of various earth environments; meteorological process affecting biosystems. Climatic change and the human impact on the atmosphere, consequences of climatic change and mitigation policies, microclimates and urban climates, atmospheric pollution, extreme events and ozone depletion. Design and operation of weather information systems; automated weather stations. Prereq: Agriculture and Natural Resources 290 or equivalent.

481 Capstone in Environmental and Soil Sciences (3) Integrative course in which students work individually and collaboratively to develop solutions for soil and water related environmental problems. Writing and oral communication emphasis course. Prereq: 434 and senior standing.

500 Thesis (1-15) P/NP only.

502 Registration for Use of Facilities (3-15) 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. May be repeated. Satisfactory/No Credit grading only.

503 Seminar (1) Presentations and discussions of current scientific material. May be repeated. Maximum 3 hours. (Same as Biosystems Engineering 503; Biosystems Engineering Technology 503.)

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-root interface; and responses to adverse soil environmental conditions. 3 hours and 1 rec. Prereq: 434 or Integrated Plant Systems 431 or Plant Sciences 431 or General Plant Physiology.

512 Pedology (3) Physical and chemical weathering processes, factors of soil formation, soil forming processes. 2 hours and 1 lab. Prereq: 442 or consent of instructor.

513 Advanced Soil Chemistry (3) Chemical properties and processes that operate in soil environment: thermodynamics of soil solutions and surface chemistry of soils, solubil complex formation, mineral solubility, electrochemical equilibria, geochemical modeling, ion exchange equilibria, surface functionality and reactivity, adsorption phenomena, and surface complexation modeling. Prereq: 434 or consent of instructor.
514 Environmental 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 soil; 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. Prereq: 444 or equivalent.

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. 2 hours and one 3 hour lab. Prereq: 210 or consent of instructor.

593 Special Problems in Plant and Soil Science (1-3) May be repeated. Maximum 6 hours.

600 Doctoral Research and Dissertation (3-15)

601 Special Topics in Science (1-3) Thermodynamics of soil solutions, clay structure and surface chemistry, soil mineralogy, plant mineral nutrition, soil microbiology, water movement and use by plants, soil structure, soil thermal properties, interaction in the soil-plant environment. May be repeated. Maximum 6 hours.

603 Seminar (1) Presentations and discussion of current scientific material. May be repeated. Maximum 3 hours. (Same as Biosystems Engineering 603.)

613 Advanced Topics in Soil Chemistry and Fertility (2) Topics of current significance; scientific literature. Prereq: 513 or equivalent.

614 Advanced Topics in Soil Biology and Biochemistry (2) Topics of current significance; scientific literature. Prereq: 516 or equivalent.

615 Advanced Topics in Soil Physics, Genesis, and Morphology (2) Topics of current significance; scientific literature.

ENVIRONMENTAL ENGINEERING (344)

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

508 Seminar (1) Reports on current research in environmental engineering at the University of Tennessee, Knoxville. Prereq: Graduate standing. Satisfactory/No Credit grading only.

520 River Mechanics (3) An integrated study of river mechanics including the principles of open channel flow, and the fluvial processes associated with a mobile bed. Theory and analysis of open channel hydraulics include uniform, gradually-varied, rapidly-varied, spatially-varied, and unsteady flow conditions. Fluvial processes consist of sediment properties, dynamics of suspended and bedload sediment transport, adjustments in channel morphology and channel stability, channel regime theory and erodible channel design, and modeling applications. Prereq: Civil Engineering 390

522 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; cast studies. Prereq: Civil Engineering 390 or consent of instructor for non-majors.

525 Soil Erosion and Sediment Yield (3) Theory of soil erosion and sediment yield processes from disturbed land; methods and computer models for estimating sediment yield. Erosion and sediment control theory and management practices. Local and state regulations. Prereq: Civil Engineering 395 or 416. (Same as Biosystems Engineering 525.)

530 Urban Hydrology and Stormwater Engineering (3) Planning, design, modeling, management, 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. Prereq: 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 PDEs that describe flow through porous media: boundary conditions, stability, existence and uniqueness. Prerequisite: 485 or Geology 485 or consent of instructor. (Same as Geology 535.)

543 Instrumentation and Measurement (3) (See Biosystems Engineering 543.)

545 Monitoring Hydrologic Phenomena (3) (See Biosystems Engineering 545.)

551 Physicochemical Unit Processes (3) Theory and design application in water and wastewater treatment. Prereq: Civil Engineering 380 and 390.

552 Biological Treatment Theory (3) Theory and design applications of biological processes to treatment of wastewater and solid wastes. 2 hours and 1 lab. Prereq: Civil Engineering 380. (Same as Biosystems Engineering 552.)

553 Aquatic Chemistry (3) Theoretical, applied and analytical chemistry related to generation, measurement and treatment of environmental contaminants. 2 hours and 1 lab. Prereq: General Chemistry.

554 Environmental Engineering Chemistry (3) Application of chemical principles in analyzing physical, chemical, or biological interactions of chemical contaminants in various environmental compartments: atmosphere, hydrosphere, and lithosphere. Prereq: One year chemistry and consent of instructor.

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. Prereq: Senior standing.

556 Hazardous Waste Management (3) Analysis and design of operations and processes for hazardous waste disposal and processing: regulations analysis; industrial applications. Prereq: 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. Prereq: 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. Prereq: 570.

572 Air Quality Dispersion Modeling (3) Diffusion in atmosphere; application of atmospheric dispersion models and evaluation of meteorological and air quality data. Prereq: 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. Prereq: 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. Prereq: Graduate standing. May be repeated. Maximum 6 hours. Satisfactory/No Credit grading only.

595 Special Topics (1-4)
Problems and topics related to current developments in field. May be repeated.

620 Advanced Surface Water Hydraulics (3)
Advanced topics in surface water hydraulics; solutions in St. Venant equations of unsteady flow for complex channel situations; dam breach modeling. Prereq: 520.

651 Industrial Waste Unit Operations and Processes (3)
Theoretical design and laboratory modeling of industrial waste treatment processes and operations. 2 hours and 1 lab. Prereq: 551, 553. Prereq or coreq: 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. Prereq: 551.

691 Special Topics in Environmental Engineering (3)
Selected advanced problems of current interest. Prereq: Consent of instructor. May be repeated.

EXERCISE SCIENCE (347)

480 Physiology of Exercise (3)
Functions of body in muscular work: physiological aspects of fatigue, training and adaptation to environment. Prereq: Biochemistry and Cellular and Molecular Biology 230 or 440. (Same as Biochemistry and Cellular and Molecular Biology 480.)

500 Thesis (1-15)
P/NP only.

501 Special Project (3)
Culminating experience for non-thesis major. Research study suitable for publication, or practicum requiring special written work. 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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). Prereq: Course in statistics or consent of instructor.

525 Epidemiology of Injury and Violence (3)
Epidemiologic methods to describe magnitude and examine etiology of unintentional and intentional injury. Alternative approaches for preventing or controlling occurrence of injury and violence in both general population and high risk sub-populations.

531 Biomechanics (3)

533 Exercise Physiology (3)
Physiology of human performance: acute and chronic effects of exercise on metabolic, cardiac, pulmonary, and skeletal systems. Prereq: Human physiology or general physiology, general chemistry. 2 hours and 1 lab.

541 Special Topics (1-3)
Advanced study in selected areas of exercise science. May be repeated.

565 Advanced Physiology of Exercise (3)
Systematic study of skeletal muscle and metabolism related to acute exercise and physiological, and experimental evidence concerning relationship and effects of exercise on health-related components of fitness. Prereq: 480 or 533.

567 Exercise Testing and Prescription (3)

569 Clinical Exercise Physiology (3)
Cardiac structure and function, interpretation of 12-lead electrocardiograms, exercise considerations for cardiac and pulmonary patient. Prereq: 480 or 533, and 567.

600 Doctoral Research and Dissertation (3-15)
P/NP only.

601 Research Seminar (1) (3-15)
Research topics in different aspects of exercise science, sport psychology, and sport sociology. May be repeated. Maximum 6 hours. Satisfactory/No Credit grading only. (Same as Sport Studies 601.)

622 Directed Independent Research (3-6)
Prereq: Doctoral student or consent of instructor. May be repeated. Satisfactory/No Credit or letter grade.

625 Mortality and Survival (3)
Life table and other population-based approaches to studying international and sociodemographic patterns and differentials in mortality, morbidity, and disability. Prereq: 2 graduate statistics courses 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. Prereq: Elementary statistics, 480 or 533 and 567 or consent of instructor. (Same as Public Health 635.)

661 Seminar in Exercise and Applied Physiology (1-3)
Selected topics in exercise and environmental physiology. Prereq: 480 or 533. May be repeated with consent of instructor.

664 Research Participation in Exercise Science (1-6)
Participation in research with faculty member whose interests coincide with those of student. Satisfactory/No Credit grading only.

681 Practicum (1-3)
Intern experience in areas of major interest. May be repeated.
693 Independent Study (1-3) May be repeated. Satisfactory/No Credit or letter grade.

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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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. Prereq: 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. Prereq: Business Administration 511, 512, and 513, 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. Prereq: Business Administration 511, 512, 513, and 514, or consent of instructor.


551 Financial Management of a New Enterprise (3) Financial issues associated with formation, control, and long-term planning of new enterprise. Acquisition of venture capital. Prereq: 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 variety of 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. Prereq: Business Administration 511, 512, 513, and 514, or consent of instructor.

599 Special Topics in Finance (1-3) Topics vary. Prereq: Consent of instructor. May be repeated. Maximum 6 hours. Satisfactory/No Credit or letter grade.

600 Doctoral Research and Dissertation (3-15) P/NP only.

641 Seminar in Finance (1-3) Capital markets, utility theory, asset pricing, theory of the firm, capital structure, dividend policy. Prereq: Consent of instructor. Satisfactory/No Credit or letter grade.

651 Seminar in Corporate Finance (1-3) Recent theoretical and empirical developments in micro-finance literature. Topics vary. Prereq: 641 and consent of instructor. May be repeated. Maximum 6 hours. Satisfactory/No Credit or letter grade.

652 Seminar in Asset Pricing and Markets (1-3) Recent theoretical and empirical developments in finance. Topics vary. Prereq: 641 and consent of instructor. May be repeated. Maximum 6 hours. Satisfactory/No Credit or letter grade.

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. Prereq: 641 and consent of instructor. May be repeated. Maximum 6 hours. Satisfactory/No Credit or letter grade.

654 Special Topics (1-3) Recent developments in finance. Topics vary. Prereq: 641 and consent of instructor. May be repeated. Maximum 6 hours. Satisfactory/No Credit or letter grade.

FOOD SCIENCE AND TECHNOLOGY (390)

410 Food Chemistry (4) Reactions of water, proteins, lipids, carbohydrates, minerals, enzymes, vitamins, and additives in foods. 3 hours and 1 lab. Prereq: Chemistry 110, Biochemistry and Cellular and Molecular Biology 310.

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. Prereq: Microbiology 210. Coreq: 429.


430 Sensory Evaluation of Food (3) Principles and methods of sensory evaluation of foods. 2 hours and 1 lab. Prereq: Basic statistics.

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. 3 hours lecture and 1 lab. Prerequisite: 340 and 410 or consent of instructor.

460 Meat Science (3) Carcass characteristics of meat animals, muscle structure and composition, cut identification, curing, freezing and cookery. Prereq: 140 or consent of instructor.

469 Meat Science Lab (1) Slaughter and processing methods for beef, pork, lamb and poultry. Coreq: 460.

490 Food Laws and Regulations (3) Laws and regulations designed to preserve safety, wholesomeness, and nutritional quality of United States food supply; precedent case studies and their impacts on laws and regulations. Prereq: 140; consent of instructor for non-majors.

495 Quality Assurance and Sanitation Practices (3) Design and evaluation of food processing operation to produce safe and acceptable quality food product. Prereq: 320 and 340 or consent of instructor.

500 Thesis (1-15) P/NP only.

501 Seminar (1) Individual reports and discussion on topics from current literature. May be repeated. Maximum 3 hours. 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

503 Problems in Lieu of Thesis (2-3) May be repeated. Satisfactory/No Credit grading only.

507 Professional Development Seminar (1) (See Agriculture and Natural Resources 507.)
510 Instrumental Analysis of Food (3) Modern instrumental methods for control of food manufacturing processes. Prereq: 410. 2 hours and 1 lab.

512 Flavor of Foods (2) Chemical basis, measurements, and reactions involved in flavor changes in foods. Manufacture and application of flavorings in foods. 1 hour and 1 lab. Prereq: 410 or equivalent.

515 Food Carbohydrates, Proteins and Lipids (4) Advanced study of chemical and physical components 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. 3 hours and 1 lab. Prereq: 410 or equivalent.

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. Prereq: 420, 429 or equivalent.

540 Food Product Development (3) Art, science and technology of developing and marketing new food products. 2 hours and 1 lab. Prereq: 340.

560 Advanced Meat Science (3) Physical and chemical changes that occur in conversion of muscle to meat; effect of postmortem treatments on meat quality, composition and palatability; packaging, preservation and quality control. 2 hours and 1 lab. Prereq: 460.

590 Special Topics in Food Technology and Science (1-3) Critical reviews of current research and production concerns of food industry. 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. May be repeated. Maximum 6 hours.

600 Doctoral Research and Dissertation (3-15) P/NP only.

601 Seminar (1) Reports and directed discussion on research topics from current literature. May be repeated. Maximum 3 hours. Satisfactory/No Credit grading only.

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. Prereq: 410, 521, or consent of instructor.

640 Advanced Food Processing (3) Role of processing treatments in modification of food properties; texture, flavor and color characteristics. Prereq: Food Preservation, 510, 511, 512 or consent of instructor.

FOREIGN LANGUAGE/ESL EDUCATION (394)

455 Teaching of Foreign Languages, Grades 7-12 (3) Instructional methods, lesson planning, peer-teaching; materials for teaching foreign language and culture; evaluation techniques. Required for certification in modern foreign languages and Latin. Prereq: Completion or near completion of foreign language hours for certification and 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. Prereq: 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. Required course for ESL certification. Prereq: 578 or consent of instructor.

578 Teaching English as a Second Language (3) Instructional methods; utilization of assessment procedures to diagnose English linguistic proficiency; materials for non-native speaker in K-12 classroom. Required for Tennessee ESL (K-12) licensure. Prereq: 587 or 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. Prereq: 578 or consent of instructor.

687 Advanced Studies in Foreign Language Education (3) Research, curricula, assessment, trends and issues in foreign language education. Prereq: 587 or consent of instructor.

FORESTRY (396)

421 Forest and Wildland Resource Economics (3) Production functions, supply-demand and market analysis; non-market programs and projects; economic analysis and decision models; investment and financial analysis; managerial economics; taxes; forest products marketing. Prereq: 324 or consent of instructor.

422 Forest and Wildland Resource Policy (3) Policy formulation; criteria for policy determination; forest and wildland law and regulation; theory of conflict resolution; formal and informal resolution. Prereq: Senior standing or consent of instructor.

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. 2 hours and 1 lab. Prereq: 321 or consent of instructor.

433 Wood Adhesives and Glued Wood Products (2) Theory and practice of adhesive bonding of wood; wood substrate-adhesive interface for bonding; principles of adhesion; wood adhesives; gluing of solid wood and composite wood manufacturing practices; laboratory manufacture and/or testing of adhesives, adhesive bond strength and glued-wood product performance; day field trips. 1 hour and 2 labs. Prereq: 331 and 332, or consent of instructor.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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. Available only to students in non-thesis option for MS in Forestry.

512 Seminar (1) Current developments in forestry. Required of all graduate students in residence in fall. May be repeated. Maximum 2 hours. Satisfactory/No Credit grading only.

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. Prereq: Botany 110-120, or Biology 101/102. Students cannot receive credit for both 414 and 514.

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. Not available to students in forestry or wildlife and fisheries science. May be repeated. Maximum 3 hours.
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. Prereq: 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. Prereq: Basic understanding of polymer chemistry, engineering and physics, or consent of instructor. Prereq: Silvicultural methods and Biology 220 or consent of instructor.

525 Woodlot Management (3) Current technologies and management strategies concerning wise use of forest resources for private, non-industrial forest landowners necessary for decision-making and implementation. 6.5 hours and 1 lab weekly for 6 weeks. Prereq: 6 hours of biological sciences or consent of instructor. Not available to students in forestry or wildlife and fisheries science.

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. Prereq: Senior-level forest management or consent of instructor.

540 Genetics in Forestry (3) Genetic improvement of forest trees, selection of superior phenotypes; field testing for genetic variability; tree breeding; development of seed orchards; hybridization; tree cytology and tissue culture; use of biochemical variation; planning and conducting forest genetics research.

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. Overnight field trips. Prereq: Senior level in forest recreation or consent of instructor.

580 Advanced Silviculture (3) Silvical characteristics, silvicultural practices and systems applied to commercially important hardwood 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. 2 hours and 1 lab. Prereq: Undergraduate silviculture course or consent of instructor.

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 multiphase sampling. Growth and yield predictors for even-aged and uneven-aged forests. Prereq: 326 and 329 or consent of instructor.

590 Advanced Topics in Forestry (1-3) Recent advances and concepts; research techniques and analysis of current problems. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

593 Independent Study in Forestry (1-4) 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. 2 hours and 1 lab. Prereq: Undergraduate silviculture course or consent of instructor.

FORESTRY, WILDLIFE AND FISHERIES (398)

410 Wildlife Habitat Evaluation and Management (3) Ecological relationships between wildlife and habitat. Evaluation, modeling, and management of wildlife habitat. Effects of land-use practices on wildlife habitat. Weekend field trips. 2 hours and 1 lab. Prereq: 317 or consent of instructor. Applicable to majors in Forestry and in Wildlife and Fisheries Science.

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. Applicable to majors in Forestry and in Wildlife and Fisheries Science. 1 hour and 2 labs. Prereq: Senior standing.

520 Natural Resource Issues at International Level (2) 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 world: Northern Europe, Latin America, Asia, Africa, and South America. In-depth case study and class presentation required by student teams. Not available for students who have taken 420.

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. Prereq: 416 or equivalent or consent of instructor. Applicable to majors in Forestry and in Wildlife and Fisheries Science.

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. Prereq: Graduate standing. Students who received credit for Forestry 570 may not receive credit for Forestry, Wildlife and Fisheries 570.

590 Advanced Topics in Forestry, Wildlife and Fisheries (1-3) Recent advances and concepts, research techniques, and analysis of current problems. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

600 Doctoral Research and Dissertation (3-15) P/NP only.


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 fall. May be repeated. Maximum 3 hours.

**FRENCH (405)**


411 French Literature of the 16th Century (3) Highlights of 16th-century French literature. Excerpts from Rabelais and Montaigne; readings of poems from writers from Lyon and members of Pléiade. Prereq: 300-level literature course.


413 French Literature of the 18th Century (3) Major works of Enlightenment. Prereq: 300-level literature course.


420 French Cinema (3) French cinema from earliest days through New Wave directors. Prereq: 300-level literature course. May apply toward major. *(Same as Cinema Studies 420.)*

421 Phonetics (3) Foundation in science of phonetics. Practical exercises and individual performance. Graduate credit not offered to students majoring in Romance language. Prereq: 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 French language. Writing creative free-style compositions. Prereq: 333 or 334 or 345.

423-424 Advanced Conversation (1,1) Informal conversation with native speaker on contemporary topics. Stresses in-class contact rather than outside preparation. Prereq: 333 or 334 or 345. Meets 2 hours a week.

425 Introduction to Descriptive Linguistics (3) Theory and practice of techniques of linguistic analysis in sub fields of phonetics, phonology, morphology, syntax, semantics, pragmatics and historical linguistics; discussion of relevance to learning and teaching of foreign languages and to study of literary texts. Recommended prereq: Language, Linguistics and Society. *(Same as German 425; Linguistics 425; Russian 425; and Spanish 425.)*

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. Writing-emphasis course. Prereq: French 351 or 352. May apply toward major as a literature course.

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. Prereq: 300-level literature course.

432 Contemporary French Culture (3) Current French cultural issues placed in historical perspective with comparative emphasis. Taught in English; readings in French for majors.

434 Literature of Quebec (3) Survey of literature of Quebec as well as French literature connected with North America. Readings include explorer and missionary works, such as Voyages of Champlain and Journals of Jesuits, and literature of contemporary Quebec. Prereq: 300-level literature course.

445 Advanced French for Business (3) Advanced contemporary French language and culture as relates to business transactions. Comparative approach to explore differences and similarities between francophone business culture(s) and those of North America and Japan. Building knowledge of business terminology while being sensitized to cultural differences and dangers of simplistic stereotyping. Prereq: 345 or consent of instructor.

500 Thesis (1-15) P/NP only.

501 Techniques in Literary Analysis (3) Required for MA program. Close stylistic analysis of texts representative of different eras and of different genres. Development and improvement of student’s written French.

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. May be repeated. Satisfactory/No Credit grading only.

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 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 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 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. May be repeated. Maximum 6 hours with consent of department.

584 Modern Theory and Criticism (3) Survey of 20th century critical theory, including psychoanalysis, Marxism, structuralism, and more.
591 Foreign Study (1-15) See College of Arts and Sciences.

592 Off-Campus Study (1-15) See College of Arts and Sciences.

593 Independent Study (1-15) See College of Arts and Sciences. Satisfactory/No Credit or letter grade.

594-595 French Directed Readings (3,3) P/NP only.

596 Directed Readings (3-15) P/NP only.

597 Directed Research (4-12) Satisfactory/No Credit or letter grade.

598 Directed Research (2-12) P/NP only.

599 Directed Research (1-15) Satisfactory/No Credit or letter grade.

600 Doctoral Research and Dissertation (3-15) P/NP only.

610 Doctoral Seminar in French and Francophone Studies, or Linguistics (3) Content varies. May be repeated. Maximum 12 hours with consent of department.

GEography

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: coordinate systems, datum issues, scanning and digitizing, map standards, and uncertainty in Geographic Information Systems. 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 of GIS. 2 hours lecture and 2 hours lab. Prereq: 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. 2 hours and 2 labs. Prereq: 310 or consent of instructor.

413 Remote Sensing: Types and Applications (4) Principles and uses of remote sensing imagery, digital data, and spectral data: geographic interpretation and mapping techniques. 3 hours lecture, 2 hours lab. Prereq: 310 or consent of instructor.

414 Spatial Databases and Data Management (3) Types, sources, acquisition, and documentation of spatial data. Spatial database management methods and strategies for data sharing. 2 hours lecture and 2 hours lab. Prereq: Geography 411 or consent of instructor.

415 Quantitative Methods in Geography (3) Geographic application of statistical techniques, point pattern analysis, and analysis of areal units. Prereq: Mathematics 115 or Statistics 201 or consent of instructor.

421 Geography of Folk Societies (3) Geographical study of folk culture, traditional material culture and rural settlement, examples from eastern North America and selected foreign areas.

422 Geography of American Popular Culture (3) Geographical study of regional variation in popular cultures, youth cultures in United States. (Same as American Studies 423.)

423 Dendrochronology (4) Principles, techniques, and interpretation in tree-ring science. Applications in geography, climate, ecology, forestry, archaeology, and earth sciences. 3 hours and 2 hours lab per week. Prereq: 131-132 or consent of instructor.

424 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. Prereq: 131-132 or consent of instructor.

425 Biogeography (3) Changing distribution patterns of plants and animals on variety of spatial and temporal scales. Effects of continental drift, Pleistocene climatic change, and human activity on world biota. Prereq: 131-132 or consent of instructor.

430 Climatology (3) General circulation system leading to world pattern of climates. Climatic change and modification, and interrelationships of climate and human activity. Prereq: 131 or consent of instructor.

431 Special Topics in Geography (1-4) Topics vary. Prereq: consent of instructor. May be repeated with consent of instructor. Maximum 8 hours. Satisfactory/No Credit or letter grade.

432 Water Resources (3) Global water resources and hydrologic processes: water availability, flooding, and water quality issues from physical and economic geographical perspectives. Prereq: 131-132 or consent of instructor.

433 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. Prereq: 131 or 132 or coursework in botany or consent of instructor.

434 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. Writing emphasis course. (Same as Urban Studies 441.)

435 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. Writing-emphasis course.

436 Water Resources (3) Global water resources and hydrologic processes: water availability, flooding, and water quality issues from physical and economic geographical perspectives. Prereq: 131-132 or consent of instructor.

437 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. Prereq: 131 or 132 or coursework in botany or consent of instructor.

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. Writing emphasis course. (Same as Urban Studies 441.)

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 (Same as Urban Studies 442.)

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. Writing-emphasis course.

444 Geography of Transportation (3) Examination of transportation systems, their effects on trade patterns, land use, location problems, and development.

450 Process Geomorphology (3) (See Geology 450.)

451 Terrain Analysis (3) Analysis of landscape history from digital elevation datasets and traditional topographic maps. Basement materials and structures; and erosional and depositional evidence, including fluvial, glacial, aeolian, and shoreline features, of past climatic and biological regimes. Prereq: 131-132 or Geology 101-102 /107-108.

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 K-12 schools. Course organization and content based largely on that of National Geography Standards.

495 Special Topics in Geography (1-4) Topics vary. Prereq: consent of instructor. May be repeated with consent of instructor. Maximum 8 hours. Satisfactory/No Credit or letter grade.

500 Thesis (1-15) P/NP only.

501 Colloquium in Geography (1) Discussion of departmental research, current research literature, and general topics. Registration required of resident graduate students whenever offered. May be applied toward graduate degree. May be repeated. Maximum 4 hours. 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

504 Introduction to Geographical Research (1) Research interests and methods of departmental faculty. Research frontiers in geography. Required of new graduate students. Satisfactory/No Credit grading only.

505 Directed Research (2-6) Research on problems as defined by individual students. Prereq: Written consent of instructor and department prior to registration. May be repeated with consent of instructor. Maximum 9 hours. Satisfactory/No Credit or letter grade.

506 Directed Readings (2-6) Readings on topics of interest as defined by individual students. Prereq: Written consent of instructor and department prior to registration. May be repeated with consent of instructor. Maximum 9 hours. Satisfactory/No Credit or letter grade.
509 Topics in Geography (2-3) Topics vary. Prereq: Consent of instructor. May be repeated with consent of instructor. Maximum 6 hours. Satisfactory/No Credit or letter grade.

510 Geographic Software Design (3) Algorithms for spatial analysis, software design, and program implementation in stand alone and distributed computing environments. Prereq: Consent of instructor.

513 Topics in Remote Sensing (3) Applied research using imagery for interpretation and mapping of geographic data. Prereq: 413 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hours.

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. Prereq: 415 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hours.

517 Geographic Information Management and Processing (3) Concepts and methods in management of geographic information. Database design, manipulation, sampling and analysis. Prereq: 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. Prereq: 411 or consent of instructor.

519 Graduate Practicum in Cartography/Remote Sensing/GIS (2-6) Prereq: Written consent of department before registration. May be repeated with consent of instructor. Maximum 6 hours.

521 Topics in Cultural Geography (3) Examination of trends, problems, and methods in cultural geography. Prereq: 421 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hours.

523 Topics in Physical Geography (3) Trends, problems, and methods in geomorphology or other areas of physical geography. Prereq: Consent of instructor. May be repeated with consent of instructor. Maximum 6 hours.

532 Topics in Global Change (3) Emerging trends, anticipated problems and methods in global change research and response. Prereq: 434 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hours.

533 Topics in Physical Geography (3) Trends, problems, and methods in geomorphology or other areas of physical geography. Prereq: Consent of instructor. May be repeated with consent of instructor. Maximum 6 hours.

534 Topics in Climatology (3) Trends, problems and methods in area of climatology. Prereq: 434 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hours.

535 Topics in Biogeography (3) Examination of trends, problems, and methods in biogeography. Prereq: 435 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hours.

536 Topics in Watershed Dynamics (3) Trends, problems and methods in study of watershed processes. Prereq: Consent of instructor. May be repeated with consent of instructor. Maximum 6 hours.

541 Topics in Urban Geography (3) Analysis of research on urban systems, internal morphology, urban problems and urban spatial behavior. Prereq: 441 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hours.

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. Prereq: 449 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hours.

591 Foreign Study (1-15) See College of Arts and Sciences. Prereq: Written consent of department prior to registration. Satisfactory/No Credit or letter grade.

592 Off-Campus Study (1-15) See College of Arts and Sciences. Prereq: Written consent of department prior to registration. Satisfactory/No Credit or letter grade.

593 Independent Study (1-15) See College of Arts and Sciences. Prereq: Written consent of department prior to registration. Satisfactory/No Credit or letter grade.

599 Geographic Concept and Method (3) Traditional and modern geographic thought: readings on nature, scope, problems, and methods of geography. Prereq: Consent of instructor.

600 Doctoral Research and Dissertation (3-15) P/NP only.

609 Seminar in Geography (2-3) Topics vary. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

623 Seminar in Dendrochronology (3) Prereq: 432 or consent of instructor. May be repeated. Maximum 6 hours.

633 Seminar in Physical Geography (3) Prereq: 533 or consent of instructor. May be repeated. Maximum 6 hours.

634 Seminar in Climatology (3) Prereq: 534, 532 or consent of instructor. May be repeated. Maximum 6 hours.

635 Seminar in Biogeography (3) Prereq: 535 or consent of instructor. May be repeated. Maximum 6 hours.

641 Seminar in Urban Geography (3) Prereq: 541 or consent of instructor. May be repeated. Maximum 6 hours.

643 Seminar in Rural Geography (3) Prereq: 443 or consent of instructor. May be repeated. Maximum 6 hours.

649 Seminar in Geography of Transportation (3) Prereq: 549 or consent of instructor. May be repeated. Maximum 6 hours.

663 Seminar in Geography of the American South (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

GEOLOGY (424)

401 Quantitative Methods in Geology (3) Applications of calculus and differential equations to problems in earth sciences. Examples of diffusion equation in hydrogeology; wave equation in geophysics; mechanical modeling and boundary conditions in structural geology and tectonics. Prereq: two 100-level geology courses and Mathematics 141, or consent of instructor.


411 Optical Mineralogy (2) Laboratory course on principles of optical mineralogy. Use of petrographic microscope to identify rock-forming minerals with applications to petrology and environmental mineralogy. Prereq: 310.

412 Elements of X-ray Diffraction (2) Laboratory course on principles and applications of X-ray diffraction. Phase identification, quantitative determination of mineral abundances in mixtures, and crystal structure determination. Prereq: 310.
440 Field Geology (5) Summer field course for advanced undergraduate and graduate students in geology. Taught off-campus and requires full time of student. Synthesis of major aspects of geological sciences in societal context. Field techniques demonstrated, practiced, and applied to solution of geological problems. Prereq: Completion of major core courses and consent of instructor.

450 Process Geomorphology (3) Integrative approach to development of surface of earth based upon case histories, maps, remote sensing imagery, 2 hours and one 2 hour lab. Prereq: two 100-level geology courses or consent of instructor. (Same as Geography 450.)

455 Basic Environmental Geology (3) Applications of geological sciences toward comprehension of effects of geological processes on humans and effects of human activities on earth's environments. 2 hours and one 3 hour lab or field period. Prereq: one 100-level geology course or consent of instructor.

460 Principles of Geochemistry (4) Applications of chemical principles to geologic systems: problem-solving techniques. 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. 3 hours and one 2 hour tutorial. Prereq: Chemistry 120-130, Mathematics 141-142. Recommended prereq: Geology 330 or consent of instructor.

470 Applied Geophysics (3) Basic principles of geophysical exploration: applications to environmental problems. Seismic and electromagnetic methods. Prereq: 6 hours of geology courses numbered above 300 and Physics 135-136 or equivalent, or consent of instructor.

475 Physical and Chemical Systems of the Earth (3) Development of physical earth from solar nebula to present. Formation, composition and evolution of hydrosphere, crust, mantle, and core. Interdependence of earthquakes, volcanism, plate tectonics, geomagnetism, chemical and isotopic processes of interior, and earth's temperature. Historical perspective on major controversies of past, and problems unresolved today. 2 hours and 1 discussion. Prereq: 16 hours of geology courses numbered 300 and above.

480 Principles of Economic Geology (4) Ore-forming processes, classification of mineral deposits, survey of different types of mineral deposits with examples, and metallogenesis. 1 hour and one 2 hour lab. Prereq: 310 and 330 or equivalents. Recommended prereq: 460.

485 Principles of Hydrogeology (3) Physical principles of flow, flow equations, geologic controls, aquifer analysis, water well design/testing, introduction to transport processes. Prereq: one 100-level geology course, Mathematics 141-142, and Physics 135 or 136 or equivalent, or consent of instructor. (Same as Civil Engineering 485.)

486 Hydrogeology Laboratory (1) Application and demonstration of hydrogeological principles in field and laboratory. Prereq or coreq: 485 or Environmental Engineering 535 or consent of instructor.

500 Thesis (1-15) P/NP only.

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. Prereq: 401, or at least two Earth Science related courses, 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

505 Structure of the Southern and Central Appalachians (2) Structural development of Southern and Central Appalachians from extensional Late Proterozoic—early Paleozoic rift-drift-platform margin through processes related to compressional events producing accretory elements that formed Appalachians throughout the Paleozoic. Comparisons to similar orogens. Prereq: 370.

510 Clay Mineralogy (3) Origin, chemistry, structures, and properties of clay minerals; application of mineralogical techniques in clay mineral studies. 2 hours and 1 lab. Prereq: 310 and 568 or equivalent.

530 Petrogenesis of Crystalline Rocks (4) Origin and properties of igneous and metamorphic rocks, magmatic and subsolidus processes and physical conditions. Laboratory involves petrographic study of crystalline rocks in thin section. 3 hours and 1 lab. Prereq: 410.

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 geological problems. 2 lecture hrs and one 2-hour lab. Prereq: 310; Mathematics 141-142; and Physics 135; or consent of instructor.

540 Seminar in Local Geology (1) Introduction of geology of Southern Appalachians. 1 hour plus field trips.

544 Paleopedology (3) Field, microscopic, and geochemical analysis of fossil soils (paleosols) and comparison with modern analog soils; interpretation of changes in paleoweathering processes, paleoclimate, and paleoatmospheric chemistry over 4.6 billion years of earth history based on paleosols. Prereq: 340 or equivalent, general chemistry, or consent of instructor.

545 Sandstone Petrology/Physical Sedimentology (4) Field and microscopic analysis of terrigenous clastic rock types; physical processes of sedimentation, transport of sediment, and formation of sedimentary structures. 3 hours and 1 lab. Prereq: 340 or equivalent.

546 Carbonate Sedimentology (4) Environments of deposition of modern and ancient carbonate sediments and diagenesis of resultant rocks; field and laboratory analysis of sample material and preparation of scientific reports. 3 hours and 1 lab.

556 Ice-Age Environments and Global Climate Change (3) (See Ecology and Evolutionary Biology 556.)

557 Quaternary Ecology (3) (See Ecology and Evolutionary Biology 557.)

561 Organic Geochemistry (3) Fundamentals of organic geochemistry; primary production, diagenesis, and preservation of organic matter in the sedimentary rock records; and reconstruction of ancient geologic environments using biomarker compounds. 3 lecture hours. Prereq: Chemistry 120-130 or equivalent 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. Prereq: General Chemistry or equivalent.


568 Geochemical Analysis (3) Collection and treatment of geochemical data using electron microprobe, x-ray fluorescence, and atomic absorption spectrophotometry techniques. 2 hours and 1 lab. Prereq: 310 or consent of instructor.
570 Advanced Structural Geology (4) Current topics in structural geology and tectonics of mountain belts; recent literature. 3 hours and 1 lab or seminar. Prereq: 370 or equivalent, or consent of instructor.

572 Fracture Analysis (3) Field and subsurface characterization, and mechanical development of natural fractures: role in groundwater flow. Prereq: Structural Geology or equivalent, or consent of instructor. (Same as Civil Engineering 572.)

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. 3 hours and 1 seminar. Prereq: Structural Geology or 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. Prereq: 470 or 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. Prereq: 485 or 535; 460; or Environmental Engineering 553 or equivalent, and 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. Prereq or coreq: 485 or Environmental Engineering 535; and consent of instructor.

590 Special Problems in Geology (1-3) Directed study or special topics. Prereq: Consent of instructor. May be repeated. Maximum 10 hours.

591 Foreign Study (1-15) See College of Arts and Sciences.

592 Off-Campus Study (1-15) See College of Arts and Sciences.

593 Independent Study (1-15) See College of Arts and Sciences.

595 Selected Topics in Geology (1) Presentation of research by faculty and visiting scientists. Registration required each semester for resident full-time graduate students, except in summer and when registered for 596. Satisfactory/No Credit grading only.

596 Geology Colloquium (1) Preparation and oral presentation of scientific material. Grade based on content, preparation, presentation, and instructor critique in departmental seminar. Taken only once during residence for each graduate student.

600 Doctoral Research and Dissertation (3-15) P/NP only.

630 Seminar in Petrology (3) May be repeated with consent of department. Maximum 9 hours.

640 Seminar in Sedimentary Geology (3) May be repeated with consent of department. Maximum 9 hours.

650 Seminar in Geomorphology and Quaternary Geology (3) May be repeated with consent of department. Maximum 9 hours.

660 Seminar in Geochemistry (3) May be repeated with consent of department. Maximum 9 hours.

670 Seminar in Structural Geology (3) May be repeated with consent of department. Maximum 9 hours.

675 Seminar in Geophysics (3) Advanced treatment of selected topics in geophysics. Prereq: 470 or consent of instructor.

685 Seminar in Hydrogeology (3) May be repeated with consent of department. Maximum 9 hours.

593-332 Elements of German for Upper-Division and Graduate Students (3,3) Elements of language, elementary and advanced readings, and a final 10,000 word translation project. Open to graduate students preparing for language examinations, and upper-division students desiring reading knowledge of the language. No credit for students having completed 101-102. 332 may be repeated. Maximum 6 hours. Undergraduate credit only.

411-412 Advanced Conversation and Composition (3,3) Prereq: 311-312 or equivalent or consent of department.

415 Special Topics (3) Topics vary. 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. Prereq: German 101-102 or simultaneous enrollment in that sequence and 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. Prereq: 6 hours of 300 courses or equivalent, excluding 331-332.

420 Selected Topics in German Literature from 1750 to the Present (3) Prereq: 6 hours of 300-level courses (excluding 331-332 and courses in English translation) or equivalent.

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. Survey of non-phonological linguistic change, language families, Proto-Indo-European, and other proto languages. Prereq: 6 hrs of upper division foreign language courses (excluding courses in translation or graduate reading courses). (Same as French 426; Linguistics 426; Russian 426; Spanish 426.)

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. Prereq: 6 hours of 300 courses or equivalent, excluding 331-332.

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. Prereq: 6 hours of 300 courses or equivalent, excluding 331-332.

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 eighteenth 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. Prereq: 6 hours of 300 courses or equivalent, excluding 331-332.

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. Prereq: 6 hours of 300 courses or equivalent, excluding 331-332.
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. Prereq: 6 hours of upper-division German language courses (excluding courses in translation and graduate reading courses). (Same as Linguistics 435.)

436 History of the German Language (3) Development of 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. Prereq: 6 hrs of upper-division German language courses (excluding courses in translation or graduate reading courses). (Same as Linguistics 436.)

485 Business German (3) Survey of German used in fields of business, government, administration, and economics. Prereq: 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. Prereq. 18 hours of upper-division German courses and consent of program chair. Maximum of one hour credit per semester. May be repeated for a maximum of 3 hours.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

510 German Phonetics and Advanced Grammar (3) Advanced work in phonetics, pronunciation, and selected topics in German grammar. For teachers and prospective teachers. Prereq: 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 GTAs, except those whose previous training or experience warrants excuse by 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. May be repeated. Maximum 6 hours.

552 German Enlightenment, Rococo, and Sturm und Drang (3) Content varies. May be repeated. Maximum 6 hours.

553 German Classicism and Romanticism (3) Content varies. May be repeated. Maximum 6 hours.

554 German Realism and Naturalism (3) Content varies. May be repeated. Maximum 6 hours.

555 Modern German Literature 1890-1945 (3) Content varies. May be repeated. Maximum 6 hours.

556 Modern German Literature 1945-Present (3) Content varies. May be repeated. Maximum 6 hours.

560 German Literary Theory and Criticism (3)

561-562 Directed Readings in German Language and Literature (3,3)

591 Foreign Study (1-15) See College of Arts and Sciences.

592 Off-Campus Study (1-15) See College of Arts and Sciences. Satisfactory/No Credit or letter grade.

600 Doctoral Research and Dissertation (3-15) P/NP only.

621-622 Seminar in German Literature (3,3) May be repeated. Maximum 18 hours.

631-632 Seminar in German and Germanic Philology (3,3)

**HEALTH (449)**

400 Consumer Health (3) Survey of 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.)

405 Alcoholism and Alcohol Education (3) Problems of alcoholism. Factors which make alcoholism serious health and safety problem. Various types of instructional/educational and intervention programs.

406 Death, Dying and Bereavement (3) Aspects of dying, death and handling trauma of loss. Medical, financial, physical, legal and social implications of death.

420 Sex Education As It Relates to Human Sexuality (3) Exploration of science of human sexuality. Trends, issues, and content of sex education.

425 Women's Health (3) Factors influencing women's health and women consumers in nation's health service delivery systems. 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 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 health perspective as related to health promotion and wellness of aged.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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 projects, 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. 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. Prereq: Consent of instructor. May be repeated. Maximum 3 hours. Satisfactory/No Credit grading only. (Same as Sociology 585.)

590 Research Methods in Health (3) Basic research techniques in variety of health settings. Development of research skills and problem identification for research topic. (Same as Public Health 590.)

593 Directed Independent Studies (1-3) Individual identification and study of health/wellness or health promotion problem/issue. Specific proposal to instructor before registration. May be repeated. Maximum 12 hours.

600 Doctoral Research and Dissertation (3-15) P/NP only.

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. Prereq: 590, 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 throughout world. (Same as Public Health 660.)

HIGHER EDUCATION ADMINISTRATION (461)

455 Seminar in Student Leadership (1) Topics to be assigned. To develop knowledge and skills in leadership roles for resident assistants, student government leaders, student activities, and other student organizations. May be repeated. Maximum 3 hours.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

503 Problems in Lieu of Thesis (2-3) May be repeated. Maximum 9 hours. Satisfactory/No Credit grading only.

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.)

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) Consent of instructor required. May be repeated. Maximum 9 hours.

595 Special Topics (1-3) May be repeated. Maximum 12 hours.

599 Internship in College Student Personnel (1-6) Prereq: Consent of instructor. May be repeated. Maximum 6 hours. Satisfactory/No Credit grading only.

600 Doctoral Research and Dissertation (3-15) P/NP only.

604 Seminar in Educational Administration and Policy Studies (1-4) Directed readings and research in educational administration. May be repeated. Maximum 6 hours. Satisfactory/No Credit grading only.

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 literature in administrative and organizational theory. (Same as Educational Administration 605.)

606 Leadership Forum (2) (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 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) May be repeated. Maximum 12 hours.

695 Special Topics (1-3) May be repeated. Maximum 12 hours.

HISTORY (462)

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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.

512 Teaching Western Civilization (3) Methodology, conceptualization, historiography, text-book selection and syllabus construction to prepare students to teach courses in western civilization.

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. Open only to master’s candidates in history. May be repeated. Maximum 6 hours. Satisfactory/No Credit grading only.

531 Topics in Premodern Europe (3) Reading seminar: secondary sources on premodern European movements and trends. Focus varies. 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. 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. May be repeated. Maximum 15 hours.

541 Topics in Early American History (3) Reading seminar: secondary sources on early North American history. Focus varies. 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. May be repeated. Maximum 15 hours.

543 Topics in 20th-Century United States (3) Reading seminar: secondary sources on 20th-century U.S. Focus varies. 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. May be repeated. Maximum 15 hours.

551 Topics in the History of Foreign Relations (3) Reading seminar: secondary sources on foreign relations. Focus varies. 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. 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. 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. 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. 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. Focus varies. May be repeated. Maximum 15 hours.

559 Topics in Jewish History (3) Reading seminar: secondary sources on Jewish history. Focus varies. May be repeated. Maximum 15 hours.

561 Topics in Latin American History (3) Reading seminar: secondary sources in Latin America. Focus varies. May be repeated. Maximum 15 hours.

562 Topics in Asian History (3) Reading seminar: secondary sources on Asian history; East Asia and Middle East. Focus varies. May be repeated. Maximum 15 hours.

580 Topics in History (3) Reading seminar: secondary sources for new topics. Focus varies. 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. May be repeated. Maximum 9 hours.

591 Foreign Study (1-15) See College of Arts and Sciences.

592 Off-Campus Study (1-15) See College of Arts and Sciences.

593 Independent Study (1-15) See College of Arts and Sciences.

600 Doctoral Research and Dissertation (3-15) P/NP only.

621 Directed Readings (3) Directed readings to prepare candidate for doctoral comprehensive examination. May be repeated. Maximum 1 per doctoral field. Satisfactory/No Credit grading only.

631 Seminar in Pre-Modern European History (3) Research seminar in primary sources. Focus varies. 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. May be repeated. Maximum 15 hours.
641 Seminar in 17th- and 18th-Century America (3) Research seminar in primary sources. Focus varies. 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. 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. 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. Prereq: 210, 211, 224, Marketing 300 or consent of instructor.

435 Conventions and Meetings: Pursuit and Attainment (3) Discussion of types of conventions/meetings, roles of meeting planners, identifying decision makers, site selection, negotiating, budgeting, marketing and gaining commitment from group. Prereq: 210, 211, 390 or consent of instructor.

500 Thesis (1-15) P/NP only.

501 Professional Project (3-6) Application-oriented, capstone project to show competence in major academic area. Enrollment limited to hotel, restaurant and tourism students in non-thesis program. Prereq: Consent of instructor. May be repeated. Maximum 6 hours. 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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. (Same as Recreation and Leisure Studies 510.)

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. Prereq: Consent of instructor. May be repeated.

535 Directed Study in Foodservice and Lodging Administration (1-3) Problems selected for study by student with guidance of faculty member. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

537 Seminar in Foodservice and Lodging Administration (1) May be repeated. Satisfactory/No Credit grading only.

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. Prereq: 531, 532.

547 Field Experience (3-9) Experience in food- or lodging-related industry or agency under supervision of faculty member. Prereq: Consent of instructor. Satisfactory/No Credit grading only.

600 Doctoral Research and Dissertation (3-15) P/NP only.

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 ECOLOGY (520)

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

HUMAN RESOURCE DEVELOPMENT (529)

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

503 Problems in Lieu of Thesis (3) May be repeated. Maximum 6 hours. Satisfactory/No Credit grading only.

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 resource knowledge and assists the student in research and career advancement. Prereq: 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 knowledge 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 Development research and practice. Linking research and practice, importance of theory to inform practice, research needs reflected in practice, cycle of how researchers and practitioners learn, how they design practice, and how they evaluate to inform policy. Prereq: 510.

513 Special Topics in Human Resource Development (1-3)
Topics vary in research, theory and current issues in Human Resources. Prereq: Consent of instructor. May be repeated. Maximum 9 hours.

514 Individual Study in Human Resource Development (3)
Prerequisite: Consent of supervising instructor. Approval form must be filed in office of the Program Liaison. May be repeated. Maximum 6 hours.

517 Career Development (3)
Examination of processes and practices that facilitate the individual’s leadership development, performance improvement and career goals in relation to the organization’s present and future human resource needs, including identification of personal responsibilities and organizational opportunities through successful career 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, facilitating, and implementation of performance technologies that support human resource functions and facilitate their value to organizations. Prereq: 510.

519 Human Resource Problems (3)
Accommodates experiential learning for students who have a background in human resource development. In an employment context, students identify, analyze design, develop, implement, and evaluate a practical human resource development intervention. Prereq: 510 and 511.

520 Collaborative Strategies in Human Resource Development (3)
Examines the strategies for collaboration and teambuilding within organizational systems. The course assists human resource professionals understand 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. Prereq: 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 organizational culture in a global context. Coreq: 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. Coreq: 510.

559 Evaluation Strategies (3)
Evaluation strategies for professional settings. This course examines the importance of evaluation, how to conduct appropriate evaluations, instrumentation and analysis strategies, how to assess the return-on-investment, and guidelines for creating an evaluation report. Prereq: 557.

561 Strategic Human Resource Development (3)

563 Organizational Communication Strategies (3)
Students investigate organizational communication theory, purposes, channels, practices, styles, approaches, skills, and tools. Process improvement strategies 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)
P/NP only.

602 Proseminar I in Human Resource Development (3)
Basic thought, concepts, and issues required for advanced graduate study in human resource development. Must be taken during first year of study in program. Consent of instructor for non-HRD 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 first year of study in program. Consent of instructor for non-HRD students.

605 Seminar in Organizational Theory and Environmental Context (3)
Organizational structure and basic systems influencing individual, group and organizational behavior with an emphasis on environmental context impacting worker performance and opportunities for learning transfer. Ecological approach to organizational effectiveness is addressed. Prereq: 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 settings. Use of methods: structured interviews using heuristic elicitation methodology, participant/observation and case studies. Prereq: 602 and 603.

607 Seminar in Organizational Communication Processes (3)
Students study how the elements and complexities of organizationcommunication lead to potential miscommunications. This course involves analysis of contemporary and leading-edge organizational communication systems and processes. Students address prevention and minimization of destructive system and process complexities, and maximization of constructive elements; and explore organizational and individual accountability for creating, sustaining, and improving organizational communication systems, processes, and environments. Prereq: 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. Prereq: 602 and 603.

609 Seminar in Technological Frameworks for Human Resource Development (3)
Provides instruction and discussions on technology and human performance issues in today’s organization. Topics include technology diffusion, performance improvement technologies, and privacy and ergonomic issues in utilizing technologies to improve human performance in organizations. Prereq: 602 and 603.

611 Internship in Human Resource Development (3)
Field experience in relevant organizations. Prereq: Consent of instructor. May be repeated. Maximum 6 hours. Satisfactory/No Credit grading only.

613 Seminar in Selected Topics (3)
Topics in human resource development. May be repeated. Prereq: 602 and 603.
525 Research in Industrial/Organizational Psychology (1-3)
Available only to students admitted to program or by prearrangement 
with program director. May be repeated. Maximum 6 hours. 
Satisfactory/No Credit or letter grade.

567-568 Proseminar in Industrial/Organizational Psychology 
(3,3) 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. 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) P/NP only.

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. Prereq: 567-568 or consent of instructor.

612 Seminar in Work Motivation (3) Current theories, concepts, 
and issues associated with psychology of work motivation. Prereq: 
567-568 or consent of instructor.

613 Seminar in Performance Appraisal (3) Current issues, 
problems, and research in performance appraisal and criterion development; 
aplications in compensation. Prereq: 567-568 or consent of 
structor.

614 Seminar in Employee Selection (3) Current issues, concerns, 
and methods used in employee selection. Prereq: 567-568 or consent 
of instructor.

615 Seminar in Organizational Training and Development (3) 
Current issues, problems, and research in training and development. 
Prereq: 567-568 or consent of instructor.

625 Topics in Organizational Psychology (3) Topics vary. May be 
repeated. Maximum 9 hours.

626 Topics in Industrial Psychology (3) Topics vary. 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, 
aademic, 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. Satisfactory/No Credit or letter grade.

INDUSTRIAL ENGINEERING (556)
Note: Any 400-level course required in the Bachelor of Science in 
industrial engineering program at the University of Tennessee, 
Knoxville, may not be used for grade 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. Prereq: 330.

402 Production System Planning and Control (3) Theory and 
application of forecasting systems, regression and time series models. 
Independent demand inventory models, development of safety stock. 
Coverage of 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. Prereq: 202.

405 Engineering Economic Analysis (3) Introduction to engineering 
economy and application in engineering practice. Time-value of 
money and discounted cash flow techniques. Decisions among engineering 
alternatives: design options, equipment selection, break-even points, and similar situations. Cost estimating and consideration 
of taxes and inflation. Analyzing uncertainty in economic estimates using nonprobabilistic techniques. Prereq: Junior standing or consent of instructor.

421 Information Systems Analysis and Design (3) Systems engineering approach to analysis and design of systems of information. Topics include: 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. Prereq: Senior standing or consent of instructor.

422 Senior Industrial Engineering Problems Analysis (3) Application of industrial engineering to field assignments in local organizations, problem definitions, analysis and presentation. Prereq: Expected term of graduation or consent of instructor.

423 Industrial Safety (3) Accident causation, losses, and investigative 

427 Introduction to Lean Systems (3) Introduces a framework to implement improvements within an enterprise. This framework will focus on designing both 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. Prereq: Senior standing in major or consent of instructor. Coreq: 306, 402

440 Process Improvement Through Planned Experimentation 
(3) Fundamentals of continuous improvement, advanced statistical 
process control techniques, and strategies for short production runs. 
Use of experimental design techniques to improve processes: single and multiple-factor designs, blocking and confounding, and fractional designs. Full factorial designs compared to fractional designs to balance experimental efficiency with loss of information. Lab component utilizes statistical and simulation software to provide hands-on experience. Prereq: 300.

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...
ware requirements, input/output device design, and error message handling. Prereq: Junior standing in major and computer programming skills; or 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) P/NP only.

501 Design Project (1-3) Enrollment limited to industrial engineering students in non-thesis program. May be repeated. Maximum 6 hours. 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

503 Industrial Engineering Methods Review (3) Survey of industrial engineering tools and techniques applied to analysis, design, and improvement of manufacturing systems. Required of dual degree students who do not have an undergraduate degree in industrial engineering. May not be counted toward degree requirements. Prereq: Admission to dual MS-MBA program. Satisfactory/No Credit grading only.

504 Product Development Process (1) (See Mechanical Engineering 504.)

506 Product Selection and Evaluation (2) (See Mechanical Engineering 506.)

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 selecting processes. Analysis of manufacturing system costs. Presentation of factors affecting manufacturing system design. Case studies and team projects. Prereq: Consent of instructor. (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. Prereq: Consent of instructor. May be repeated. Maximum 3 hours. (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. Prereq: 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. Prereq: 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. Prereq: 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 organization; model validation and verification; linear regression and correlation; analysis of variance; single and multiple factor experimental design. Prereq: Probability and Statistics for Scientists and Engineers, or equivalent.


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 computer simulation and decision trees; multi-attribute decision analysis; and other advanced topics. Prereq: 405 and Probability and Statistics for Scientists and Engineers, or equivalent.

519 Human Factors Engineering and Ergonomics (3) Application of human factors and ergonomic concepts and principles to design and analysis of man/machine 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. Prereq: Probability and Statistics for Scientists and Engineers I 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. Prereq: 519 or consent of instructor.

521 Advanced Human Factors Engineering Methodology (3) Advanced methodologies used in human factors engineering. Observational methods; function/task analysis; computerized human factors design methods; human reliability and error prediction; evaluation of human-machine interface; modeling techniques; questionnaire and survey design; experimental design, and other selected topics. Prereq: 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. Prereq: Operations Research or Engineering Management 537.


525 Systems Modeling and Simulation (3) Modeling of discrete systems using current simulation software and Monte-Carlo simulation. Problem definition, 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. Prereq: 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. Prereq: 306 or 525. (Same as Management Science 526.)

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. Prereq: 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. Prereq: Admission to graduate program. Satisfactory/No Credit grading.

552 Advanced Linear Programming and Extensions (3) Linear programming solution procedures, duality, sensitivity, and parametric analysis; and quadratic, separable, integer, and goal programming. Prereq: 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 problems 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. Prereq: 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 lifecycle, 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. Prereq: 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. Prereq: 516 or equivalent course.

591-592-593 Special Topics in Industrial Engineering (1-3,1,3-1-3) Individual or group research projects. Prereq: Consent of instructor. May be repeated.

594 Culminating Integrated Project Report (3) (See Mechanical Engineering 594.)

600 Doctoral Research and Dissertation (3-15) P/NP only.

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. Prereq: 518, 523.

602 Nonlinear Optimization (3) (See Management Science 651.)


691-692-693 Advanced Topics in Industrial Engineering (3,3,3) Forum to study individually or in groups. Prereq: Graduate standing and consent of instructor. May be repeated with 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. Prereq: 341 or consent of the instructor.

542 Application Security and Controls (3) Introduces students to data security, systems controls, and privacy issues regarding Internet applications. Prereq: 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. Prereq: 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. Prereq: 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) P/NP only.

502 Registration and 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. May be repeated. Satisfactory/No Credit grading only.

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. Organization and management of regional collections.

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.

541 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.

542 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.

543 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. Prereq: 550 or consent of instructor.

544 Specialized Information Agencies and Services (3) Development and present status, scope and objectives. Information resources external to organization. Prereq: 550 or consent of instructor.

545 Public Library Management and Services (3) Development, roles, political environment, governance, organization, fiscal management, services, marketing, and performance evaluations. Prereq: 550 or consent of instructor.

546 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.

547 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.

548 Library Services for a Diverse Society (3) Examines the issues of diversity and multiculturalism in libraries and librarian- ship. 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.

549 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.

550 Contemporary Book Publishing (3) Creation, design, production, marketing, and distribution; various types of publishers.

551 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.

552 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.

553 Digital Libraries (3) Technological and social aspects of electronic publishing and digital libraries. Technologies and standards that enable electronic publishing and digital libraries. History of electronic publishing and digital libraries and their impact on user needs and information provision.

554 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.

555 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.


557 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.

558 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. Prereq: 571 or 572.

559 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.


561 Library 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.

562 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.

563 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.

564 Library Services for a Diverse Society (3) Examines the issues of diversity and multiculturalism in libraries and librarian- ship. 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.

565 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.

566 Contemporary Book Publishing (3) Creation, design, production, marketing, and distribution; various types of publishers.

567 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.

568 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.


570 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.

571 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.


573 Library 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.

574 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. Prereq: 571 or 572.
574 Resources and Services for Adults (3) Examines strategies and procedures 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. Prerequisite: 560.

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 audience.

580 Information Science Theory (3) Definitions of information, information sciences, and information technology; theories of information, information representation, retrieval, and transfer; standards and technologies for information processing and distribution; research front; bibliometrics and infometrics; relationships with other disciplines.

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) Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

591 Independent Project or Research (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

594 Graduate Research Participation (3) Advanced research techniques under supervision of staff research director whose area coincides with interests of student. Prereq: Consent of advisor and research director. May be repeated. Maximum 6 hours. Satisfactory/No Credit grading only.

595 Student Teaching in School Library Information Center (9) Planned professional semester: full day school library work and classroom observation activities. 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. May be repeated. Maximum 6 hours. Satisfactory/No Credit grading only.

599 Practicum (3-6) Opportunity to translate theory into practice under guidance of qualified information professionals. Prereq: Completion of core and pertinent advanced courses relevant to student’s practicum design. Minimum 3.0 cumulative GPA. Written consent of advisor and approval of practicum coordinator. May be repeated. Maximum 6 hours. Satisfactory/No Credit grading only.

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.

INSTRUCTIONAL TECHNOLOGY (569)

521 Computer Applications in Education (3) Use and integration of technology in educational settings to support teaching and learning. Prereq: 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. Prereq: 521, 570, or consent of instructor.

573 Introduction to Multimedia in Instruction (3) Selected computer-based multimedia production tools and use to produce instructional materials based on specific learner characteristics and objectives. Prereq: 521 or consent of instructor.

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. Prereq: Admission to an ITES program or permission 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, designing, creating, testing, and evaluating. Prereq: 521, 570, 573, 575.
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. Prereq: 575 or 521.

578 Web Design (3) Design and development of instructional Web sites using basic design principles and visual Web editor software. Prereq: 575.

669 Instructional Media Research (3) Identification, location, and collection of developmental and experimental research on instructional media. Application of research.

678 Seminar in Instructional Technology (1) Readings and discussions based on current literature, research, theories and practices in instructional technology. Prereq: Consent of instructor. May be repeated. Maximum 3 hours.


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. Prereq: 521, 570, 573, 575, or consent of instructor.

INSTRUCTIONAL TECHNOLOGY AND EDUCATIONAL STUDIES (570)

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

503 Problems in Lieu of Thesis (2-3) May be repeated. Maximum 9 hours. Satisfactory/No Credit grading only.

518 Educational Specialist Research and Thesis (3) May be repeated. P/NP only.

591 Foreign Study (1-15) See College of Arts and Sciences.

592 Off-Campus Study (1-15) See College of Arts and Sciences.

593 Independent Study (1-15) See College of Arts and Sciences.

ITALIAN (584)

401 Dante and Medieval Culture (3) Introduction to significance of this great Italian writer. Writing-emphasis course. Prereq: 212 or consent of instructor.

402 Petrarch and Boccaccio (3) Writing-emphasis course. Prereq: 212 or consent of instructor.

403 Literature of the Rinascimento (3) From Pulci to Tasso, Quattrocento and Cinquecento. Prereq: 212 or consent of instructor.

406 The Modern Italian Novel (3) From Manzoni to Calvino. Prereq: 212 or consent of instructor.

409 Directed Readings (3)

410 Italian Theatre (3) Survey of Italian theatre from Renaissance to present. Prereq: 212 or consent of instructor.

421 Topics in Italian Literature and Cinema (3) Examination of Italian literature and cinema from 1930 to the present focusing on literary works translated into English and adapted into film. Objectives of the course are to investigate the relationship between literature and cinema and to achieve a greater understanding of Italian culture since 1930. Films will be shown in Italian with English subtitles. Writing-emphasis course. May be repeated. Maximum 6 hours. (Same as Cinema Studies 421.)

510 Readings in Italian Literature (3) Topics vary. May be repeated with consent of department.

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)

400 Mass Communication Law and Ethics (3) Emphasis on legal issues affecting print and electronic media, including libel, privacy, copyright, free press-fair trial, governmental regulations of advertising, electronic media and public relations. Also includes ethical standards and practices. Prereq: Consent of instructor. (Same as Legal Studies 400.)

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. Prereq: 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. Prereq: 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. Prereq: 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. Prereq: 315.
433 Editing and Layout for Print/Web (3) Editing and layout for newspapers, magazines and online publishing. Prereq: 203 or consent of instructor.

440 Corporate Video (3) Examination of the special requirements of business, industrial, educational and medical uses of video. Includes management, budgeting, planning, producing, and evaluating projects. Students learn digital video production and non-linear editing. Prereq: 435 or consent of instructor.

444 Journalism as Literature (3) Study of writers from the 17th century to the modern era whose works have endured as both journalism and literature. An emerging genre called literary journalism will be examined as a means of cultural reporting with a personal narrative style. Prereq: 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. Prereq: Consent of instructor. (Same as Information Sciences 450.)

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. Prereq: Consent of instructor.

455 Issues in Science Communication (3) Topics vary. Prereq: Consent of instructor. May be repeated.

456 Science Writing as Literature (3) Survey of important science writing for the general public across the spectrum of science, engineering, and medicine. Works by authors such as Arthur C. Clarke, Stephen J. Gould, and Richard Selzer will be analyzed for literary qualities in a quest to understand why some science writing succeeds. Prereq: Consent of instructor.

457 Media and Society (3) Media processes and effects on society. Major theories/research are introduced and applied to current issues. Prereq: 200 and 275 or consent of instructor.


465 Media and Diversity (3) Media coverage and portrayal of various social groups based on gender, class, and race/ethnicity. Effects of media on public perceptions and attitudes toward these groups. Discussion of historical and legal implications of media effects.


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. Regulatory, policy, programming, and management issues arising from new media and digital technologies. Prereq: 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.


488 Web Publishing (3) Cross-disciplinary approach to design and production of on-line publications. Emphasis on researching, planning, site content and design, and the economic, legal and ethical issues involved in online publishing. Prereq: Senior standing and consent of instructor. Prereq: Consent of instructor


491 Foreign Study (1-15) Advance approval of hours and topics by advisor required for registration. May be repeated. Maximum 15 hours.

500 Thesis (1-15) P/np only.

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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

510 International Communication (3) Studies the development and impact of international and trans-national media systems. Traces history of efforts to reach beyond national borders, and the implications for individuals, societies, global cultures, and political economies. Comparative analysis of media (print, broadcast, cable, satellite, Internet), media practices, and flow of information throughout the world. Prereq: Consent of instructor or admission to program.

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. Prereq: Consent of instructor or admission to program.

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.

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.)

535 Publications Management (3) Problems in management, production, market analysis, and design. Techniques of writing, editing, and presenting comprehensive articles and other material, regional and specialized magazines. Individual editorial projects. Prereq: 485 or consent of instructor.

550 Writing And Editing Projects (3) Specialized writing or editing interests: agriculture, politics, labor, finance, science, technical, general publications. Prereq: Consent of instructor.

551 Seminar in Science, Society, and the Mass Media (3) Investigation of interplay between scientific community and mass media: how scientific information reaches public and impact of journalism on scientific practice. Prereq: Consent of instructor.

552 Seminar in Health Communication (3) Methods, problems, 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. Prereq: Consent of instructor.

553 Seminar in Risk Communication (3) Interaction of scientists, journalists, and public on scientific, technological, and medical risks; analysis of methods for enhancing public understanding. Prereq: Consent of instructor.
555 Seminar in Media Economics and New Technology (3) Electronic and print media ownership, finance and corporate structure. Roles of new technologies and marketing techniques in changing media content and function in future. Prereq: Consent of instructor or admission to program.

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. Prereq: 488


570 Advanced Media Audience Analysis (3) Various techniques used by media companies and consultants in audience research. Deciding which method to use, interpreting results, and applying research to management decision making. Prereq: 302 or consent of instructor.

580 Seminar in Visual Communication (3) Behavioral aspects of communication with images. Theories of psychological effect in color, shape, texture, and other design elements.

585 Advanced Electronic Media Management (3) Financial management of broadcast, cable, and Internet operations: budgeting, financial planning, accounting, and related techniques. Theoretical perspectives in organization and management of commercial and non-commercial operations. Prereq: 485 or consent of instructor

590 Project (3) Capstone project under guidance of faculty. Applications of principles from previous coursework. Satisfactory/No Credit grading only.

593 Seminar in Journalism And Electronic Media Issues (3) Contemporary topics in communications. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

597 Independent Study (3) Prereq: Consent of instructor.

598 Internship (3) Full-time (30-40 hours per week) work experience in news, production, or sales and management with non-university professional organization. Educational experience beyond that available at university. Final term paper. No retroactive credit for previous work experience. Prereq: Senior or graduate standing, completion of core curriculum and at least 15 hours of Journalism and Electronic Media courses, GPA 3.0 or better, and consent of unit head.

JUDAIC STUDIES (595)

405 Modern Jewish Thought (3) (See Religious Studies 405.)

425 Early Christian and Byzantine Art, to 1535 (3) (See Art History 425.)

431 Medieval Art of the West, 800-1400 (3) (See Art History 431.)

LATIN AMERICAN STUDIES (600)

456 Latin American Government and Politics (3) (See Political Science 456.)

465 Latin American Film and Culture (3) (See Cinema Studies 465; Spanish 465.)

479 Disenchanted Texts in Hispanic Literature (3) (See Spanish 479.)

510 Special Topics (3) 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 decisions; 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. Coreq: 920 for students electing concentration in advocacy.

814 Legal Profession (3) Legal, professional and ethical standards applicable to lawyers. 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.


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 process with both realities 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 ventures, 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. Prereq: 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. Prereq or coreq: 827.

833 Representing Enterprises (3-5) Capstone course for concentration in business transactions. Simulated business transactions and completion of major planning drafting project. Transactions vary: formation of new business, acquisition of existing business, development of real estate project, various financing transactions and corporate reorganization. Prereq: Completion of all courses for concentration in business transactions.

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. Prereq: 812. May be repeated under different topic.

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. Prereq: 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; adoption; 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.

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 with no undergraduate background in economics or mathematics.

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.

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 Employment Law (3) Legal regulation of employment relationship: legal, social and economic influences in employee-employer relationship; employment discrimination; legally prescribed minimum standards of compensation and safety; restraints on termination of employment; regulation of retirement systems.

898 Arbitration Seminar (2) Arbitration of labor agreements; judicial and legislative developments; nature of process; relationship to collective bargaining; selected arbitration problems on various topics under collective agreements; and role of lawyers and arbitrators. Prereq: 895.

899 Labor Relations Seminar (2) Selected labor relations law problems. Prereq: 895.

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, planning for transactions and dispute resolutions, initiating and defending claims, conducting factual investigations, and presenting evidence. Prereq: 920 and third-year standing. May not receive credit for both 905 and 946 or both 905 and 947.

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.

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. Coreq: 813 for students electing concentration in advocacy. Prereq: 813 for all other students.

921 Pre-Trial Litigation (3) Civil pre-trial process. Drafting of actual pre-trial documents in civil cases: complaint, motions for preliminary injunction, 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. Prereq: 920.

927 Interviewing, Counseling and Negotiation (3) Development of conceptual and practical frameworks for understanding 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. Not open to students who have taken 904 or 906.

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. Not open to students who have taken 927.

935 Gratuitous Transfers (3) Gifts; will substitutives; 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.


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. Prereq: 818, 826, 827, 972. Prereq or coreq: 842. 826 may be waived for those with sufficient business background. May not receive credit for both 946 and 905.

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. Prereq: Third-year standing, 813, 920, and either 854 or 855, and consent of instructor. May not receive credit for both 947 and 905.

950 Computers and Law (3) Impact of computers on law and practice of law: expert systems; legal skills required in building expert systems; common law office uses of computers; and computerized research. Preparation of lawyers to think effectively concerning use of computers. Prior computer experience not necessary.

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.

960 Employee Benefits Law (2-3) Employee Retirement Income Security Act, federal law governing employee benefit plans sponsored by private employers. Applied problem method of instruction: questions, issues, and problems involving employee benefit plans likely to arise in general litigation or business transaction practice. For three credit hours, includes Chapter 400 of Internal Revenue Code.

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, proof, 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.


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. Prereq or coreq: 935.

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. Limited enrollment.


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, disability, and death benefits; exclusiveness 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. May be repeated.

991 Issues in the Law Seminar (2) Selected topics. May be repeated.

993 Directed Research (1-2) Independent research and writing under direct supervision of faculty member. Proposals must be approved by supervising faculty member and by the Dean or the Dean’s designee. Maximum of one each semester during last two years of study. Prereq: Second-year standing.

994 Independent Study (1-4) Independent study under direct supervision of faculty member. Proposals must be approved by supervising faculty member and by the Dean or the Dean’s designee. Maximum of one each semester during last 3 semesters of study.

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 senior 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. May be repeated. Satisfactory/No Credit grading only. Does not count toward total number of elective upper-division courses taken Satisfactory/No Credit.
CONJUNCTION WITH SUBSTANTIVE COURSES WHEN SUCH PLANNING AND DRAFTING PROJECT UNDER FACULTY SUPERVISION IN INTERNATIONAL LAW (3)

SOCIETY AND LAW (3)

(SEE SOCIOLOGY 455.)

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. MAY BE REPEATED.

LEGAL STUDIES (617)

MASS COMMUNICATIONS LAW AND ETHICS (3) (SEE JOURNALISM AND ELECTRONIC MEDIA 400.)

UNITED STATES CONSTITUTIONAL LAW: SOURCES OF POWER AND RESTRAINT (3) (SEE POLITICAL SCIENCE 430.)

UNITED STATES CONSTITUTIONAL LAW: CIVIL RIGHTS AND LIBERTIES (3) (SEE POLITICAL SCIENCE 431.)

CRIMINAL LAW AND PROCEDURE (3) (SEE POLITICAL SCIENCE 435.)

ADMINISTRATIVE LAW (3) (SEE POLITICAL SCIENCE 442.)

ADMINISTRATION OF JUSTICE (3) (SEE POLITICAL SCIENCE 445.)

CRIMINAL JUSTICE (3) (SEE SOCIOLOGY 451.)

SOCIETY AND LAW (3) (SEE SOCIOLOGY 455.)

INTERNATIONAL LAW (3) (SEE POLITICAL SCIENCE 470.)

LANGUAGE AND LAW (3) (SEE ENGLISH 490.)

THE RHETORIC OF LEGAL DISCOURSE (3) (SEE ENGLISH 496.)

LIFE SCIENCES (621)

THESIS (1-15) P/NP ONLY.

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. MAY BE REPEATED. SATISFACTORY/NO CREDIT GRADING ONLY.

GRADUATE RESEARCH PARTICIPATION (3-12) SPECIAL ADVANCED RESEARCH PROJECT NOT RELATED TO DISSERTATION RESEARCH. TOPICS CHOSEN WITH CONSENT OF INSTRUCTOR. MAY BE REPEATED. MAXIMUM 12 HOURS.

RESEARCH ROTATION (2) LABORATORY ROTATIONS WITH FACULTY MEMBER ON CLEARLY DEFINED PROJECTS. WRITTEN PROPOSAL AND ORAL REPORT. MAY BE REPEATED. MAXIMUM 8 HOURS.

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. MAY BE REPEATED. MAXIMUM 12 HOURS.

SPECIAL TOPICS IN LIFE SCIENCES (1-3) SPECIALIZATIONS IN BIOTECHNOLOGY; CELLULAR, MOLECULAR, AND DEVELOPMENTAL BIOLOGY; ENVIRONMENTAL TOXICOLOGY; ETHOLOGY; PLANT PHYSIOLOGY AND GENETICS; AND PHYSIOLOGY. MAY BE REPEATED. MAXIMUM 9 HOURS.

515-516 INTRODUCTION TO GENOME SCIENCE AND TECHNOLOGY I, II (1,1) 515—INTRODUCTION TO RESEARCH IN GENOME SCIENCE AND TECHNOLOGY CONCENTRATION. 516—SCIENCE AND ETHICS OF PRACTICE OF SCIENCE. SATISFACTORY/NO CREDIT GRADING ONLY.

520-521 GENOME SCIENCE AND TECHNOLOGY I, II (4,4) 520—OVERVIEW OF GENOMICS, ADVANCED GENETICS PRINCIPLES. 521—ANALYTICAL TECHNOLOGIES AND SPECIAL TECHNIQUES.

540-541 COLLOQUIUM (1,1) INVITED SPEAKERS. TOPICS ANNOUNCED IN ADVANCE. MAY BE REPEATED. MAXIMUM 12 HOURS. SATISFACTORY/NO CREDIT GRADING ONLY.

550 MAMMALIAN GENETICS AND GENOMICS (3) GENETIC VARIATION, INHERITANCE, PHENOTYPIC TRAITS, MOLECULAR GENETICS AND GENOMICS, MUTAGENESIS IN LABORATORY RODENTS AND OTHER MAMMALS. PREREQ: 520-521.

591 FOREIGN STUDY (1-15) SEE COLLEGE OF ARTS AND SCIENCES.

592 OFF-CAMPUS STUDY (1-15) SEE COLLEGE OF ARTS AND SCIENCES.

593 INDEPENDENT STUDY (1-15) SEE COLLEGE OF ARTS AND SCIENCES.

595-596 SPECIAL TOPICS IN GENOME SCIENCE AND TECHNOLOGY (1-3) TUTORIALS OR LECTURES IN VARIETY OF SPECIAL TOPICS TO BE CHOSEN BY INSTRUCTOR. MAY BE REPEATED. MAXIMUM 12 HOURS.

600 DOCTORAL RESEARCH AND DISSERTATION (3-15) P/NP ONLY.

615 JOURNAL CLUB IN GENOME SCIENCE AND TECHNOLOGY (1) READING AND DISCUSSION BASED ON CURRENT LITERATURE. MAY BE REPEATED. MAXIMUM 12 HOURS. SATISFACTORY/NO CREDIT GRADING ONLY.

695-696 ADVANCED TOPICS IN GENOME SCIENCE AND TECHNOLOGY (1-3) TUTORIALS OR LECTURES ON VARIETY OF ADVANCED TOPICS TO BE CHOSEN BY INSTRUCTOR. MAY BE REPEATED. MAXIMUM 12 HOURS.

LINGUISTICS (623)

TOPICS IN LINGUISTICS (3) CONTENT VARIES. 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 HEBREWS AND GREEKS THROUGH MODERN TIMES. READINGS FROM BOAS, SAPIR, BLOOMFIELD, AND OTHERS. PREREQ: 9 HOURS OF COURSES REQUIRED FOR LINGUISTICS MAJOR (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) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

510 Logistics 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. Prereq: 510 and Business Administration 511, 512, 513, and 514.


593 Independent Study (3-6) Directed research and study. Prereq: Consent of instructor. May be repeated.

599 Special Topics in Logistics (3-6) Seminar designed to study specific current problem areas in logistics. Topic announced prior to offering. Prereq: Consent of instructor. May be repeated.

600 Doctoral Research and Dissertation (3-15) P/NP only.

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 Logistics Models (3) Analysis of contemporary models and methodologies in logistics research, topical coverage at discretion of instructor.

693 Independent Study (1-6) Directed research on subject of mutual interest to student and faculty. May be repeated. Prereq: Consent of instructor.

MANAGEMENT (625)

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

511 Organizational Theory: Integrated Structure and Behavior (3) Cases, group projects, discussion; organizational theories, organizational effectiveness; contextual factors of organizations: environment, size, technology; organizational structure configurations, organization design; social influences on organization effectiveness: motivation, leadership, group behavior, intergroup relations, organization change and development.

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.

531 Management of Technology-Based Organizations (3) Role of technology and innovation in formulation and implementation of strategy. Management of research and development function and coordination with other functions. Management of scientists and engineers.

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. May be repeated. Maximum 6 hours. Satisfactory/No Credit or letter grade.

595 Selected Topics in Current Management Issues (3) In-depth consideration of current issues. Managerial impact of emerging topics. Prereq: Consent of instructor.

600 Doctoral Research and Dissertation (3-15) P/NP only.

MANAGEMENT SCIENCE (627)

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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. Prereq: Fundamentals of matrix algebra.

532 Stochastic Models in Management Science (3) Discrete-time Markov chains, Poisson processes, continuous-time Markov chains, renewal theory, and queuing theory. Prereq: Statistics 563 and Mathematical Analysis or consent of instructor.

533 Computational Mathematical Programming (3) Computational aspects of mathematical programming models, in particular for large systems. Prereq: 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.

600 Doctoral Research and Dissertation (3-15) P/NP only.
621 Network Flows (3) Treatment of network optimization algorithms, transportation and transshipment models and primal-dual and primal-basis tree methods. Prereq: 531 or equivalent.

631 Integer Programming (3) Theoretical and computational aspects of linear programming with integer variables, branch and bound, cutting plane, and group theoretic algorithms. Prereq: 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. Prereq: 531 or equivalent, proficiency in computer language. *(Same as Industrial Engineering 602.)*

652 Mathematical Programming (3) Theory and computational aspects of linear programming with integer variables, branch and bound, cutting plane, and group theoretic algorithms. Prereq: 531 or equivalent.

681 Special Topics (3) Prereq: 531, 532 and consent of instructor. May be repeated. Maximum 9 hours.

691-692 Management Science Seminar (1,1) Subjects selected from current literature. Satisfactory/No Credit grading only.

693 Independent Study (1-6) Directed research on subject of mutual interest to student and staff member. May be repeated.

699 Special Topics Seminar (3) Topics vary: market forecasting, market segmentation, services marketing, marketing channels, and related issues. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

700 Doctoral Research and Dissertation (3-15) P/NP only.

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 competitor behavior; marketing strategy; marketing mix tools; and ethical issues in marketing. Examination of research for contributions to advancing knowledge and opportunities for new research.

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, cultural and demographic differences, consumer socialization, and ethical considerations.

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.

630 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 marketing and supply chain networks across multiple geographic locations. Prereq: 520 and Business Administration 511, 512, and 513 or consent of instructor.

653 Independent Study (3) Directed research and study. Prereq: MBA Core and consent of instructor. May be repeated. Maximum 6 hours.

661 Theoretical Foundations (3) Theoretical foundations and frameworks common to business research. Historical and philosophy of science perspectives. *(Same as Logistics 661.)*

662 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 662.)*

663 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.

664 Contemporary Marketing Thought (3) Representative topics comprising content of marketing knowledge: macromarketing, markets, channels, and competitor behavior; marketing strategy; marketing mix tools; and ethical issues in marketing. Examination of research for contributions to advancing knowledge and opportunities for new research.

665 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, cultural and demographic differences, consumer socialization, and ethical considerations.

666 Measurement (3) Measurement and measurement process: design and development of tools, process of testing, and determination of reliability and validity.

667 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.
476 Overview of Intermetallic Compounds and Composites (3) Fabrication and processing, ultradilute and concentrated alloys - nanotechnology, thermodynamics and stability, microstructural characterizations, mechanical properties, corrosion and oxidation properties, theoretical modeling, and design and industrial applications of intermetallics and composites. Laboratory demonstrations and group projects. Prereq: 201.

484 Introduction to Maintainability Engineering (3) (See Nuclear Engineering 484.)

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

503 Graduate Seminar in Materials Science and Engineering (1) Prereq: Admission to graduate program. May be repeated. Satisfactory/No Credit grading only.

504 Graduate Seminar in Polymer Engineering (1) Prereq: Admission to graduate program. May be repeated. Satisfactory/No Credit grading only.

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.


522 Defects in Crystals (3) Analytical and experimental analysis of defect interactions in solids. Prereq: 421 or consent of instructor.

524 Metallurgical Thermodynamics (3) Applications of chemical thermodynamics to metallurgical problems: refining, oxidation, surface treatments, alloy systems. Prereq: 570 or equivalent.

525-526 Welding Metallurgy (3,3) 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.

528 Ceramic Matrix Composites: Material and Mechanics (3) (See Engineering Science 528.)

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. Prereq: 470 or consent of instructor.


540 Basic Polymer Chemistry (3) Synthesis, reactions and degradation of polymers. Molecular characterization: solution methods and spectroscopy. Prereq: Semester of organic chemistry and thermodynamics or equivalent.

541 Polymer Rheology (3) Deformation and flow of polymeric materials. Development of empirical models, linear viscoelasticity and finite strain constitutive equations; material functions, temperature dependence and rheometry with applications to synthesis and processing. Elementary kinetic theory of elastic dumbbell suspensions. Prereq: Chemical Engineering 240 or equivalent. (Same as Chemical Engineering 541.)

542 Further Topics in Polymer Processing (3) Description and analysis of selected polymer processing operations. Prereq: 541.


544 Polymer Solution Thermodynamics and Characterization (3) Theories of solutions, statistical thermodynamics. Characterization, treatment of chromatography, viscosity, light scattering and osmotic pressure. Prereq: Undergraduate physical chemistry.

545 Polymer Engineering Processing and Characterization Laboratory (3) Polymer film casting, film blowing, mixing and extrusion are operated and studied. Flow rates, temperatures, pressures and velocity profiles are acquired and used in finite element modeling and simulation to correlate the polymeric material properties and morphology. Supporting instrumentation includes linear viscoelastic rheometry, capillary viscometry, SEM, OM, FTIR, etc. Fundamentals of processing-structure-property relationships are documented in a literature review paper. Prereq: Consent of instructor.

546 Mechanical Properties of Solid Polymers (3) Types of mechanical behavior; Hookean and rubber elasticity; plastic deformation; fracture; linear viscoelasticity; dynamic mechanical behavior and testing; loss tangent; experimental methods. Introduction to mechanical properties of polymeric composites.

549-550 Laboratory Methods in Polymer Engineering (1,2) Basic experimental techniques and instrumentation associated with characterization, x-ray and light scattering, calorimetry, rheometry, mechanical properties of solid polymers, polymer processing operations. Coreq: 540 or consent of instructor. 549-Satisfactory/No Credit grading only.

552 Fiber Science (3) Physical properties, mechanical properties and microstructure of polymeric fibers; relation to end-use properties. Prereq: Organic chemistry and thermal physics or equivalent.

553 Nonwovens Science and Technology I (3) Nonwoven fabric technology; different web forming processes; and relationships among the chemical, morphological and mechanical properties of fibers and orientation in webs to final performance properties of bonded structures. Prereq: Organic chemistry or consent of instructor.

554 Nonwovens Science and Technology II (3) Interrelations between mechanics of production and mechanical properties of nonwoven fabrics; characterization of fiber morphology and web structure; chemistry of nonwoven binders and finishes; and engineering of specific fabric properties. Prereq: 553 or equivalent.

555 Laboratory Methods in Nonwovens Processing and Characterization (3) Laboratory experience in nonwovens fabrication processes and characterization techniques. Effect of processing conditions on structure development and properties of different types of webs. Prereq: 552 and 553.
560 Principles of Ceramic Processing (3) Treatment of ceramic processing; raw materials preparation and characterization; powder consolidation; drying, firing, sintering techniques, mechanisms and kinetics. Prereq: 360 or equivalent.

570 Optical Microscopy (4) Basic compound and polarizing microscopy for imaging. Optical property measurements, and structure elucidation. Other methods of optical microscopy. 3 hours and 2 labs. Prereq: Physics 232 and 240 or equivalent.

572 X-Ray Diffraction (3) Symmetry of crystals, space group theory, reciprocal lattice and application to definition of structures; powder and single crystal x-ray techniques; introduction to crystal structure determination; characterization of orientation; application to inorganic, metallic and polymer structures.

575 Surface Characterization (3) Analytical techniques for characterizing surfaces of textile materials. Applications of well-established techniques: spectroscopy and microscopy. Prereq: 552.

576 Special Topics in Materials Science and Engineering (3) Topics of current significance and interest. Prereq: Consent of instructor. May be repeated.


594 Culminating Integrated Project Report (3) (See Mechanical Engineering 594.)

600 Doctoral Research and Dissertation (3-15) P/NP only.

621 Theoretical Metallurgy (3) Topics in solid state physics as applied to metallurgy; introduction to quantum theory, specific heats, electron theory of solids, electrical and thermal conductivity, magnetic properties, theories of alloy formation. Prereq: Consent of instructor.

625 Materials Lifetime Science and Engineering I (3) Fundamentals of aqueous and high-temperature corrosion and fatigue; methods of materials lifetime modeling. Prereq: 531 and 532, or consent of instructor.

626 Materials Lifetime Science and Engineering II (3) Interactions between corrosion and fatigue at ambient and high temperatures; lifetime modeling of materials simultaneously subjected to corrosion and fatigue. Prereq: 625.

627 Case Studies in Materials Lifetime Science and Engineering (3) Studies of, and participation in, industrial analyses of lifetimes of structural materials subjected to aqueous-corrosion/fatigue and high-temperature-oxidation/fatigue, performed as part of the student’s industrial and national-laboratory internship programs. Prereq: 531 and 532, or consent of instructor.

628 Graduate Seminar in Materials Lifetime Science and Engineering (1) Seminars by students, faculty, and visiting scholars on materials lifetime science and engineering; processes, mechanisms, and materials lifetime modeling. Prereq: 531 and 532, or consent of instructor. Satisfactory/No Credit grading only.

630 Thin Film Materials Processing (3) Students learn materials issues and thin film processing techniques used to manufacture semiconductor devices. Topics include basic vacuum technology, plasma physics, sputtering, evaporation (resistive, electron beam, laser ablation), chemical vapor deposition, and etching. The mechanisms of each process are explored and relevant material chemistries are discussed. Thin film growth models are also explained and processing variables are related to material properties. Prereq: Permission of instructor.

632 Advanced Topics in Intermetallic Compounds and Composites (3) Thermodynamics, mechanical behavior, corrosion and oxidation, and modeling of intermetallic compounds and composites. Prereq: 476 or permission of instructor.

633 Design of Intermetallic Compounds and Composites (3) Team-based design projects, including literature review, material selection, material/component design and fabrication, material properties, and theoretical modeling. Prereq: 476 and 632, or permission of instructor.


642 Advanced Topics in Polymer Processing (3) Application of theories of rheological behavior and of structure development to analysis of polymer processing operations. Prereq: 541. (Same as Chemical Engineering 642.)

643 Phase Transformations in Polymers (3) Glass transition and glassy state; annealing of polymeric glasses; crystallization of polymers; nucleation, growth and morphology; secondary nucleation theory; solidification of copolymers; crystallization under stress. Prereq: 543.

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 characterizations. The focus is to understand electron related processes and optoelectronic characterizations of polymeric materials and devices. The fundamentals of laser spectroscopy are also explained in determining structure-property relationships in polymer research. Prereq: 543 or equivalent, and permission of instructor.

671 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. Prereq: Either 405, 511, or 572; and permission of instructor.

673 Introduction to Scanned Probe Microscopies (3) A survey of techniques for surface imaging and characterization. Young’s Topograph, field emission, and the beginning of scanning tunneling microscopy (STM). Practical operation of the STM (includes laboratory sessions). Image resolution and interpretation in the TEM, 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. Prereq: Permission of the instructor.

676 Advanced Topics in Materials Science and Engineering (3) Latest developments and/or advanced special topics. Prereq: Consent of instructor. May be repeated.

678 Seminar in Recent Advances in Materials Science and Engineering (3) Directed and independent study of advanced topics. Prereq: Consent of instructor. May be repeated.

MATHEMATICS (641)

400 History of Mathematics (3) Development of major ideas in mathematics from ancient to modern times and influence of ideas in science, technology, philosophy, art, and other areas. Writing emphasis course: at least one in-class essay examination and 3000 words of writing outside classroom. Prereq: 251 (or 257) and 300.
401 Mathematics and Microcomputers (3) Primarily for students seeking certification as mathematics teachers at secondary level. Use of microcomputers to study concepts and problems in mathematics. Does not satisfy the major requirements for a BS or MS in mathematics. Prereq: 141 or 147.

403 Mathematical Methods for Engineers and Scientists (3) Matrix computations, numerical methods, partial differential equations, Sturm-Liouville Theory and special functions used in engineering and science. Does not satisfy major requirements for a BS or MS in mathematics. Prereq: 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 theorems of Gauss and Stokes. Prereq: 241 or 247.

405 Models in Biology (3) Difference and differential equation models of biological systems. May not be counted toward graduate degree. Prereq: 142 or 148 or 152.


421 Combinatorics (3) Introduction to problems of construction and enumeration for discrete structures: sequences, partitions, graphs, finite fields and geometries, or experimental designs. Prereq: 323 or consent of instructor.

423 Probability I (3) Axiomatic probability, multivariate distributions, conditional probability and expectations, methods of moment generating/characteristic functions. Laws of large numbers and central limit theorem. Prereq: 300-level probability or consent of instructor.

424 Probability II (3) Elements of stochastic processes: Random walk, Markov chains and Poisson processes. Other topics as selected by instructor. Prereq: 423.

425 Statistics (3) Derivation of standard statistical distributions: t, F and χ²; independence of sample mean and variance; basic limit theorems; point and interval estimation, Bayesian estimates; statistical hypotheses, Neyman-Pearson theorem; likelihood ratio and other parametric and non-parametric tests; sufficient statistics. Prereq: 423 or consent of instructor.


445-446 Advanced Calculus I, II (3,3) Theory of sequences, series, differentiation, and Riemann integration of functions of one or more variables. Prereq: 241 or 247 and 300, or consent of instructor.

447-448 Honors: Advanced Calculus I, II (3,3,) Honors version of 445-446. Prereq: 341 or consent of instructor.

453 Matrix Algebra II (3) Matrix theory including Jordan canonical form. Prereq: 251 or 257.

455-456 Abstract Algebra I, II (3,3) Algebraic structures: groups, rings, fields, vector spaces and linear transformations. Prereq: 251 or 257 and 300, or consent of instructor.

457-458 Honors: Abstract Algebra I, II (3,3) Honors version of 455-456. Prereq: 351 or consent of instructor.

460 Geometry (3) Axiomatic and historical development of neutral, Euclidean, and hyperbolic geometry stressing proof technique and critical reasoning. Models of Non-Euclidean geometries. Prereq: 300 or consent of instructor.

461 Topology (3) Topology of line and plane, separation properties, compactness, connectedness, continuous functions, homeomorphisms, continua and topological invariants. Prereq: 241 or 247 and 300, or consent of instructor.

471 Numerical Analysis (3) Computation, instabilities, and rounding. Interpolation and approximation by polynomials and piecewise polynomials. Quadrature and numerical solution of initial and boundary value problems of ordinary differential equations, stiff systems. Prereq: 371 or consent of instructor. (Same as Computer Science 471.)


475 Industrial Mathematics (3) Modeling, analysis, and computation applied to scientific/technical/industrial problems. Prereq: 231 and familiarity with an operating system and a programming language (e.g. 171, 371, or Computer Science 102.)

490 Readings in Mathematics (1-3) Open to superior students with consent of department head. Independent study with faculty guidance. Prereq: Consent of faculty mentor to supervise independent work. May be repeated. Maximum 9 hours.

499 Seminar in Mathematics (1-3) Topics vary. Requires out-of-class projects and in-class presentations by students. Credit hours announced for each seminar. Prereq: Consent of instructor. May be repeated. Maximum 9 hours.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

504 Discrete Mathematics for Teachers (3) Mathematical logic and methods of argument, sets, functions and relations, combinatorics. Normally first graduate course for students seeking MM degree. For students in Master of Mathematics program and for students in graduate programs in College of Education, Health, and Human Sciences. May not apply toward MS degree in mathematics. Prereq: 1 year calculus or equivalent.

505 Analysis for Teachers (3) Development of differential and integral calculus, proofs of basic theorems. For students in Master of Mathematics program and for students in graduate programs in College of Education, Health, and Human Sciences. May not apply toward MS degree in mathematics. Prereq: 1 year calculus or equivalent.

506 Algebra for Teachers (3) Algebraic structures: integral domains and fields and their applications to algebra of integers and polynomials. For students in Master of Mathematics program and for students in graduate programs in College of Education, Health, and Human Sciences. May not apply toward MS degree in mathematics.

509 Seminar for Teachers (3) For students in Master of Mathematics program and for students in graduate programs in College of Education, Health, and Human Sciences. May not apply toward MS degree in mathematics. Prereq: Consent of instructor. May be repeated. Maximum 12 hours.

510 Applied Mathematics Laboratory (1) Computer applications in applied mathematics: software packages for matrix analysis, symbolic algebra, and differential equations. Coreq: 511 or 512. May be repeated.


513-514 Mathematical Principles of Fluid Mechanics (3,3) Equations of motion, incompressible and compressible potential flow, shock waves, viscous flows. Navier-Stokes equations, Prereq: 431, 435, and 445-446 or 404, or consent of instructor.

515-516 Analytical Applied Mathematics (3,3) 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, integral equations. Prereq: 446 or 448, 453, and either 511-512 or both 431 and 435.

517-518 Mathematical Methods in Physics (3,3) (Same as Physics 571-572.)

519 Seminar in Applied Mathematics (1-3) May be repeated. Maximum 12 hours.

521-522 Enumerative Combinatorics (3,3) Sieve methods, recursion, generating functions, and permutation groups applied to enumeration of discrete structures. Incidence algebras and combinatorics of partially ordered sets.

523-524 Probability (3,3) Pertinent facts from measure theory, definition of abstract probability spaces; Kolmogorov’s existence theorem; series of independent random variables and laws of large numbers; general theory of distributions of random vectors and their characteristic functions; weak convergence concept, weak compactness and Levy’s continuity theorem in Euclidean spaces; infinitely divisible distributions and central limit problem; general concept and properties of conditional expectation, martingales, Doob’s martingale and optional sampling theorems. Prereq: 445-446. Recommended prereq: 423.

525-526 Statistics (3,3) Pertinent facts from probability theory; formulation of statistical models; sufficiency, Fisher-Neyman factorization theorem, exponential families, Bayesian models; methods of estimation and optimality theory; uniform minimum variance unbiased estimates, asymptotic efficiency and optimality; the confidence procedures and hypothesis testing; optimal tests and confidence intervals, the Neyman-Pearson lemma, uniformly most powerful tests; general theory of distributions, estimation and tests in linear models; non-parametric models, rank methods for comparison, linear regression and independence, robust tests; topics from decision theory. Prereq: 445-446. Recommended prereq: 425.

527 Stochastic Modeling (3) Models in probability applied to real world situations; queuing theory; branching processes; Monte Carlo simulation. Prereq: 445-446 or consent of instructor.

529 Seminar in Stochastics (1-3) May be repeated. Maximum 12 hours.


534 Calculus of Variations (3) Necessary conditions for extrema, Euler’s equation, broken extremals, Weierstrass-Erdmann conditions. Sufficient conditions for extrema-Legendre’s and Jacobi’s conditions, conjugate points. Multiple integrals. Prereq: 431.

535-536 Partial Differential Equations (3,3) First order equations, classification of equations and properties of elliptic, hyperbolic, and parabolic equations in several variables. Prereq: 445-446 and 231 or consent of instructor.

537-538 Mathematical Principles of Continuum Mechanics (3,3) Conservation principles, equations of equilibrium and motion for fluids and elastic solids, constitutive relations and stress, convexity properties, bifurcation phenomena, existence theory. Prereq: 431, 435, 446 or 448, or consent of instructor.

539 Seminar in Differential Equations (1-3) Prereq: Consent of instructor. May be repeated. Maximum 12 hours.

545-546 Real and Complex Analysis (3,3) Measure theory, Lebesgue integration, Hölder and Minkowski inequalities, Radon-Nikodym theorem, Fubini’s theorem, holomorphic functions, Cauchy’s theorem, Maximum Modulus theorem, Schwarz’s lemma, normal families, Riemann mapping theorem.

547-548 Applied Linear Analysis (3,3) Banach and Hilbert spaces, linear operators and spectral theory with applications to integral and differential equations, optimization, numerical analysis, and quantum mechanics, Sobolev spaces and embedding theorems. Prereq: 445-446.

549 Seminar in Analysis (1-3) May be repeated. Maximum 12 hours.

551-552 Modern Algebra (3,3) Groups, rings, modules and linear algebra, fields and Galois theory. Must be taken in sequence. Prereq: 455-456 or consent of instructor.

553 Linear Programming (3) Theory and applications. Prereq: Consent of instructor or 453 and programming ability.


555-556 Number Theory (3,3) Introduction to algebraic number theory. Prereq: 455-456 or consent of instructor.

559 Seminar in Algebra (1-3) Prereq: Consent of instructor. May be repeated. Maximum 12 hours.


567-568 Differential Geometry (3,3) Classical differential geometry in two and higher dimensions: curves and surfaces in Euclidean space, Gauss map, curvature, Gauss-Bonnet theorem, hyperbolic geometry. Manifolds and Riemannian metrics; connections, geodesics, Jacobi fields, sectional curvature. Differential forms and moving frames. Prereq: 445-446 or consent of instructor.

569 Seminar in Topology (1-3) May be repeated. Maximum 12 hours.


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. Prereq: 453, 471-472, or consent of instructor. May be repeated. Maximum 9 hours. (Same as Computer Science 575.)

577 Optimization (3) Major topics in optimization with problems developed from real-world applications including constrained and unconstrained optimization with analysis of major algorithms and utilization of appropriate software. Prereq: Numerical Algorithms, 453, 445-446.

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. Prereq: 435 or 512 or 515, Fortran or C, or consent of instructor.

579 Seminar in Numerical Mathematics (1-3) May be repeated. Maximum 12 hours.

581-582 Mathematical Ecology (3,3) Deterministic and stochastic models of populations, communities, and ecosystems. Prereq: 431, 453 or consent of instructor. (Same as Ecology and Evolutionary Biology 581-582.)

583 Mathematical Evolutionary Theory (3) Population genetics and evolutionary ecology. Prereq: 431, 453 or consent of instructor. (Same as Ecology and Evolutionary Biology 583.)

585 Optimal Control Theory (3) Deterministic optimal control. Examples involving calculus of variations, optimal trajectories, and engineering control problems. Introduction to stochastic control. Prereq: 431, 445-446 or consent of instructor.

589 Seminar in Mathematical Ecology (1-3) May be repeated. Maximum 12 hours.

593 Independent Study (1-15) See College of Arts and Sciences.

598 Graduate Reading in Mathematics (1-3) Independent study with faculty guidance. Prereq: Graduate standing and consent of instructor. May be repeated. Maximum 6 hours.

599 Seminar in Mathematical Presentations (1)

600 Doctoral Research and Dissertation (3-15) P/NP only.


619 Seminar in Applied Mathematics (1-3) May be repeated. Maximum 12 hours.

623-624 Advanced Probability (3,3) Selected topics in modern theory of probability and stochastic processes: Itô’s calculus and stochastic differential equations, integration prediction theory, ergodic theory, probability on algebraic structures, limit theorems, geometry and probability in Banach spaces, probability methods in analysis. Prereq: 523-524 or consent of instructor. May be repeated with consent of department. Maximum 12 hours.

629 Seminar in Combinatorics (1-3) May be repeated with consent of department. Maximum 12 hours.

631-632 Advanced Ordinary Differential Equations (3,3) Theory of ordinary differential equations from advanced viewpoint. Topics from current literature. Subject matter varies according to interests and preparations of students. Prereq: 531-532 or consent of instructor. May be repeated with consent of department. Maximum 12 hours.

635-636 Advanced Partial Differential Equations (3,3) Selected topics in classical and modern theoretical partial differential equations. Prereq: 541-542 or 547-548 or consent of instructor. May be repeated with consent of department. Maximum 12 hours.


643-644 Harmonic Analysis (3,3) Fourier series and Fourier transforms on Euclidean spaces or topological groups: convergence, summability, uniqueness, inversion, duality, Plancherel transform, Hilbert transform, Hardy-Littlewood maximal function, interpolation of operators, or Fefferman-Stein duality. Prereq: 541-542 and 543. May be repeated with consent of department. Maximum 12 hours.

649 Seminar in Analysis (1-3) May be repeated with consent of department. Maximum 12 hours.

651-652 Advanced Modern Algebra (3,3) Selected topics in modern algebra or number theory. Prereq: 551-552 or consent of instructor. May be repeated with consent of department. Maximum 12 hours.

659 Seminar in Algebra (1-3) Prereq: Consent of instructor. May be repeated with consent of department. Maximum 12 hours.

661-662 Modern Topology (3,3) Technical background to current literature in topology. Topics vary. May be repeated with consent of department. Maximum 12 hours.

663-664 Algebraic Topology (3,3) Homology, cohomology and homotopy theories: duality theorems and Hurewicz isomorphism theorem. Prereq: 561-562 and 1 year of abstract algebra, 455-456 or 551-552. May be repeated with consent of department. Maximum 12 hours.

667-668 Advanced Differential Geometry (3,3) Selected topics from Riemannian geometry and analysis on manifolds: Lie groups, metric geometry, spectrum of Laplacian, Hodge Theory, variational problems, curvature and topology of manifolds. Prereq: 567-568 or consent of instructor. May be repeated with consent of department. Maximum 12 hours.

669 Seminar in Topology (3) May be repeated with consent of department. Maximum 12 hours.


679 Seminar in Numerical Mathematics (1-3) May be repeated with consent of department. Maximum 12 hours.

681-682 Advanced Mathematical Ecology (3,3) Selected topics in theoretical and applied mathematical ecology: population, community, ecosystem ecology and applied topics such as demography, ecotoxicology, epidemiology, environmental change, and resource management. Prereq: 581-582. May be repeated. (Same as Ecology and Evolutionary Biology 681-682.)

MATHEMATICS EDUCATION (642)

485 Teaching Mathematics, Grades 7-12 (3) Preparation of teaching plans, evaluation, materials for teaching mathematics; teaching simulation and directed observation in schools. Prereq: Admission to teacher education.
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. Prereq: 485, 530, 543, or equivalent.

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. Prereq: 522 or equivalent or consent of instructor.

530 Teaching Mathematics to Young Children: K-4 (3) Unit planning, daily planning, grouping and other strategies of teaching mathematics. 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. For those with little preparation in teaching middle 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. Prereq: 485, Elementary Education 505, or equivalent.

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. Prereq: 485 or equivalent.

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 preservice and in-service. Prereq: 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. Prereq: Two graduate courses in mathematics education.

MECHANICAL ENGINEERING (650)

NOTE: Not all the courses listed below are available at both the University of Tennessee, Knoxville, and UTSI campuses.


452 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. Prereq: 321, 344, 363.


475 Thermal Engineering (3) Thermal systems with emphasis on turbomachinery, heat exchangers, gas-vapor mixtures and psychrometry, fuels and combustion; chemical equilibrium; system analysis and design. Prereq: 344.

483 Introduction to Reliability Engineering (3) (See Nuclear Engineering 483.)

484 Introduction to Maintenance Engineering (3) (See Nuclear Engineering 484.)

494-495 Selected Topics in Mechanical Engineering (1-4, 1-4) Problems and topics related to developments and practice in mechanical engineering. Prereq: Consent of instructor.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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. Prereq: Consent of instructor. (Same as Industrial Engineering 504.)


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. Prereq: 504. (Same as Industrial Engineering 506.)

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. Prereq: 555.


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 buoyancy driven flows. Prereq: 541.
514 Phase Change Heat Transfer (3) Mechanisms and modeling of nucleate, 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. Prereq: 344, 511.


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. Prereq: 506 or consent of instructor.

521-522 Thermodynamics I and II (3,3) 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. Prereq: 332.

523 Special Topics in Thermodynamics (3) Application of thermodynamics to topics of current interest in mechanical engineering. Prereq: Consent of instructor.

525 Combustion and Chemically Reacting Flows I (3) Fundamentals: thermochemistry, chemical kinetics and conservation equations; phenomenological approach 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. Prereq: 522, 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. Prereq: 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. Prereq: 344.


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. Prereq: Mathematics 431 or Engineering Analysis, undergraduate vibrations course. (Same as Aerospace Engineering 533; Engineering Science 533.)

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. Prereq: Undergraduate vibrations course. (Same as Aerospace Engineering 533; Biomedical Engineering 534; Engineering Science 534.)

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. Prereq: 231, 321.

539 Continuum Mechanics (3) (See Engineering Science 539.)

541 Fluid Mechanics I (3) Derivation of equations governing flow of inviscid and viscous fluids (conservation of mass, Newton’s second law, conservation of energy). Equations of state and constitutive relations. Euler and Navier-Stokes forms and nondimensionalization. Exact solutions and introduction to potential and boundary-layer flows. Prereq: Fluid mechanics. (Same as Aerospace Engineering 541; Biomedical Engineering 541; Engineering Science 541.)

542 Fluid Mechanics II (3) Equations of viscous fluid flows. Basic concepts and equations of turbulent flow. Separation, stability and transition. Laminar and turbulent boundary-layer flows. Exact, approximate, and numerical solutions. Prereq: 541. (Same as Aerospace Engineering 542; Biomedical Engineering 542.)

547 Advanced Linear Control (3) Multivariable feedback systems; transfer function and state-space techniques; stability of linear systems; optimality and robustness; control system design. Prereq: 507 or equivalent

551-552 Mechanical Engineering Design (3,3) Design of mechanical engineering devices and systems. Prereq: Consent of instructor.

555 Human Vibrations Analysis and Protection (3) (See Biomedical Engineering 555.)

559 Advanced Mechanics of Materials I (3) Elasticity in three dimensions: equations of equilibrium, strain-displacement relations, compatibility, constitutive equations. Energy methods. Beams on elastic foundation, unsymmetrical bending, shear center, beam-columns, buckling, plastic collapse. Prereq: Mechanical Engineering 321 (Same as Aerospace Engineering 559; Biomedical Engineering 559; Engineering Science 559.)

561 Finite Elements for Engineering Applications (3) (See Engineering Science 551.)

562 Computational Fluid Dynamics (3) (See Engineering Science 552.)

563 Computational Solid Mechanics (3) (See Aerospace Engineering 573; Engineering Science 553.)


577 Neural Networks in Engineering (3) (See Engineering Science 577.)

581 Rocket Propulsion I (3) Rocket propulsion fundamentals; thermodynamics of nonreacting and chemically reacting ideal gases, rocket nozzle design; ideal rocket performance parameters; rocket heat transfer; chemistry of propellants; liquid rocket engine systems; ground testing; introduction to solid propellant rockets. Prereq: Consent of instructor.
582 Rocket Propulsion II (3) Solid propellant rocket performance, homogeneous and heterogeneous propellant chemistry and combustion system performance, thermal decomposition and gas phase reaction models; effect of chamber pressure and additives on solid propellant burn rates, erosive burning; analysis of two-phase solid rocket exhaust flow. Introduction to nuclear and electric propulsion; electrical resistance and electric field (ion) engine performance, magnetohydrodynamic thrusters, traveling wave thrusters; exotic propulsion systems. Prereq: Consent of instructor.

584-585 Turbomachinery Systems I, II (3,3) Ideal cycle analysis of turbine engines, real cycle analysis, component performance analysis, component design and systems integration (inlets, nozzles, combustors, compressors, turbines), flowthrough theory, turbine engine component matching, transient operation, surge and rotating stall, engine control systems, structural considerations. Prereq: First year graduate standing and consent of instructor.

586 Mechanics and Control of Robotic Manipulators (3) Fundamentals of robotic manipulation: kinematics and dynamics of manipulators, control systems design, trajectory planning, advanced force and impedance control strategies. Prereq: 451, 533, or equivalent.

587 Dynamic Modeling and Simulation (3) Modeling and analysis of physical systems. Systems and parameter identification. Mathematical modeling methods and approximations. Digital simulation techniques and practices. Design and control applications. Prereq: 451 or equivalent. (Same as Biomedical Engineering 587.)

588 Introduction to Hybrid Electric Vehicles (3) Series, parallel, and dual configurations. Sizing and analysis of typical HEV components: motors, auxiliary power sources, on-board energy storage, and fuels. Steady-state HEV force and power modeling schemes. Power train design using various computer simulation tools. Prereq: Consent of instructor.

589 Hybrid Electric Vehicle Control Systems Design and Analysis (3) Dynamic modeling, simulation and analysis of complete hybrid electric vehicle systems. Linear control design techniques and discrete logic design applied to HEV power trains and operating mode controls. Digital and real-time control and hardware issues of automotive systems. Design and human factors engineering issues of vehicle controls and displays. Prereq: 588 or consent of instructor.

590 Selected Engineering Problems (2-6) Enrollment limited to students in problems program. Prereq: Consent of advisor. May be repeated. Satisfactory/No Credit grading only.

594 Culminating Integrated Project Report (3) Final phase of product development process. Multidisciplinary teams submit and defend comprehensive project report. Report includes all engineering and business considerations needed to convince potential investors to fund proposed business venture. Prereq: Consent of instructor. (Same as Chemical Engineering 594; Electrical and Computer Engineering 594; Industrial Engineering 594; Materials Science and Engineering 594; Nuclear Engineering 594.)

595 Seminar (1) All phases of mechanical engineering, reports on current research at the University of Tennessee, Knoxville, and the University of Tennessee Space Institute. May be repeated. Satisfactory/No Credit grading only.

599 Special Topics in Mechanical Engineering (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

600 Doctoral Research and Dissertation (3-15) P/NP only.

610 Advanced Topics in Fluid Mechanics and Heat Transfer (3) Advanced theory and application of fluid mechanics and heat transfer; natural convection, multi-phase flow, high speed reacting and nonreacting flows, advanced boundary layer techniques, combustion, perturbation and variational methods of analysis, heat exchanger theory and design. May be repeated. Maximum 9 hours. Prereq: Consent of instructor.

581 Advanced Topics in Fluid Mechanics and Heat Transfer (3) Radiation heat transfer in absorbing, emitting and scattering media; interaction of thermal radiation with conduction and convection heat transfer. Prereq: 511, 512.

621 Advanced Topics in Solid Mechanics (3) Advanced theory and applications in mechanics, dynamics, vibrations, and strength of materials. Prereq: Consent of instructor. May be repeated. Maximum 9 hours.

583 Advanced Mechanics of Materials I (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, plates with holes, axisymmetric shells. Stress concentrations. Prereq: Mechanical Engineering 559 or consent of instructor. (Same as Aerospace Engineering 659; Biomedical Engineering 659; Engineering Science 659.)


671 Advanced Topics in Applied Artificial Intelligence (3) (See Nuclear Engineering 671.)


MEDIEVAL STUDIES (674)

401 Dante and Medieval Culture (3) (See Italian 401.)

402 Petrarch and Boccaccio (3) (See Italian 402.)

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.)

510 Special Topics (3) May be repeated. Maximum 6 hours.
Bacterial Physiology (3) Modern concepts of structure and function of bacterial cell. Prereq: 310.


Medical Microbiology (3) Disease-producing microorganisms, including bacteria, rickettsia, chlamydia and fungi. Prereq: 310.

Medical Microbiology Laboratory (2) Laboratory exercises in medically important areas of microbiology: microorganisms, pathogenesis and immunology. Prereq: 319, 430. Coreq: 420.

Immunology (3) Principles of inflammation and immunity; immunoglobulin structure and theories of formation and diversity; complement, hypersensitivities, cell cooperation and recognitions in immune mechanisms; soluble factors. Prereq: Biology 240.


Microbial Ecology (3) Physiological diversity and taxonomy of microorganisms from natural environments. Functional role of microorganisms in natural and simulated ecosystems. Prereq: 310.

Thesis (1-15) P/NP only.

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. May be repeated. Satisfactory/No Credit grading only.

Molecular Epidemiology and Mycology (3) (See Entomology and Plant Pathology 550.)

Applied Microbiology and Bioengineering (3) (See Chemical Engineering 575.)

Foreign Study (1-15) See College of Arts and Sciences.

Off-Campus Study (1-15) See College of Arts and Sciences.

Independent Study (1-15) See College of Arts and Sciences.

General Seminar (1) Lectures and seminars by invited speakers, faculty, and graduate students. May be repeated. Maximum 18 hours. Satisfactory/No Credit grading only.

Laboratory Rotation (1) Familiarization with research areas in department through series of rotations in laboratories of individual faculty members. May be repeated. Maximum 3 hours. Satisfactory/No Credit grading only.

Doctoral Research and Dissertation (3-15) P/NP only.

Journal in Microbial Physiology (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hours. Satisfactory/No Credit grading only.

Journal in Microbial Pathogenesis (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hours. Satisfactory/No Credit grading only.

Journal in Immunology (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hours. Satisfactory/No Credit grading only.

Journal in Virology (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hours. Satisfactory/No Credit grading only.

Journal in Microbial Genetics (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hours. Satisfactory/No Credit grading only.

Topics in Microbial Physiology (1-3) Prereq: 410 or consent of instructor. May be repeated. Maximum 12 hours.

Topics in Microbial Pathogenesis (1-3) Prereq: 420, 430 or consent of instructor. May be repeated. Maximum 12 hours.

Topics in Immunology (1-3) Prereq: 430 or consent of instructor. May be repeated. Maximum 12 hours.

Topics in Virology (1-3) Prereq: 440 or consent of instructor. May be repeated. Maximum 12 hours.

Topics in Microbial and Molecular Genetics (1-3) Prereq: 411 or consent of instructor. May be repeated. Maximum 12 hours.

Advanced Topics in Environmental Microbiology (1-3) Prereq: Consent of instructor. May be repeated. Maximum 12 hours.

Foundations of Music Education (3) Historical, philosophical and aesthetic bases. Prereq: Consent of instructor.

Research in Music Education (3) Definition of research problems, data collection and analysis, and research report writing. Application of knowledge of research techniques to analysis of existing research literature in music education. Prereq: Consent of instructor.


Studies in Multicultural Music Education (3) Study of music literature, art and customs of various cultures appropriate for students in K-8. Strategies and techniques for teaching music at this level.

Musical Repertoire Laboratory (1) Performance of music from various cultures: production of musicals appropriate for students in grades K-8. Singing, dancing, acting, costumes, set design, traditional and non-traditional instrumental ensembles. Limited to students majoring or concentrating in art, dance or theatre. Prereq or coreq: 570. May be repeated. Maximum 2 hours.

Analysis for Teaching for Professional Development (2) Strategies to document and analyze effectiveness of teaching and professional development. Study and application of various approaches. Coreq: 575.

Professional Internship in Teaching (1-8) Teaching and teaching-related experiences in professional settings in public schools. Enrollment limited to post-baccalaureate students in professional year program. Prereq: Admission to Teacher Education program and consent of School of Music. May be repeated. Maximum 12 hours. Satisfactory/No Credit grading only.

Seminar in Music Education (3) Class investigation and individual reporting of pertinent topics and issues in music education. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

Special Topics in Music Education (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

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. Coreq: 575.

Special Problems in Music Education (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hours.
MUSIC ENSEMBLE (708)

Prerequisite: By audition or consent of instructor.

502 Jazz-Saxophone Ensemble (1) May be repeated. Maximum 4 hours.

503 Small Jazz Ensemble (1) May be repeated. Maximum 12 hours.

504 Jazz Ensemble (1) May be repeated.

505 Studio Orchestra (1) May be repeated. Maximum 12 hours.

506 Trombone Choir (1) May be repeated.

510 Percussion Ensemble (1) May be repeated.

511 Marimba Choir (1) May be repeated.

515 Chamber Music Ensemble (1) May be repeated. Maximum 12 hours.

530 Chamber Singers (1) May be repeated.

540 Opera Theatre (1) May be repeated.

550 Concert Band (1) May be repeated.

552 Symphonic Band (1) May be repeated. Maximum 12 hours.

553 Wind Ensemble (1) May be repeated. Maximum 12 hours.

554 Varsity Band (1) May be repeated.

559 Marching Band (1) May be repeated.

570 Symphony Orchestra (1) May be repeated.

580 Concert Choir (1) May be repeated.

583 Men’s Chorale (1) May be repeated. Maximum 4 hours.

589 Women’s Chorale (1) May be repeated.

599 Accompanying (1) May be repeated.

MUSIC GENERAL (698)

500 Thesis (1-15) P/NP only.

501 Graduate Recital (2)

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. May be repeated. Satisfactory/No Credit grading only.

510 Music Bibliography (3) Bibliographic methodology in music.

511 Lecture Recital (2)

520 Musical Styles (3) Elements of design and their role in definition of musical styles. Prereq: Consent of instructor.

521 Special Topics in Performance (1-3) Prereq: Consent of school director.

540 Secondary Applied Music (1) May be taken by music majors desiring applied study on a 2nd or 3rd instrument. May be repeated for a maximum of 4 hours credit on each instrument. Admission by audition. Requires payment of Applied Music fee.

MUSIC INSTRUMENTAL (710)

490 Instrumental Conducting (3) Development of knowledge and skills in instrumental conducting; study of various periods and composers and relationship of different styles to conductor’s art; musical analysis and practice in conducting. Prereq: Music Education 320 or equivalent.

580 Band History and Literature I (3) Antiquity to 1900.

581 Band History and Literature II (3) 1900 to present.

583 Recitative for Instrumental Conductors (1) Problems in conducting recitatives. Prereq: Consent of instructor. Satisfactory/No Credit grading only.

584 Practicum for Instrumental Conductors (1) Intern experience in field other than area of major interest. 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. Prereq: Consent of instructor. May be repeated. Maximum 8 hours.

595 Instrumental Conducting Performance (1) Preparation and juried performance of band or orchestral work(s). Prereq: Consent of instructor.

MUSIC JAZZ (711)

410 Advanced Improvisation (3) Further development of individual skills and solving individual problems in jazz improvisation. Prereq: 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. Prereq: Studio Music and Jazz major or consent of instructor.

520 Seminar in Jazz (3) Topic varies.

MUSIC KEYBOARD (712)

410 Organ Practicum (1) Improvisation, hymn playing, and accompanying on the organ. Prereq: Organ proficiency at the 200 level. May be repeated. Maximum 3 hours.

420-430 Piano Literature I,II (3,3) 420—From 1750 to middle 19th century; 430—Middle 19th century to present.

460-470 The Organ and Its Literature I,II (3,3) Development of organ and organ literature from Middle Ages to present; problems of style and interpretation; pedagogical literature and methods; organ design. Prereq/coreq: Musicology 220 and 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. Prereq: Consent of instructor.

485-495 Suzuki Piano Method I,II (2,2) Psychology, procedures, and literature of Suzuki piano method. Must be taken in sequence. Prereq: Consent of instructor.

490-491 Internship (2,2) Opportunity for pedagogy students to gain experience in teaching beginning students under supervision of experienced instructors. Weekly discussion seminars.

520 Piano Literature Seminar (3) Topics vary. May be repeated. Maximum 9 hours.

531-541 Recital Project (2,2) Preparation and accompaniment of full recital for accompanying concentrations only. 531—Vocal recital, 541—Instrumental recital. Prereq: 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. Prereq: Consent of instructor. May be repeated. Maximum 8 hours.

560 Organ Literature Seminar (3) Topics vary. May be repeated. Maximum 6 hours.
MUSIC PERFORMANCE (713)

All performance courses require an audition and consent of instructor. May be repeated. Maximum 8 hours toward Master of Music degree.

403 Flute (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 304, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

404 Flute (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 403, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

405 Oboe (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 306, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

406 Oboe (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 405, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

410 Bassoon (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 311, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

411 Bassoon (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 410, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

415 Clarinet (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 316, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

416 Clarinet (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 415, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

420 Saxophone (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 321, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

421 Saxophone (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 420, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

425 Horn (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 326, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

426 Horn (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 425, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

430 Trumpet (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 331, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

431 Trumpet (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 430, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

435 Trombone (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 336, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

436 Trombone (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 435, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

440 Baritone (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 341, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

441 Baritone (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 440, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

445 Tuba (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 346, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

446 Tuba (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 445, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

450 Percussion (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 351, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

451 Percussion (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 450, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

455 Voice (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 356, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

456 Voice (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 455, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

460 Violin (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 361, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

461 Violin (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 460, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

465 Viola (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 366, grade C or better. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

466 Viola (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 465, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

470 Cello (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 371, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.
471 Cello (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 470, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

472 Electric Bass (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 373, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

473 Electric Bass (1-3) By audition only. Prereq: Music General 101 or equivalent. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). Music Performance 472, grade C or higher. May be repeated. Maximum 8 hours.

474 String Bass (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 375, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

475 String Bass (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 474, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

480 Piano (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 381, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

481 Piano (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 480, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

482 Guitar (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 384, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

483 Guitar (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 483, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

484 Harpsichord (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 386, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

485 Harpsichord (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 485, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

486 Harpsichord (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 480, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

490 Organ (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 489, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

491 Composition (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 395, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

492 Composition (1-3) By audition only. Prereq: Music General 101 or equivalent; Music Performance 396, grade C or higher. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). May be repeated. Maximum 8 hours.

493 Improvisation (1-2) By audition only. Prereq: Music General 101 or equivalent and consent of instructor. Coreq: Ensemble appropriate to degree program (see School of Music Undergraduate Handbook). Cannot be used to satisfy applied music requirement. May be repeated. Maximum 4 times.

501 Flute (1-4)

505 Oboe (1-4)

510 Bassoon (1-4)

515 Clarinet (1-4)

520 Saxophone (1-4)

525 Horn (1-4)

530 Trumpet (1-4)

535 Trombone (1-4)

540 Baritone (1-4)

545 Tuba (1-4)

550 Percussion (1-4)

551 Accompanying and Coaching (1-4)

555 Voice (1-4)

560 Violin (1-4)

565 Viola (1-4)

570 Cello (1-4)

572 Electric Bass (1-4) May be repeated. Maximum 8 hours.

575 String Bass (1-4)

580 Piano (1-4)

583 Guitar (1-4) May be repeated. Maximum 8 hours.

585 Harpsichord (1-4)

590 Organ (1-4)

594 Composition (1-3)

595 Composition with Electronic Media (1-3)

599 Improvisation (1-4)

MUSIC TECHNOLOGY (717)

496 Computer Music Transcription (3) Projects in notation, play-back, 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. No credit toward Master of Music concentration in music theory with technology emphasis. Prereq: Consent of instructor.

500 Computer Projects (3) High-level programming languages used to design and implement computer-managed instruction; Internet development tools; writing of documentation for computer projects. Prereq: 540 or equivalent.

501 Technology in Music Research (3) Use of technology for research projects in music analysis or pedagogy: development and execution of research project. Prereq: 550.
MUSIC THEORY (714)

430-440 Counterpoint I, II (3,3) 430—Study of species counterpoint in modal and tonal styles, works of Palestrina and J.S. Bach. Prereq: 210 with grade C or higher. 440—Writing of contrapuntal forms of the 18th century and fugue analysis of works from the 10th through 20th centuries. Prereq: 430 with grade C or higher.

450 Choral Arranging (2) Analysis of scores and writing of arrangements for choruses. Prereq: 210 and 240 with grade C or higher, or consent of instructor.

520 Analytical Techniques (3) Analytical techniques, contemporary approaches. Tonal and neotonal music. Prereq: 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. Prereq: Consent of instructor.

593 Independent Study (1-15) See College of Arts and Sciences. Prereq: Consent of school director.

MUSIC VOICE (715)

410-420 Song Literature I, II (2,2) 410—German songs. 420—French, Italian, Russian, Scandinavian, Czechoslovakian, British, and American art songs. Graduate credit not available for students in vocal performance.

425 Functional Diction for Singers (3) Comprehensive survey of singing diction in six languages: English, French, German, Italian, Latin and Spanish. Basic instruction in International Phonetic Alphabet; development of basic diction skills; overview of diction styles and traditions in each language; survey of diction resources and reference materials. Does not fulfill deficiency requirements for graduate students in voice or accompanying.

510 Vocal Literature Seminar (3) Topics vary. May be repeated. Maximum 6 hours.

520 Performance Techniques for Singers (1) Improvisation, movement, and basic techniques for dramatic vocal performance. Prereq: Vocal major or consent of instructor. May be repeated for credit. Maximum 2 hours.

530 Opera Performance (2) Prereq: Consent of instructor. May be repeated. Maximum 4 hours.

540 Opera Production (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

550-560 Advanced Vocal Pedagogy I, II (2,2) 550—Study of vocal production, examination of different methods. 560—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. Prereq: Consent of instructor.

570 Vocal Chamber Music Performance (2) Prereq: 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. Available only for graduate students majoring in vocal pedagogy. Prereq: Consent of instructor. May be repeated. Maximum 2 hours.

580-585 Choral Literature I, II (2,2) Choral music from middle ages to present with consideration of historical development of major choral genres.

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. May be repeated. Maximum 8 hours.

594 Project in Choral Conducting Performance (1-3) Public performance, critical document; recording project. Prereq: Consent of instructor. May be repeated.

595 Choral Conducting Seminar (3) Topics vary. Prereq: 590 or consent of instructor. May be repeated.

MUSICOCOLOGY (706)

410 Music History Genre (3) Topics vary. May be repeated. Maximum 6 hours.

420 History of Opera (3) Dramatic, vocal, and orchestral elements in opera of Italian, French, and German schools, 1600-present.

430 Symphonic Literature (3) Literature for orchestra from Baroque to present, evolution of symphony.

450 Composer Seminar (3) Life and works of single composer. Subjects vary.

460 Music Aesthetics (3) Nature of music and musical experience, sense perception and emotions, music, and 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 Music of the Medieval and Renaissance Periods (3) Survey of major musical phenomena from c. 900 to c. 1600. Chant, troubadour/trouveure song, Notre Dame polyphony, Ars Nova, Ars subtilior, madrigal, chanson, mass and motet. Musical developments considered against historical, cultural, analytical, and literary frameworks.

550 Music in the Baroque Period (3) From c.1600 to 1750; rise of opera and oratorio, sacred and secular cantatas, instrumental forms, performance practice.

560 Music in the Classic Period (3) Evolution of classical style from pre-classic music to music of Haydn, Mozart, and early Beethoven.

570 Music in the Romantic Period (3) Nineteenth-century musical styles from Beethoven to post-romanticists.

580 Music in the 20th Century (3) From 1890, Debussy, to present, Stockhausen and others.

585 Topics in Music of the Americas (3) Topics vary.

586 Topics in Opera (3) Topics vary within operatic repertory from the 17th c. to the present including music and drama; interdisciplinary, race, or gender studies; realism; nationalism; expressionism; minimalism. May be repeated. Maximum 6 hours.

590 Introduction to Ethnomusicology (3) Ethnomusicology as scholarly discipline. History, theories, and methodologies as applied to study of music in culture. Prereq: 380 or equivalent.

593 Independent Study (1-15) See College of Arts and Sciences. Prereq: Consent of school director.

595 Seminar in Ethnomusicology (3) Topics vary. Prereq: 590 and consent of instructor.

596 Seminar in Historical Musicology (3) Topics vary; specific musical genre, composer, or phenomenon. 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. Prereq: 304.

404 Nuclear Fuel Cycle (3) Mining, milling, fabrication, in-core management, reprocessing, waste disposal, regulatory and radiation health issues and requirements. Prereq: 470 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. Prereq: Physics 232.

421 Introduction to Nuclear Criticality Safety (3) Fundamentals of nuclear criticality safety; criticality accidents; safety standards; overview of experiments, computational methods, and applications. Prereq: 301.

431 Radiation Protection (3) External and internal dosimetry, biological effects of radiation, radiation detection, radiation risk assessment. Prereq: 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. Prereq: 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. Prereq: Senior standing or consent of instructor. (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. 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. Prereq: Senior standing in engineering and consent of instructor. (Same as Chemical Engineering 484; Industrial Engineering 484; Materials Science and Engineering 484; Mechanical Engineering 484.)

494 Special Topics in Nuclear Engineering (3) Problems related to recent developments and practice. Prereq: Senior standing and consent of instructor. May be repeated. Maximum 6 hours.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

509 Multidisciplinary Project (1) (See Industrial Engineering 509.)

511-512 Transport Processes in Nuclear Engineering (3,3) 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.

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.


541 Reactor Fuel Management (3) Topics relative to in-core fuel management. Applicable topics in reactor physics, fuel depletion, isotopic inventories, reactivity control and numerical methods. Prereq: 470 or consent of instructor.


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. Prereq: 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 measurement and fundamentals of radiation detection instrumentation operation. Prereq: 551.


552 Radiological Assessment and Dosimetry (3) Transport of radionuclides in environment, food chain pathways, internal dosimetry and personnel dosimetry. Prereq: 551 or consent of instructor.

553 Radiation Risk Analysis (3) Methods for radiation risk prediction, survival analysis, parameter estimation, real data analysis, extrapolation techniques. Prereq: 552 or consent of instructor.

561 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. Lecture and lab. Prereq: Consent of instructor.

563 Medical Physics II (3) Physics of ionizing radiation therapy with emphasis on quality assurance, treatment planning, radiation protection, and special treatment procedures. Lecture and lab. Prereq: 567.

571 Reactor Theory and Design (3) Analytical and numerical techniques for neutronics modeling of nuclear systems. Forward and adjoint Boltzmann transport equation, Multigroup diffusion theory. Core analysis methods and codes. Prereq: 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. Prereq: Consent of instructor.

577 Neural Networks in Engineering (3) Neural network technology for use in intelligent systems; rationale for neural computing, structure of neural computing systems, programming. Prereq: Consent of instructor. (Same as Biomedical Engineering 577; Engineering Science 577; Mechanical Engineering 577.)

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 machinery 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. Prereq: Graduate standing or consent of instructor.

582 Monte Carlo Analysis (3) Analysis of radiation transport problems in radiation shielding by Monte Carlo method, use of MCNP code system. 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. Prereq: 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. Prereq: Consent of instructor. (Same as Chemical Engineering 585.)

594 Culminating Integrated Project Report (3) (See Industrial Engineering 594.)

597 Special Topics in Nuclear Engineering (3) Lectures and recitation on recent advances in nuclear engineering. Prereq: Consent of instructor. May be repeated with consent of department.

598 Nuclear Engineering Practice (3-9) Experience in solving and reporting on engineering problems. Prereq: Approval of department. May be repeated. Enrollment limited to alternative plan students. Satisfactory/No Credit grading only.

600 Doctoral Research and Dissertation (3-15) P/NP only.

611-612 Selected Topics in Reactor Theory (3.3) Transport theory, control rod theory, stochastic methods. Selected topics from literature. Prereq: 572.

621 Selected Topics in Radiation Protection (3) Prereq: 551, 552. May be repeated with consent of department.

653 Theory of Information Processing (3) Modern system theoretical methods for evaluating system performance from dynamic measurements. Prereq: 522 or equivalent.

671 Advanced Topics in Applied Artificial Intelligence (3) Recent advances in engineering applications of artificial intelligence. Prereq: 577. (Same as Engineering Science 671; Mechanical Engineering 671.)

697 Special Topics in Nuclear Engineering (3) Investigation of new developments. Prereq: Consent of instructor. May be repeated with consent of department.

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. Open to students in all colleges.

402 Gerontology Practicum (3) Off-campus supervised experience in gerontology. Offered as part of the gerontology minor. Open to students in all colleges. Prereq: 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. Prereq: Upper-division status.

500 Thesis (1-15) P/NP only.

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. Prereq or coreq: Graduate level statistics.

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. May be repeated. Satisfactory/No Credit grading only.

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. Didactic (2.5) and lab (.5). Prereq: Admission to MSN program or consent of instructor.

505 Advanced Clinical Pharmacology (3) Pharmacological agents utilized to treat common, recurrent health problems; indications, contraindications, side and interactive effects of commonly prescribed drugs. Prereq: Undergraduate pharmacology course or consent of instructor.


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. Didactic (3) and Seminar (1).

509 Graduate Seminar in Public Health (1) (See Public Health 599.)

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. Prereq: Admission to MSN program or consent of instructor.

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.

515 Advanced Pathophysiology for Nursing Practice (3) Advanced physiologic and pathophysiologic concepts, principles, and theories applied to deviations of human systems. Prereq: Undergraduate pathophysiology course.

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 noncardiac and non-neurological procedures who present with either neurological and/or cardiovascular comorbidity. Prereq: 521. Coreq: 523.


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. Prereq: Undergraduate pharmacology course or consent of instructor.


523 Advanced Principles of Nurse Anesthesia Practice (2) Advanced concepts/principles of anesthetic management and legal implications of nurse anesthesia practice.

524 Basic Principles of Anesthesia I (3) An introduction to the scientific principles upon which anesthesia administration is based. The focus of this course (part one of a two-part series) is on the sound elementary principles of safe anesthesia delivery for the beginning practitioner.

525 Basic Principles of Anesthesia II (3) A continuation of 524 (Basic Principles of Anesthesia I) 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 (part two of a two-part series) is on the sound basic principles of safe anesthesia management for the beginning practitioner.

526 Professional Issues in Nurse Anesthesia (2) Exploration of historical and current issues surrounding nurse anesthesia education, practice, and the profession.

530 Adult Health Nursing I (6) Advanced nursing practice for health promotion, restoration, and maintenance of young, middle-aged, and older adults. Theories and research to advanced practice with individual clients in variety of settings. Didactic (2) and practicum (4). Prereq: 504, 505, 515. Prereq/Coreq: 507, 510.

531 Adult Health Nursing II (7) Continuation of 530. Delivery, provision, and management of health care for adult groups and communities. Didactic (2) and practicum (5). Prereq: 530, 501.

544-545-546-547-548-549 Clinical Nurse Anesthesia Practicum/Seminar I, II, III, IV, V, 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. Prereq for 544: Admission to nurse anesthesia concentration. Prereq for 545: 544, 521, 504, 505. Must be taken in sequence.

550 Nursing of Women and Children I (8) Advanced practice nursing for women and children; clinical experience in role of nurse practitioner or clinical nurse specialist in variety of settings. Health promotion and nursing interventions for actual or potential health problems of women, children, and families. Didactic (3) and practicum (5). Prereq: 504, 505, 515. Prereq/Coreq: 507, 510.

551 Nursing of Women and Children II (8) Continuation of 550. Role refinement of nurse practitioner or clinical specialist in health maintenance and restoration for women, children, and families. Didactic (3) and practicum (5). Prereq: 550, 501. Prereq/Coreq: 582.

552 Care of the Critically-Ill Neonate (3) Physiology and pathophysiology of the neonate and the recommended interventions in pathology. Focus I is on the high-risk neonate. Didactic and independent study. Coreq: 550.

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. Didactic (2) and practicum (4). Prereq: 504, 505, 515. Prereq/Coreq: 507, 510.

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. Didactic (2) and practicum (5). Prereq: 560, 501. Prereq/Coreq: 582.

565 Teaching Practicum (1-6) Individually designed teaching experience in college teaching, program, or nursing practice setting. Objectives to be developed collaboratively by student and faculty. Prereq/Coreq: 566 and consent of instructor. Satisfactory/No Credit or letter grade.

566 Educational Principles and Strategies (3) Exploration and analyses of selected educational, curriculum; teaching-learning, measurement, and evaluation principles and theories as applied to instruction of undergraduate nursing students, staff development, and patient education. Prereq: Consent of instructor.

570 Family Nurse Practitioner I (6) Application of advanced health/physical assessment and diagnostic reasoning in nursing management and primary care of and individuals and their families with actual and potential acute health problems; clinical experience in role of family nurse practitioner in variety of settings. Didactic (2) and practicum (4). Prereq: 504, 505, 515.

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; Prereq/Coreq: 507, 510.

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. Practicum (2). Prereq: 571.

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. Didactic (2) and practicum (6). Prereq: 501, 572. Prereq/Coreq: 582.

577 Special Topics (1-3) Topic is determined by faculty and student interest. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

582 Scholarly Inquiry for Advanced Practice Nursing (3) Non-the- sis 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. Prereq or coreq: 501 or consent of instructor. May be repeated. Maximum 6 hours.

583 Directed Clinical Practice (1-10) Additional opportunities for advanced nursing practice. Objectives to be developed collaboratively by student and faculty. Prereq: Enrollment in or completion of graduate level courses in clinical nursing. May be repeated. Maximum 14 hours. Satisfactory/No Credit or letter grade.

585 Seminar in Gerontology (1) (See Health 585.)


593 Independent Study (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

600 Doctoral Research and Dissertation (3-15) P/NP only.
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.

603 Nursing Research and Inquiry (3) Philosophical, theoretical, and methodological bases for nursing inquiry. Prereq: 601.


606 Nursing Research Seminar (3) Selected topics pertaining to dissertation proposal process, research experience, and defense.

607 Qualitative Nursing Research (3) Critique and application of qualitative nursing research methods. Prereq: 601, 603.


609 Research Practicum (1-3) Supervised individual or group research experience under guidance of faculty. Prereq: Consent of instructor. May be repeated. Maximum 12 hours.

610 Nursing Science Seminar (2) Critical Analysis and synthesis of literature in selected focus area within nursing science. Prereq: Admission to doctoral program in nursing or consent of instructor.

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.

613 Nursing Leadership in Complex Systems (3) Analysis and evaluation of nursing leadership/management in complex professional, academic, and health care systems.

614 Nursing Preceptorship (3) Individually-designed practicum, field, or internship experiences in variety of administrative, educational, research, or clinical practice settings. Prereq: 601.

NUTRITION (726)

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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. Prereq: 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. Prereq: 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. Prereq: Advanced nutrition or consent of instructor.

514 Community Nutrition II (3) Planning, implementation, and evaluation of public health nutrition programs. Concurrent field experiences. Prereq: 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. Prereq: 513, 514 and consent of instructor. Satisfactory/No Credit grading only.

516 Maternal and Child Nutrition (3) Nutrition principles related to growth and development during pregnancy, infancy, and childhood to age 5, high risk conditions. Prereq: Advanced nutrition 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. Prereq: Advanced nutrition or consent of instructor.

518 Nutrition and Aging (3) Nutritional problems of adults; nutritional requirements, dietary intakes; affects of nutrition on biological aging. Prereq: Advanced nutrition or consent of instructor.

520 Nutritional Ecology (2) Examination of issues in natural, physical, political, and social environments that impact availability of food and nutrients in U.S. food supply.

521 Physiological Basis for Diet and Disease (3) Altered nutrient needs as result of metabolic changes that occur in selected disease states. Prereq: Nutrition in Disease or consent of instructor.

522 Nutrition Counseling (2) Individual eating habits and disorders; evaluation strategies for effectiveness of helping process. Prereq: Nutrition in Disease or consent of instructor.

530 Molecular Application in Nutrient-Gene Interaction I (1) Theories and applications of gene regulation methodologies. Experimentation with DNA and RNA. RNA and DNA isolation and analysis to illustrate nutrient regulation of gene expression. Combination of lab/lecture.

540 Seminar in Nutrition (1) May be repeated. Satisfactory/No Credit grading only.

541 Research Methods (2) Basic principles of planning, conducting, and interpreting nutrition and foodservice systems administration research. Prereq: 6 graduate hours in nutrition and food system administration and statistics.

542 Advanced Experimental Nutrition (2) Application of research principles to individual project using experimental animals. Prereq/coreq: 541.

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. Prereq/Coreq: 541.

547 Field Experience (3-9) Experience in food-related industry or agency under supervision of faculty member. Prereq: Consent of instructor. Satisfactory/No Credit grading only.

548 Directed Study in Nutrition (1-3) Advanced study in nutrition. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

549 Special Topics (1-3) Recent advances in nutrition or food systems administration. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

600 Doctoral Research and Dissertation (3-15) P/NP only.

602 Advanced Topics in Nutrition Science (1-3) Comprehensive individual study and group discussion of topics related to current problems in nutrition. Prereq: 512 or consent of instructor. May be repeated.

603 Current Trends in Food and Sociocultural Change (2) Critical evaluation of research. Prereq: 508 or consent of instructor.
OPERATIONS AND MANAGEMENT SCIENCE (738)

540 Statistics and Operations Management (3) Analysis of methods and models for understanding supply chain flows processes. Introduction to management strategies and techniques applicable to design of systems in logistics and operations processes. Prereq: Business Administration 511, 512, and 513 or consent of instructor. (Same as Logistics 510.)

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 problems of definition, supporting data structure design, model design, solution, implementation, and maintenance. Prereq: 540 or Logistics 510 or permission of instructor.

PHILOSOPHY (745)

400 Special Topics (3) May be repeated when topic varies. 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) Figures or movements from antiquity through mid-twentieth century. Prereq: 6 hrs of philosophy or consent of instructor. May be repeated when topic varies. Maximum 9 hours.

435 Intermediate Formal Logic (3) Metatheory of formal logic and philosophy of logic. Prereq: Consent of instructor.

440 Contemporary Ethical Theory (3) Topics in meta-ethics or ethics. Prereq: 6 hrs of philosophy or consent of instructor.

443 Advanced Business Ethics (3) Advanced topics in business ethics. When content varies, may be repeated. Maximum 6 hours.

445 Advanced Environmental Ethics (3) Advanced topics in environmental ethics. When content varies, may be repeated. Maximum 6 hours.

446 Advanced Bioethics (3) Advanced topics in bioethics. When content varies, may be repeated. Maximum 6 hours.

462 Philosophy of Biology (3) Current issues: nature of natural selection, adaptation, and fitness; level of selection debate; nature of species; interaction of environment and organism, and others. Prereq: Upper-division coursework in philosophy or biology or consent of instructor.

472 Philosophy of Language (3) Problems of meaning, reference and truth. Relation between words and world. How sentences manage to be about the world. What is true? Prereq: 3 philosophy courses 200 level or above.

473 Philosophy of Mind (3) Problems of mind and body in relation to consciousness and personal identity. Prereq: 6 hours of philosophy or consent of instructor.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

510 Philosophical Research (3) Paper workshop (writing, revising papers, getting papers ready to publish). Does not count toward hours required for degree. May be repeated. Satisfactory/No Credit grading only.

520 Topics in Ancient or Medieval Philosophy (3) Intensive critical work on major philosopher or school. May be repeated. Maximum 9 hours.

522 Topics in Modern Philosophy (3) Intensive critical work on major philosopher or school. May be repeated. Maximum 9 hours.

524 Topics in Twentieth-Century Philosophy (3) Intensive critical work on major philosopher or school. May be repeated. Maximum 9 hours.

528 Topics in Contemporary Philosophy (3) Intensive critical work on themes in late 20th-century philosophy. May be repeated. Maximum 9 hours.

540 Topics in Ethics or Value Theory (3) May be repeated. Maximum 9 hours.

542 Topics in History of Ethics (3) Dominant movements in history of ethics. May be repeated. Maximum 9 hours.

544 Topics in Applied Ethics (3) Single author, tradition, or topic in ethical theory, application to issues in health, business, technology, ecology, and other practical fields. May be repeated. Maximum 9 hours.

546 Orientation to Medical Ethics (3) Survey of ethical theories in application to issues in medical ethics.

548 MA Clinical Practicum (3) Series of clinical rotations at one or more local health care institutions. Open only to graduate students concentrating in medical ethics. Prereq: 547 and consent of Medical Ethics Committee and the UTMCK Graduate Education Committee.

575 Topics in Metaphysics and Epistemology (3) May be repeated. Maximum 9 hours.

577 Topics in Philosophy of Mind (3) Relation of mental to physical and of role of words in discourse for mental activities, thinking and feeling. May be repeated. Maximum 9 hours.

585 Special Topics (3) May be repeated. Maximum 9 hours.

587 Advanced Clinical Medical Ethics (3) Critical concepts in medical ethics, relationship of theory to practice, and professional roles and responsibilities for health care ethics consultant. Open only to PhD students concentrating in medical ethics. Prereq: Consent of Medical Ethics Committee.

588 PhD Clinical Practicum (9) Series of clinical rotations at one or more local health care institutions. Open only to PhD students concentrating in medical ethics. Prereq: 587 and consent of Medical Ethics Committee and the UTMCK Graduate Education 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. May be repeated. Maximum 9 hours.

591 Foreign Study (1-15) See College of Arts and Sciences.

592 Off-Campus Study (1-15) See College of Arts and Sciences.

593 Independent Study (1-15) See College of Arts and Sciences. Satisfactory/No Credit or letter grade.

600 Doctoral Research and Dissertation (3-15) P/NP only.

620 Topics in Ancient or Medieval Philosophy (3) May be repeated. Maximum 9 hours.

622 Topics in Modern Philosophy (3) May be repeated. Maximum 9 hours.

624 Topics in Contemporary Philosophy (3) May be repeated. Maximum 9 hours.

640 Topics in Ethics or Value Theory (3) May be repeated. Maximum 9 hours.

646 Topics in Applied Ethics (3) Prereq: Consent of Medical Ethics Committee. May be repeated. Maximum 9 hours.
PHYSICS (773)

411-412 Introduction to Quantum Mechanics (3,3) Fundamental principles of quantum mechanics and methods of calculation. Solution of Schrodinger equation for simple systems. Application to atomic, molecular, nuclear, and condensed matter physics. Must be taken in sequence. Prereq: 240 or equivalent, Mathematics 435.

421 Modern Optics (4) Transmission of light in uniform, isotropic media; reflection and transmission at interfaces; mathematics of wave motion and interference effects. Rudiments of Fourier optics and holography. 3 hours and 3 labs. Prereq: 431 or 136 or 138 or 232, and consent of instructor.

431-432 Electricity and Magnetism (3,3) Electrostatics, magnetostatics, coupled electric and magnetic fields, Maxwell’s Equations, electromagnetic waves and radiation. Prereq: 136 or 138 or 232.

461-462 Modern Physics Laboratory (3,3) 461—Introduction to fundamental and modern techniques in experimental physics, and to theory and practice of measurement and data analysis. Selected experiments in nuclear, atomic, molecular and solid state physics, and modern optics. Prereq: 240 or 411. 462—Advanced experiments and experimental techniques in modern physics; experimental team work. Thorough quantum mechanical interpretation of results and preparation of scientific reports. 6 hours lab per week. Prereq: 461.

490 Senior Seminar (1-3) Topic of current interest. May be repeated with consent of department. Maximum 6 hours.

500 Thesis (1-15) P/NP only.

501 Graduate Research Participation (3) Advanced research techniques under supervision of staff research director whose research area coincides with interests of student. Open to all graduate students in good standing. Prereq: Consent of department and research director. May be repeated with consent of department. Maximum 18 hours. 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

503 Physics Colloquium (1) Lectures and discussion on current research topics. Continuous registration required for current graduate students. May be repeated. Maximum 6 hours. Satisfactory/No Credit grading only.

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 expansion flows; reacting 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 cryogenic-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.

511-512 Theoretical Physics (3,3) 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, 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.

521-522 Quantum Mechanics (3,3) 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, absorption, absorption, and scattering of light, bremsstrahlung, pair creation and annihilation. Application of quantum mechanics to problems of atomic, molecular, nuclear, and solid state physics. Prereq for 522: 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. Prereq: 531.

541-542 Electromagnetic Theory (3,3) 541—Review of electrostatics, magnetostatics, and quasi-static problems; Maxwell’s field equations and their solutions in dielectric and conducting media; electrodynamics and relativity, retarded potentials and gauge transformations, radiation produced by accelerating charges. 542—Advanced treatment of Electrodynamics, collisions between charged particles, bremsstrahlung, multipole fields. Topics may vary according to interest of students and instructor. Prereq or coreq for 541: 571. Prereq for 542: 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. Prereq/Coreq: 531 and 541.


591 Foreign Study (1-15) See College of Arts and Sciences.

592 Off-Campus Study (1-15) See College of Arts and Sciences.

593 Independent Study (1-15) See College of Arts and Sciences.

594 Special Problems (3) Especially assigned theoretical or experimental work on problems not covered in other courses. May be repeated. Maximum 9 hours.


600 Doctoral Research and Dissertation (3-15) P/NP only.

601-602 Atomic Physics (3,3) 601—Survey of research problems and methods. Topics of current interest. Intended for all graduate students. 602—Advanced problems for students specializing in 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. Prereq: 521, 541.

606 Nonlinear Optics (3) Nonlinear optical susceptibilities, wave propagation in nonlinear media, sum-frequency and difference frequency generation, harmonic generation, parametric amplification and oscillation, stimulated Raman processes, two- and multi-photon processes, four-wave mixing and phase conjugation, transient coherent optical effects and free induction decay, optical breakdown and nonlinear effects in plasmas. Prereq: 522.

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. Prereq: 521.

611 Advanced Quantum Mechanics and Field Theory (3) Survey of problems and methods. Topics of current interest. 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. Prereq: 611 or consent of instructor.

615-616 Astrophysics and Cosmology (3,3) 615—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—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.

621-622 Nuclear Physics (3,3) 621—Survey of research problems and methods. Topics of current interest. Intended for all graduate students. 622—Advanced problems intended for students specializing in the field.

626-627 Elementary Particle Physics (3,3) 626—Survey of elementary particle physics: experimental methods, conservation laws, invariance principles, and models of interactions. Intended for all graduate students. 627—Advanced topics intended for students specializing in field: quark models, electroweak interactions and unification of elementary forces.

446 Horticultural Therapy (2) Application of horticulture as therapy for treatment, rehabilitation and/or training of individuals with disabilities. Prereq: Senior standing.

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. Prereq: Communication Studies 210 or 240.

450 Specialty Landscape Construction (3) Methods of design, materials, and construction techniques for specialized components of 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, genomic techniques. 1-hour lecture and one 3-hour lab. Prereq: 353 or Biology 240.

457 Weed Management (2) Principles of weed interference, integrated management, herbicide selectivity and behavior, specific recommendations for various crop and non-crop situations. Prereq: Environmental and Soil Sciences 210.

458 Turf Weed Management Lab (1) Laboratory addressing practices and principles presented in 457, from the standpoint of turf. Prereq or coreq: 457. Prereq: Environmental and Soil Sciences 210.

459 Agronomy Weed Management Lab (1) Laboratory addressing practices and principles presented in 457, from the standpoint of agronomy. Prereq or coreq: 457. Prereq: Environmental and Soil Sciences 210.

480 Advanced Landscape Design (3) Comprehensive application of landscape design skills to variety of project experiences: landscape planning and analysis, planting design, and materials estimating. Two 3-hour labs. Prereq: 280 and 380.

485 Computer Aided Landscape Design (3) Computer Aided Design (CAD) related to landscape design and construction. Site planning and construction of related landscape plan view and 3-D drawings. Operating system, use of AutoCAD and LANDCADD software. Two 3-hour labs. Prereq: 280, 380, Agriculture and Natural Resources 290 or Computer Sciences 100 or equivalent.

494 Professional Horticultural Communications (3) Communication for public horticulturists through written, oral and visual media. Communication skills using proper writing techniques and grammar for print media, brochure design using desktop publishing, slide show development, oral presentations, and video use for educational and informational presentations in ornamental horticulture. Prereq: Agriculture and Natural Resources 290 or Computer Sciences 100 or equivalent and senior standing.

500 Thesis (1-15) P/NP only.

501 Special Topics in Plant Sciences (1-3) Topics to be assigned. May be repeated. Maximum 6 hours. Prereq: 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

503 Non-Thesis Project (1-2) Library, field, or laboratory project under supervision of faculty member. Not for thesis candidates. May be repeated. Maximum 4 hours.

504 Seminar (1) Presentations and discussion of topics. 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.

507 Professional Development Seminar (1) (See Agriculture and Natural Resources 507.)

513 Plant Pathogenic Fungi (2) (See Entomology and Plant Pathology 513.)

521 Flowering Physiology (1) General phenomenology, photoperiodism, thermoperiodism, interactions of external factors, juvenility, and hormonal regulation. 3 hours weekly for 5 weeks. Prereq: Introductory plant physiology or equivalent.

522 Drought Physiology (1) Biophysical and biochemical aspects of plant water relations and drought physiology. 3 hours weekly for five weeks. Prereq: Introductory plant physiology or equivalent.

530 Integrated Pest Management (3) (Same as Entomology and Plant Pathology 530.)

532 Environmental Crop Physiology and Ecology (3) General and specific relations among environmental factors, crop organisms, and agricultural systems. Interrelationships of atmospheric gases in photosynthesis, evapotranspiration and foliar injury. Relationships of temperature stress, vernalization and bud dormancy to crop production. Influences of maturation ripening and senescence on post-harvest quality of fruit, vegetable, grain and forage crops. 2 hours and 1 lab. Prereq: Plant physiology course.

536 Ecology of Grazing Land Systems (3) Multi-university, field-oriented course. Components and functions of grazing lands and how these vary in different ecoregions; research needs, objectives and techniques in soil-plant-animal research; forage-livestock ecology and systems in grazing lands (cropland, pastureland, rangeland and forestland); role of forages in conservation practices, wildlife habitats, and sustainable agriculture; and industries involved with forages and livestock. Two-week field trip, inclusive report and examination. Prereq: Consent of instructor.

544 Protein Gel Electrophoresis (1) (See Entomology and Plant Pathology 544.)

545 Plant Microtechnique (1) (See Entomology and Plant Pathology 545.)

551 Organismal Plant Genetics (3) Discovery of genetics, polyploidy, extrachromosomal inheritance, apomixis, incompatibility systems, mutations, controlling elements, quantitative inheritance and heritability. Prereq: General genetics and 561 or equivalent.

561 Statistics for Biological Research (3) Application of statistics to interpretation of biological research. Notation, descriptive statistics, probability, distributions, confidence intervals, t- and chi-square tests, analysis of variance, mean separation procedures, linear regression and correlation. Prereq: Mathematics 125 or 152. Students may not receive credit for both 461 and 561.

571 Design and Analysis of Biological Research (3) (Same as Animal Science 571.)

592 Internship (1-2) Application of horticulture and design principles and practices in supervised, professional setting. approved by department. Satisfactory/No Credit or letter grade.

593 Problems in Plant Sciences (1-3) Independent study. Current topic related to technology, science or design. May be repeated. Maximum 6 hours.
600 Doctoral Research and Dissertation (3-15) P/NP only.

603 Special Topics in Crop Physiology and Ecology (1-3) Microclimatology of agroecosystems, crop dormancy and responses to stress, physiology of crop growth and reproduction. Interactions of physiology and germplasm in crop production, theory and application of quantitative methods in crop physiology and ecology research. May be repeated. Maximum 6 hours.

605 Special Topics in Plant Breeding and Genetics (1-3) Genotype by environment interactions, estimation of quantitative parameters, mutations, chromosome dynamics, polyploidy, genetic engineering, interspecific hybridization, linkage, screening methods, genome organization. May be repeated. Maximum 6 hours.

633 Plant Metabolism (3) Metabolism of chemical compounds of economic importance in crop production: plant growth regulators, naturally occurring plant metabolites, and herbicides. Prereq: Botany 521 or 522 and organic chemistry or biochemistry.

643 DNA Analysis (2) (See Entomology and Plant Pathology 643.)

653 Advanced Plant Breeding (3) Principles and methodologies targeting genetic gain for crop improvement. Concepts of qualitative and quantitative trait improvement. Parental germplasm, hybridization, population formation, inbreeding, genetic variance, heritability, selection methods, molecular genetic markers, genetically engineered crops. Prereq: 571 and general genetics, or equivalent.

POLITICAL SCIENCE (801)

402 The City in the United States (3) Development and character of U.S. cities. Contemporary issues and selected case studies. (Same as Urban Studies 411.)

403 Survey of Planning (3) 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. Not for credit for MSP degree. (Same as Urban Studies 412.)

425 Media and Politics (3) 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 (3) Analysis of judicial review, constitutional powers of President and Congress, federalism, sources of regulatory authority, and constitutional protection of political and economic rights. (Same as Legal Studies 430.)

431 U.S. Constitutional Law: Civil Rights and Liberties (3) Analysis of current issues in civil rights and liberties including: first amendment freedoms, equal protection, privacy and rights of accused. (Same as Legal Studies 431.)

435 Criminal Law and Procedure (3) Substantive and procedural law in criminal justice field: constitutional questions and public policy issues. (Same as Legal Studies 435.)


442 Administrative Law (3) Legal dimensions of administrative power and procedures, and constitutional controls over administrators. (Same as Legal Studies 442.)

445 Administration of Justice (3) Administration and processes of justice system, including judicial administration and decision making in trial and appellate courts. (Same as Legal Studies 445.)

446 Housing (3) 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. (Same as Urban Studies 446.)

451 Ethnic Conflict in Foreign Countries (3) Examination of political and violent conflict among ethnic and national groups and challenges these conflicts pose for democratic and democratizing states.

452 Black African Politics (3) Recent evolution and current political environment of Black African nations. (Same as African and African-American Studies 452.)

454 Government and Politics of China and Japan (3) Examination of the political setting, structure and political processes in China and Japan.

456 Latin American Government and Politics (3) Political development of Latin America: contemporary politics. (Same as Latin American Studies 456.)

459 Government and Politics of Russia and Eastern Europe (3) System transformation, political processes and governmental structure in Russia and Eastern European countries.

461 Policy Making in Democracies (3) Comparative approach to theory and process of making public policies.

463 Contemporary Middle East Politics (3) Governments and movements in Middle East, their characteristics, bases, and interrelationships.

471 International Political Economy (3) 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 (3) 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 (3) 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 (3) Survey of major western political thinkers from Socrates to Marsilio of Padua.

476 Modern Political Thought (3) Survey of major western political thinker from Machiavelli to Marx.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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. 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 Mass Political Behavior (3) Theoretical and empirical analyses of public opinion, political socialization, political attitudes and behavior, especially voting behavior.

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 Public Law (3) Selective examination of published research and current approaches in sub fields of constitutional law, judicial process, and judicial behavior. 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. 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. 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. May be repeated with consent of department. Maximum 9 hours.


566 Ethics, Values, and Morality in Public Administration (3) Moral-ethical-value dilemmas confronting administrators in American political system.

569 Internship in Public Administration (3-9) Open to students participating in approved internship programs. May be repeated with consent of department. Maximum 9 hours. Satisfactory/No Credit grading only.

570 Comparative Government and Politics (3) Selected topics in modern governments. 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. May be repeated with consent of department. Maximum 9 hours.

574 Area Seminar in Comparative Government and Politics (3) Survey of literature and major aspects of international politics. May be repeated with consent of department. Maximum 9 hours.

580 International Politics (3) Survey of literature and major aspects of international politics. May be repeated with consent of department. Maximum 9 hours.

582 Land Use and Comprehensive Planning (3) History of planning, structure and development of urban areas, operations of contemporary planning, trends and issues.

584 Environmental Planning (3) Role of planners and planning in maintenance of balance between natural and built environment.

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.

590 Practicum in Planning (3) Prereq: Consent of instructor.
591 Foreign Study (1-15) See College of Arts and Sciences.
592 Off-Campus Study (1-15) See College of Arts and Sciences.
593 Independent Study (1-15) See College of Arts and Sciences.
594 College Teaching in Political Science (1) Instructional effectiveness, techniques, organization, materials for teaching political science at college level. Prereq: Consent of instructor. Satisfactory/No Credit grading only.
595 Readings and Special Problems in Political Science (1-3) Prereq: Consent of instructor. May be repeated. Maximum 15 hours.
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. Satisfactory/No Credit grading only.
597 Special Topics in Planning (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hours.
598 Problems in Planning (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hours.
600 Doctoral Research and Dissertation (3-15) P/NP only.
610 Special Topics in Empirical Theory and Methodology (3) Advanced methods and procedures of analysis in political science. 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. May be repeated with consent of instructor. Maximum 9 hours.
639 Special Topics in American Government and Politics (3) Advanced study of selected topics. May be repeated with consent of instructor. Maximum 9 hours.
640 Special Topics in U.S. Constitutional Law (3) Systematic analysis of published research and judicial decision: development of constitutional law as major component of public policy. May be repeated with consent of department. Maximum 9 hours.
654 Contemporary Public Policies (3) Problems in one or more public policy areas from political and administrative perspectives. Topics selected by instructor. 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. 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. May be repeated. Maximum 9 hours.
670 Special Topics in Comparative Government and Politics (3) Research into selected topics. 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. 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. 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. Prereq: 3 hours at 300-level in another Romance language or equivalent.
431-432 Topics in the Literature and Language of Portuguese-speaking World (3,3) Outstanding works of literature and culture from Portuguese countries. Topics may vary. Prereq: At least one course at the 300-level or the equivalent. May be repeated. Maximum 12 hours.
591 Foreign Study (1-15) See College of Arts and Sciences.
592 Off-Campus Study (1-15) See College of Arts and Sciences.
593 Independent Study (1-15) See College of Arts and Sciences.

PSYCHOLOGY (830)
409 Group Facilitation (3) Study of theory and technique through supervised experience in small groups. Prereq: General Psychology or consent of instructor. May be repeated. Maximum 6 hours.
410 Sensory Processes and Perception (3) Survey of physiological and psychological theories of perception. Audition and vision. Prereq: 385 or Mathematics 115 or Statistics 201 or graduate standing.
415 Psychology of Religion (3) History of psychology of religion: various philosophical and empirical orientations. Psychological function of religion for individuals and society. Prereq: 110 or consent of instructor.
420 History and Systems of Psychology (3) History of psychological thought. Classical approaches and recent developments. Prereq: 110 or consent of instructor or graduate standing.
424 Psychology and the Law (3) Psychological aspects of legal systems. Prereq: 110 or consent of instructor.
430 Health Psychology (3) Survey of psychological factors related to health and illness: stress, personality, and environment. Applications of psychological treatments to physical illness. Prereq: 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. Prereq: 110 and junior standing (60 semester hours) or consent of instructor. (Same as Women’s Studies 434.)
440 Organizational Psychology (3) Social-psychological analysis of organizations, role-theory and systems theory. Prereq: 110 and 360 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. Prereq: 110 or consent of instructor and one of the following sequences, Biology 101 and 102, Biology 130 and 140, Anthropology 110 and 210.
470 Theories of Personality (3) Survey of major theories of human personality and their development. Prereq: 110 or consent of instructor.
475 Adolescent Development (3) Theoretical perspectives and empirical research findings pertinent to adolescent development. Prereq: 110 or consent of instructor.
480 Theories of Learning (3) Classical and current approaches to learning and cognition. Prereq: 110 or consent of instructor.
482 Topics in Psychology (3) Intensive analysis of special topics: Afro-American psychology or evaluation of programs in community. Prereq: 110 or consent of instructor. May be repeated. Maximum 6 hours.
489 Supervised Research (1-9) Prereq: Consent of instructor. May be repeated. Maximum 12 hours in 399, 489, 491, 492, and 493 combined may apply toward undergraduate major.
500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.
505 Research Design (3) Techniques for planning and conducting research in controlled and natural settings: experiments, quasi-experiments, observational studies, surveys, and program-evaluation. Development of questions and hypotheses for study. Design of studies to maximize validity. Prereq: Consent of instructor.
507 Foundations of Applied Psychology (3) Fundamental methods for application of psychology principles and techniques in community, organizational, and industrial settings, and related ethical and theoretical issues. Prereq: 505 and consent of instructor.
508 Readings and Special Issues in Psychology (1-3) Prereq: Consent of instructor. May be repeated. Maximum 9 hours.
509 Research Practicum (1-3) Required of first-year graduate students in psychology. May be repeated. Maximum 9 hours. Satisfactory/No Credit grading only.
510 Topics in Psychology (3) Intensive examination of selected issues in psychology. Prereq: Consent of instructor. May be repeated. Maximum 9 hours.
511 Developmental Psychology (3) Normal processes of human socialization; physical, cognitive, and emotional development from conception through infancy, childhood, and adolescence. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.
512 Life-Span Development (3) Theories and research concerning normal human development throughout life, adulthood and old age. Prereq: Consent of instructor.
513 Foundations of Psychology: Biological Factors, Perception, Learning, Thinking, Motivation (3) Intensive survey. Prereq: Consent of instructor.
515 Colloquium in Experimental Psychology (1) Research and practical issues in experimental psychology. Prereq: Consent of instructor. May be repeated. Maximum 4 hours. Satisfactory/No Credit grading only.
517 Foundations of Counseling Psychology (3) History, theory, research and practice of counseling psychology. 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 co-linearity between main effects and application of multiple regression to testing procedures of mediation and moderation.
526 General Vertebrate Neuroanatomy (3) Lecture and laboratory. Structure and functioning of central and peripheral nervous system. Prereq: 461 or equivalent and consent of instructor.
527 Behavioral Neurology (3) Disorders of nervous system, organic brain dysfunctions. Diagnosis and treatment. Prereq: Consent of instructor.
528 College Teaching in Psychology (3) Concepts, techniques, and materials for teaching psychology at college and/or university level. Supervised practice. Prereq: Consent of instructor. Satisfactory/No Credit grading only.
534 Cognitive Science (3) Theories and research. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.
545 Advanced Animal Behavior (3) (See Ecology and Evolutionary Biology 545.)
546 Ethological Psychology (3) Basic ethology and comparative psychology. Implications for human behavior. Prereq: Consent of instructor. (Same as Ecology and Evolutionary Biology 546.)
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. Prereq: 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. Prereq: 555. May be repeated. Maximum 6 hours.
555 Psychometrics (3) Basic concepts: factor analysis, scaling, test theories, probability models and their applications, computerized adaptive testing and other topics. Prereq: Statistics 537-538 or equivalent. May be repeated. Maximum 6 hours.
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. Prereq: Admission to doctoral program in clinical psychology or consent of instructor. Coreq: 559.
559 Laboratory in Interviewing and Observation (1) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. Coreq: 558.
560 Psychology of Learning (3) Review of current evidence from research involving human and/or non-human animals. Prereq: 400 and consent of instructor. May be repeated. Maximum 6 hours.
565 History and Systems of Psychology (3) History of philosophy concerning psychology. Major systems of psychology which emerged during 20th century. Prereq: Graduate standing.
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. Prereq: Admission to doctoral program in counseling psychology.

569 Practicum in Counseling (3) (See Counselor Education 555.)

570 Personality: Theory and Research I (3) Advanced survey of psychodynamic and neo-Freudian approaches to personality; related research. Prereq: Admission to clinical program or consent of instructor.

571 Personality: Theory and Research II (3) Advanced survey of behavioral and humanistic approaches to personality; related research. Prereq: Admission to clinical program or consent of instructor.

572 Individual Cognitive Assessment in Counseling (3) Basic concepts and applications in individual assessment of intelligence; proficiency in administrative scoring, interpretation for Wechsler, adults and children, Stanford-Binet. Prereq: 445, Counselor Education 525 or equivalent. Satisfactory/No Credit grading only.

573 Descriptive and Theoretical Psychopathology (3) Current psychiatric taxonomic system. Theories of etiology for various diagnostic categories. Examples from written case vignettes and recorded interviews. Prereq: Admission to doctoral program in clinical psychology or consent of instructor.

574 Cross-Cultural Counseling: Theory and Research (3) (See Counselor Education 570.)

576 Object Relations (3) European and American conceptions of normal and psychopathological development of object relations. Significance for psychotherapy, psychoanalysis, and psychoanalytic theory. Prereq: Admission to doctoral program in clinical psychology or consent of instructor.

580 Research Questions and Designs (3) Question-asking process in research and strategies or designs through which answers might be derived. Prereq: Admission to doctoral program in clinical psychology or consent of instructor.

593 Independent, Off-campus, or Foreign Study (1-15) Prereq: Consent of instructor. May be repeated. Maximum 9 hours. Satisfactory/No Credit grading only.

594 Psychological Assessment I (3) Basic concepts and techniques of adult assessment: intelligence tests and personality tests. Prereq: Admission to doctoral program in clinical psychology or consent of instructor.

595 Psychological Assessment II (3) Basic concepts and techniques of adult assessment, intelligence tests and personality tests. Prereq: Admission to doctoral program in clinical psychology and 594 or consent of instructor.

596 Laboratory in Psychological Assessment (1) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. Coreq: 594 or 595. May be repeated. Maximum 4 hours. Satisfactory/No Credit grading only.

597 Developmental Psychopathology (3) Research and theory on pathways to psychological disorders and personal adjustment. Prereq: 571, or equivalent or consent of instructor.

598 Ethical Issues in Professional Psychology (3) Conceptual and practical applications in human services and research. Prereq: Consent of instructor.

599 Clinical Psychopathology (3) Formal use of descriptive categories used in the diagnosis of abnormal behavior. Prereq: 597, or equivalent or consent of instructor.

600 Doctoral Research and Dissertation (3-15) P/NP only.

601 Seminar in Psychology (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hours.

607 Seminar in Applied Psychometrics (3) May be repeated. Maximum 9 hours. Prereq: 555, 557, and consent of instructor.

610 Seminar in Applied Psychology (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hours.

613 Seminar in Existential-Phenomenological Psychology (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hours.

617 Seminar in Cognitive Science (3) Prereq: 543 and consent of instructor. May be repeated. Maximum 12 hours.

623 Seminar in Methods of Naturalistic Research (3) Prereq: 546 or consent of instructor. May be repeated. Maximum 12 hours.

625 Advanced Study in Personality (3) Theory, research and conceptual analysis of studies with application to education and counseling. Prereq: 470 or equivalent. (Same as Counselor Education 625)

635 Ethical, Legal, and Professional Issues Psychology (3) Research, human services, teaching, and public policy. Prereq: Admission to doctoral program in psychology or consent of instructor. Satisfactory/No Credit grading only. (Same as Counselor Education 635; Educational Psychology 635.)

661 Education Implications of Neuropsychology (3) Theory and assessment. Common syndromes and their behavioral and cognitive manifestations. Prereq: 461 or consent of instructor.

667 Personality and Vocational Assessment (3) Use and interpretation of personality and vocational measures in assessment of clients. Prereq: 445 or Counselor Education 525 or consent of instructor. (Same as Counselor Education 671.)

670 Psychotherapy I (3) Theories and principles. Prereq: Admission to doctoral program in clinical psychology or consent of instructor.

671 Psychotherapy II (3) Theories and principles. Prereq: Admission to doctoral program in clinical psychology and 670 or consent of instructor.

672 Psychological Dysfunction (3) Classification methods, dynamics and treatment of dysfunctional individuals in counseling. Prereq: 625 and a course in abnormal psychology, or consent of instructor.

673 Laboratory in Psychotherapy (2) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. Coreq: 670 or 671. May be repeated. Maximum 6 hours. Satisfactory/No Credit grading only.

674 Practicum in Counseling Psychology (3) Supervised practice of individual counseling. Minimum 135 clock hrs required each semester. Prereq: Admission to doctoral program in counseling psychology, 445 or equivalent, 569 and consent of instructor. May be repeated. Maximum 6 hours.

675 Advanced Theory and Practice in Group Counseling (3) Theories and supervised practice. Prereq: 567 and consent of instructor.

676 Field Placement in Counseling Psychology (3) Prerequisite: 674 and admission to the doctoral program in counseling psychology. May be repeated. Maximum 12 hours. Satisfactory/No Credit grading only.

678 Theory and Practice of Counseling Supervision (3) Theory and practice of supervision in counseling. Prereq: 674 or consent of instructor. Satisfactory/No Credit grading only.

679 Internship in Counseling Psychology (1-6) Supervised employment in departmentally approved counseling psychology internship sites. Prereq: Admission to counseling psychology doctoral program and consent of instructor. May be repeated. Maximum 12 hours. Satisfactory/No Credit grading only.

683 Seminar in Behavioral Medicine (3) Current research and theory concerning relationships between behavior and health. Prereq: Consent of instructor. May be repeated. Maximum 12 hours.
**PUBLIC HEALTH (839)**

400 Consumer Health (3)  (See Health 400.)

410 Worksite Health Promotion (3) Foundations of health promotion programs delivered in worksite that revolve around issues relative to employees and management: theory, program design, implementation and evaluation from perspective of health promotion specialist. Prereq: 300.

493 Directed Independent Study (1-3) Individual in-depth study of selected issues. Prereq: Consent of instructor. 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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. May be repeated. Maximum 4 hours. Satisfactory/No Credit grading only. (Same as Exercise Science 509; Nursing 509; Nutrition 509; Social Work 509.)

510 Environmental and Occupational Health (2) Complexities of personal and ambient environment recognizing health as individual’s response to diverse and dynamic world. Principles of occupational safety and health. Survey of contemporary issues and their implications for healthful living today and in future. Prereq: Admission to MPH or public health nutrition (MS) programs or consent of instructor.

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. Prereq: 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. Prereq: 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. Prereq: Admission to MPH or public health nutrition (MS) programs or consent of instructor and introductory statistics.

540 Principles of Epidemiology (3) Distribution and determinants of health-related outcomes in specified populations, with application 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. Prereq or coreq: 530.


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 setting. Prereq: 550 or consent of instructor.


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) Prereq: Consent of instructor. May be repeated under different topic. Maximum 6 hours.

585 Seminar in Gerontology (1)  (See Health 585.)

587-588-589 Internship (3,3,3) Internship (community health education, gerontology, or health planning/administration) in either approved organization or research setting under supervision of designated preceptor. Prereq: MPH major, one semester advance notice and consent of major advisor. 589: available only for approved extended placements. Satisfactory/No Credit grading only.

590 Research Methods in Health (3)  (See Health 590.)

593 Directed Independent Study (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

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 public relations project from inception to completion. Extensive out-of-class work. Prereq: 320, 370, or consent of instructor.

490 Special Topics (3) Topics vary. May be repeated. Maximum 6 hours.

500 Thesis (1-15) P/NP only.

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. Not to be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

516 Seminar in Public Relations Issues (3) Topics vary. 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. Satisfactory/No Credit grading only.

597 Independent Study (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

598 Internship (3) Professional work in public relations supervised by communications manager with faculty approval. No retroactive credit for previous work experience. Prereq: Completion of core curriculum.

READING EDUCATION (847)

434 Topics in Reading Education (1-6) Prereq: Admission to teacher education and course in reading education. May be repeated. Maximum 6 hours.

461 Developing Reading Skills in Content Fields (3) Techniques for teaching reading and study skills in content areas of school program. Extensive assessment of textbooks. Middle school and high school.

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. Prereq: 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. Prereq: Course in reading education or consent of instructor.

534 Seminar in Reading Education (1-6) 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. Prereq: 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. Prereq: Course in reading education, or equivalent teaching experience, or consent of instructor.

538 Practicum in Diagnosis of Reading Problems (3) Theoretical and practical applications of specific reading diagnostic instruments; testing of elementary and/or secondary school students, preparing case study reports, and conducting parent conferences. Prereq: 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. Prereq: Course in diagnosis and correction of reading problems or consent of instructor.

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. Prereq: Course in reading education, or equivalent teaching experience, or consent of instructor.

541 Teaching the Gifted Reader (3) Identification, diagnosis, remediation and practical applications of specific reading diagnostic instruments; testing of elementary and/or secondary school students on one-to-one or small group basis. Prereq: Course in diagnosis and correction of classroom reading problems or consent of instructor.

554 Developmental Reading Practicum (3) Diagnosing and teaching children having developmental and corrective reading needs in regular classroom. Prereq: Course in diagnosis and correction of reading problems or consent of instructor.

560 Advanced Studies and Theoretical Models of Reading (3) Research on reading processes. Current theoretical models related to how learners process print. Prereq: 500-level courses in reading education or consent of instructor.

565 Organizing and Administering Reading Programs (3) Diagnosing and teaching children having developmental and corrective reading needs in the regular classroom. Prereq: Course in diagnosis and correction of reading problems or consent of instructor.

RECREATION AND LEISURE STUDIES (853)

415 Development and Maintenance of Recreation and Athletic Facilities (3) Principles of designing, planning, equipping, operating and maintaining various facilities. Elements of risk management and safety in design process. Prereq: 310, 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 and/or commercial enterprises. Organizational structures, personnel management, evaluation, legal authority, introduction to budgeting and fiscal procedures. Prereq: 310 or Sport Management 350.

440 Dimensions of Commercial Recreation and Leisure Enterprises (3) Prereq: 201, junior standing or consent of instructor.

450 Special Topics in Leisure Education (1-6) Development of special topics in recreation, therapeutic recreation and leisure. May be repeated. Maximum 6 hours.

470 Tourism and Leisure Industries (3) Symbiotic relationship between tourism and various sectors of leisure industry. Use of resources, both natural and developed, and economic impacts of ventures. Socio-cultural impacts on venue as well as venues impact on local population.

500 Thesis (1-15) 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 an/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

510 Trends and Issues in Service Management (3) (See Hotel, Restaurant, and Tourism 510.)

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 to 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. Prereq: Consent of instructor.

521 Facilitation Techniques in Therapeutic Recreation (3) Role of therapeutic recreation in clinical and non-clinical settings; application of life-style planning, self-awareness, values clarification and assertiveness training in therapeutic recreation, relationship of leisure education to therapeutic recreation. Prereq: 520 or consent of instructor.


540 Fiscal Policies for Recreation and Sports Related Organizations and Facilities (3) Application of fiscal policies and procedures to operation of recreation and sports related organizations and facilities. Finance, revenue generating strategies, cash and inventory control, commercial/public cooperative ventures and microcomputer applications. Prereq: 430 or consent of instructor.

541 Management and Operation of Recreation and Sport Related Facilities (3) Research for making program and management decision, process of cost analysis, and basic design and maintenance of recreation and sport related facilities. Prereq: 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 NCTRRC national guidelines. Prereq: Completion of 24 graduate hours/3.0 GPA and/or permission 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. May be repeated. Maximum 6 hours.

592 Special Topics in Recreation and Leisure Studies (1-6) May be repeated. Maximum 6 hours.

REHABILITATION COUNSELOR EDUCATION (857)

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-servicing 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 Disability Management (3) Return-to-work issues in disability management programs: early intervention, quality services, and cost containment; standards and procedures for rehabilitation counselors/case managers in private sector rehabilitation.

541 Psychosocial Aspects of Disability (3) Psychosocial impact of disability on person and family. Reaction to loss, coping with disability, and societal rehabilitation.

543 Medical Aspects of Disability (3) Etiology and clinical symptoms related to disabling conditions served by special education and rehabilitation personnel. Restrictive measures to eliminate or minimize resulting handicaps. Skills necessary to communicate with lay and professional persons.

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. Prereq: Consent of instructor.

549 Internship in Rehabilitation Counseling (12) Supervised practice in rehabilitation counseling. Full time clinical experience for second-year students (600 clock hours required).

579 Special Topics (1-3) Prereq: Admission to graduate program. May be repeated. Maximum 9 hours. Satisfactory/No Credit or letter grade.

592 Assistive Technology in Rehabilitation (3) Technology as applied to needs of school age and post-secondary age students/clients. Delivery of assistive technology services; software programs and assistive devices; delivery systems, interdisciplinary evaluation/planning, and funding issues.

593 Independent Study (1-3) May be repeated. Satisfactory/No Credit or letter grade.

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, how they are interpreted by religious communities and scholars.

405 Modern Jewish Thought (3) History, culture, and geography of the now Israeli portion of Levant from 1850 to present. Founding of modern state of Israel in 1948 and political complexities of Middle East. Israeli culture and literature. Writing emphasis course. (Same as Judaic Studies 405.)

411 Modern Religious Philosophies (3) Religious implications of major Western thinkers and movements from Nicolas of Cusa to nineteenth-century German Idealists. (Same as Philosophy 411.)

425 Seminar in Western Religions (3) Selected figures, themes, movements, and problems. Content varies. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.
430 Seminar in American Religion (3) Selected figures, themes, movements, and problems. Content varies. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

440 Seminar in Comparative Religion (3) Selected figures, themes, movements, and problems. Content varies. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

490 Readings and Research in Religious Studies (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

499 Proseminar in Religious Studies (3) For advanced students in religious studies; required for majors. Selected specific topics: nature and function of myth in religion, problem of evil, transcendence, theories of religion, hermeneutics, integrating various disciplines involved in study of religion. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.


505 Religious Texts and Contexts (3) Critical study of texts and their interpretations: sacred texts, canons, commentaries, religious autobiographies, and religious themes in literature. May be repeated. Maximum 6 hours.

506 Historical Study of Religions (3) Description and analysis of religious traditions, phenomena, and themes. 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. 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. Prereq: 503 and 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. 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. May be repeated. Maximum 6 hours.


520 Readings in the Study of Religion (1-6) May be repeated. Maximum 12 hours.

532 Topics in the History of Religions (3) Prereq: Consent of instructor.

533 Topics in Religious Thought (3) Prereq: Consent of instructor.


551 Comparative Historical Explorations in Religious Studies (3) Critical examination of parallel or contrasting historical phenomena from two or more religious traditions. Required for students in the MA concentration in religious studies. Prereq: 503. May be repeated. Maximum 6 hours.

591 Foreign Study (1-15) See College of Arts and Sciences.

592 Off-Campus Study (1-15) See College of Arts and Sciences.

593 Independent Study (1-15) See College of Arts and Sciences.

RETAIL AND CONSUMER SCIENCES (865)

412 Direct Retail Methods (3) Use of direct selling methods to sell goods and services. Analysis of consumers and product/service types for integrated direct retail methods. Direct mail, catalogs, telemarketing, infomercials, and electronic commerce (internet). Prereq: 210, 341, 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. Prereq: 210, Marketing 300.

500 Thesis (1-15) P/NP only.

501 Professional Project (3-6) Application-oriented, capstone project to show competence in major academic area. Enrollment limited to retail and consumer sciences students in non-thesis program. Prereq: Consent of instructor. May be repeated. Maximum 6 hours. 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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. Prereq: Retail Management or equivalent.


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. Prereq: Statistics 531 or equivalent.

590 Research Seminar (1) Research topics in retail and consumer sciences. May be repeated. Satisfactory/No Credit grading only.

593 Directed Study (1-3) Individual problems in retailing and consumer sciences. Prereq: 9 hours retail and consumer sciences graduate coursework. May be repeated. Maximum 9 hours.

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. Prereq: 9 hours graduate coursework. May be repeated. Maximum 9 hours.

600 Doctoral Research and Dissertation (3-15) P/NP only.
614 Theory in Retail Environment (3) Analysis and evaluation of theory in retail environment and its application to research in retailing. Prereq: 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. Prereq: 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. Prereq: 562, Statistics 538 or equivalent

625 Strategic Managerial Retailing (3) Decision-making orientation that integrates strategic framework components with preparation and analysis of specific retail case situations. Prereq: 510 or equivalent.

641 Retail Consumer Behavior (3) Theories and concepts from social science in relation to ultimate consumer's behavior. Prereq: 541 or equivalent.

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. Prereq: 9 graduate hours in consumer sciences. May be repeated. Maximum 9 hours.

RUSSIAN (886)

401-402 Advanced Grammar, Conversation, and Composition (3,3) Prereq: 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) Content varies. When content varies, may be repeated. Maximum 9 hours.

451-452 Senior Seminar (3,3) For majors in Russian; minors admitted at discretion of instructor. Intensive study of language, literary style, and literary criticism based on selected major novels.

510 Russian Phonetics and Advanced Grammar (3) Phonetics, pronunciation, stylistics, and selected topics in Russian grammar. For teachers and prospective teachers. Prereq: Consent of instructor.

550 Studies in Russian Literature (3) Content varies. May be repeated. Maximum 9 hours.

590 Special Topics (1-3) Advanced study in selected disciplinary or professional area of safety education/management. May be repeated. Maximum 12 hours.

SAFETY (890)

443 Sports and Recreational Safety (3) Accident prevention and injury control in sports activities; philosophy of sports safety; human environmental factors and interrelationship in sports injury and control; risk-taking and decision solution strategies; and contributions of sports medicine to safety. 3 hours and 2 labs.

452 Safety Principles and Practices (3) General principles, practices, and procedures in occupational and community safety. Historic and present safety issues, problems and practices addressing safety of individuals and groups in work-site, school, community, transportation, and industrial settings. Prereq: Junior or Senior standing or consent of instructor.

460 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. Prereq: Senior standing or consent of instructor.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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, instructional, 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. Prereq: 535.

572 Graduate Workshop in Safety (3) Special safety education problems. For advanced graduate students, teachers, supervisors, and administrators. 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. May be repeated. Maximum 6 hours. (Same as Health 601.)

SCIENCE EDUCATION (899)

496 Teaching Science Grades 7-12 (3) Methods, materials, recent trends in science and environmental education programs for secondary schools. Prereq: Admission to teacher education.

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.

565 Instructional Trends and Issues in Science Education (3) Analysis of current trends in science instruction, instructional issues facing elementary, secondary, and community college science teachers, and application of learning theory to teaching biological, physical, and environmental sciences.

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. 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)

454 Teaching Strategies and Issues in Social Studies Education (3) Goals, objectives, techniques, materials, and evaluation; direct observation in public schools, preparation of teaching plans and materials; simulated teaching experiences. Prereq: Admission to teacher education.

521 Teaching Social Studies in Elementary and Middle Schools (3) Planning and techniques. Trends in curriculum, development of concepts and generalizations, integration of social sciences. Prereq: 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. Prereq: Previous 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. Prereq: 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) P/NP only.

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 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. May be repeated. Satisfactory/No Credit grading only.

503 Foundations of Social Work Practice II (3) Generalist practice with family and small group systems. Ecological theory to frame understanding of such 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, advocate and 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.

508 Practicum in Social Work Research (3-6) Supervised practice in application of research methods to social work. May be repeated. Maximum 6 hours. Satisfactory/No Credit grading only.

509 Graduate Seminar in Public Health (1) (See Public Health 509.)

514-515 Human Behavior in the Social Environment I, II (3,3) Major social science theories that inform social work profession’s understanding of human behavior and social systems from ecological perspective. Interactions among biological, social, psychological, and cultural systems on development across life cycle. Effects of ethnic, racial, economic, gender, and sexual orientation variables. 514—Life cycle from infancy through adolescence. 515—From young adulthood through senescence.

516 Social Welfare Policy and Services (3) Development of contemporary social policy at local, state, national, and international levels. Contribution of social work professionals to formal policy-making process through which macrosocial change is effected and through which aggregate social welfare services are proposed, authorized, financed, and programmed. Theories of complex organizations applied to social welfare service delivery settings.

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.

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.
523 Clinical Social Work Practice with Families (3) Concepts related to understanding and analyzing family dynamics and inter-actional patterns from perspective of major family therapy models. Techniques of intervention in terms of application to families with varied system and individual problems and to families from varied social and cultural backgrounds.

524 Psychopathology and Social Deviance (3) Assessment of psycho social functioning of individuals. Examination of mental disorders: clinical presentation problems, causes, and processes. Ecological perspective. Prereq: Foundation or consent of instructor.

525 Clinical Social Work Practice with Groups (3) Theoretical and historical approaches to social work with groups and clinical principles supporting specific types of group work used in clinical practice and associated leader interventions.

526 Evaluating Clinical Practice (3) History and philosophies, conceptual approaches, techniques and methods in the practice and use of practice research as applied to implementation and evaluation of direct services to clients.

530 Seminar in Clinical Social Work (2-3) Topics in theory and practice of clinical social work with individuals, couples, families and groups. May be repeated. Maximum 6 hours.

532 Short-Term Interventions (3) Theory and practice of planned short term, emergency, and crisis interventions.

534 Social Work Interventions with Children and Adolescents (3) Various practice modalities for assessing and intervening with children and adolescents.

535 School Social Work (3) Place of school as community institution and resource. Methods, processes, and techniques employed in school social work.

540 General Topics in Social Work (3) Current topics in advanced social work. 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.

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.

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 limitation of various evaluation methods, microcomputer application of data, 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. 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. Satisfactory/No Credit grading only.

581 Field Practice (3) Instruction and supervision in social work practice. Satisfactory/No Credit grading only.

582 Field Practice (6) Instruction and supervision in clinical social work practice or management and community practice. Satisfactory/No Credit grading only.

583 Field Practice (6) Instruction and supervision in clinical social work practice or management and community practice. Satisfaction/No Credit grading only.

584 Field Practice (2-6) Instruction and supervision in social work practice. May be repeated. 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. May be repeated. Maximum 6 hours.

600 Doctoral Research and Dissertation (3-15) P/NP only.

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.

604 Research in Social Service Settings (3) Advanced research, under faculty supervision, of practice issues in community agency. Prereq: First year required PhD courses or consent of instructor. May be repeated. Maximum 9 hours.

605-606 Analysis of Social Work Data I, II (3,3) Techniques for quantitative analysis of social work data: unique data analysis problems encountered in social work research.

608 Evaluative Research for Social Work Practice, Programs and Policy (3) Techniques and strategies for quantitative and qualitative analysis for social policy’s impact on individuals and groups and for evaluating processes and outcomes of social work practice.


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 controversy; legislative changes.

660 Issues in Social Work Knowledge Building (3) Advanced seminar in theory and model building in direct intervention, administration and planning. Prereq: First year required PhD courses or consent of instructor. May be repeated. Maximum 9 hours.

670 Critical Literature Reviews (3) Techniques and methods for conducting critical reviews of literature: conceptual and methodological critiques of existing research. Satisfactory/No Credit grading only.

693 Directed Study in Social Work Research (3) Advanced individual study, under faculty guidance, of social work practice issues. Prereq: First year required PhD courses or consent of instructor. May be repeated. Maximum 9 hours.
SOCIOMETRY (915)

446 The Modern World System (3) Critical examination of capitalist world-system as 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.


452 Minorities, Crime and Criminal Justice (3) Examines racial/ethnic 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, social impact of legal sanctions, relations between law and social justice. (Same as Legal Studies 455.)

459 White-Collar Crime (3) Distinctive nature and dynamics of white-collar crime, victims and costs of white-collar crime, organizations as white-collar offenders, causal theories, and dynamics of responses to white-collar crime by private and public parties.

462 Population (3) Demographic factors and social structure; trends in fertility, mortality, population growth, migration, distribution, and composition; population policy.

464 Urban Ecology (3) Relation of humans to their urban environment: conservation and use of appropriate technology. (Same as Urban Studies 464.)

465 Social Values and the Environment (3) Human dimensions of ecosystem management and public policy. Applied focus on social values activated within specific biophysical and social settings. Prereq: 110 or 120 or consent of instructor.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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. May be repeated. Maximum 6 hours. Satisfactory/No Credit grading only.

521 Sociological Theory I (3) Assessment of what sociological theory is; its major figures and their approaches to understanding society.
655 Advanced Studies in Criminology (3) Intensive examination of selected topics in criminology. Recommended prereq: 505. May be repeated. Maximum 6 hours.

661 Environmental Theory (3) Historical and contemporary studies of interaction between humans and their environment. Prereq: Consent of instructor.

665 Advanced Studies in Environmental Sociology (3) Topical seminar covering particular lines of research and theory within area. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

675 Advanced Studies in Social Psychology (3) Selected contemporary research issues related to social psychological theories. Prereq: 541 or consent of instructor. May be repeated. Maximum 6 hours.

695 Advanced Special Topics (3) Topic of special interest or student-initiated courses that will not be regularly offered. Prereq: Consent of department. May be repeated. Maximum 6 hours.

699 Tutorials in Advanced Topics (3) Individual instruction. Prereq: Consent of department. May be repeated. Maximum 6 hours.

SPANISH (924)

421 Phonetics (3) Prereq: 323 or consent of instructor.

422 Advanced Grammar and Translation (3) Structure of grammatical system of Spanish. In-depth analysis of selected syntactic phenomena with practical illustration/application and exercise in Spanish-English and English-Spanish translation. Finer points of grammatical structures. Not available to native or bilingual students of Spanish without consent of department. Prereq: 323.

423 Advanced Composition and Conversation (3) Development of writing and speaking skills at advanced level, wide range of topics and situations. Variety of in-class and extra-class activities. Not available for credit for students whose level of proficiency in Spanish is superior as defined by the ACTFL Proficiency Guidelines or for graduate students in the Spanish MA or PhD programs. Prereq: 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) Spanish language through different areas of linguistics: phonology, morphology, syntax, semantics, sociolinguistics, dialectology and second language acquisition. Prereq: 323. May be repeated. Maximum 6 hours with consent of department. (Same as Linguistics 431.)

433 Images of Woman in Hispanic Literature (3) Major Hispanic texts (and/or women authors) in light of relation of female individuality to particular social context, role of women in society, patriarchal tradition, woman as cultural and as aesthetic value (the feminine symbolic), and feminist theoretical issues. Prereq: 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 comparison of them with treatments of related subjects in other types of artistic production. Prereq: 323, 330, and completion of 9 additional hours of upper-division Spanish. Taught in Spanish. May be repeated. Maximum 6 hours with consent of department. (Same as Cinema Studies 434.)

461 Special Topics (3) Aspects of Hispanic literature, culture, linguistics, or foreign language pedagogy. Topics vary. May be repeated with consent of department. Maximum 6 hours.

465 Latin American Film and Culture (3) 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. Graduate credit available only for Latin American Studies and Cinema Studies majors. 1 hour lecture, 2 hours screening, and 1 hour discussion. (Same as Latin American Studies 465; Cinema Studies 463.)

479 Disenched 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 varies. Prereq: 323, 330, and completion of 9 additional hours of upper-division Spanish. May be repeated. Maximum 6 hours with consent of department. (Same as Latin American Studies 479.)

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 Hispanic world, including literature itself. Prereq: 323, 330 and completion of 9 additional hours of upper-division Spanish. May be repeated. Maximum 6 hours with consent of department.

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. Prereq: 323, 330, and completion of 9 additional hours of upper-division Spanish. May be repeated. Maximum 6 hours with consent of department.

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 Hispanic world, with regard to identity and concepts of nationhood. Topics: mestizaje; conceptual distinctions between race and ethnicity in Latin America; indigenismo; afrocentrism; issues of monarchy and empire; relationship between Jews, Christians, and Moors in Spain. Prereq: 323, 330, and completion of 9 additional hours of upper-division Spanish. May be repeated. Maximum 6 hours with consent of department.

486 Literary and Artistic Movements in the Hispanic World (3) Relationships (themtic, 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. Prereq: 323, 330, and completion of 9 additional hours of upper-division Spanish. May be repeated. Maximum 6 hours with consent of department.

498 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 Middle Ages to present day. Prereq: 323, 330, and completion of 9 additional hours of upper-division Spanish. May be repeated. Maximum 6 hours with consent of department.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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 department.

531 Old Spanish (3) Evolution of Spanish language from its origins through 15th century.

532 Medieval Spanish Literature (3) Literary works of 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. May be repeated. Maximum 6 hours with consent of department.
533 Golden Age Prose (3) Wide range of prose fiction in Spain during 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. May be repeated. Maximum 6 hours with consent of department.

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.


541 19th-Century Spanish Prose (3) Costumbroso, realism, and naturalism 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. May be repeated. Maximum 6 hours with consent of department.

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) May be repeated. Maximum 6 hours.

552 Directed Readings (3)

561 Spanish American Colonial Literature (3) From pre-Columbian era through 18th century. Reading and analysis of selected works from Colonial Spanish American period and their Continental sources. Indigenous texts and authors. Content varies. May be repeated. Maximum 6 hours with consent of department.


571 Spanish American Narrative: Criollismo to 1950 (3) Critical study of major trends and movements that shaped Spanish American narrative during first half of 20th century. Content varies. May be repeated. Maximum 6 hours with consent of department.

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 second half of 20th century. Content varies. May be repeated. Maximum 6 hours with consent of department.

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. May be repeated. Maximum 6 hours with consent of department.

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. May be repeated. Maximum 6 hours with consent of department.

576 Contemporary Spanish American Poetry (3) Critical study of major poets in Spanish America from 1950 to present. Content varies. May be repeated. Maximum 6 hours with consent of department.

577 Contemporary Spanish American Theater (3) Reading and analysis of Spanish America's major dramatic works published and performed since 1950. Content varies. May be repeated. Maximum 6 hours with consent of department.


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. May be repeated. Maximum 6 hours with consent of department.

591 Foreign Study (1-15) See College of Arts and Sciences.

592 Off-Campus Study (1-15) See College of Arts and Sciences.

593 Independent Study (1-15) See College of Arts and Sciences. Letter or Satisfactory/No Credit grading.

600 Doctoral Research and Dissertation (3-15) P/NP only.

621 Seminar in Spanish Literature (3) Topics vary in field of Peninsular literature. May be repeated with consent of department. Maximum 9 hours.

631 Seminar in Spanish American Literature (3) Topics vary. May be repeated with consent of department. Maximum 9 hours.

SPECIAL EDUCATION (932)

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. Prereq: 402 and admission to Teacher Education Program. Coreq: 420.

420 Field Experience in Special Education Programs (3) Practicum in teaching special education programs: planning, developing, implementing and evaluating instruction. Prereq: 402, admission to Teacher Education Program: Coreq: 419 and/or 471. Satisfactory/No Credit grading only.

431 Field Experience in Comprehensive Programs (3) Prereq: 402 and admission to Teacher Education Program. Coreq: 432. Satisfactory/No Credit grading only.

454 Education of the Gifted and Talented Children (3) Orientation to psychometric and behavioral studies of giftedness. Analysis of past and present school practices in reference to curriculum and program implementation. Prereq: Admission to Teacher Education Program.

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) Varieties of exceptional children; general characteristics and educational needs. Implications of developmental variations for functioning as adults. Opportunity to expand study upon particular exceptionality. Enrollment limited to non-special education majors.

471 Early Childhood Special Education (3) Assessment, curriculum planning and development and teaching approaches used in early childhood special education. Prereq: Admission to teacher education.

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. Enrollment limited to those in fifth-year program. Satisfactory/No Credit grading only.

533 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.

535 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. Prereq: 553 or consent of instructor.

554 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. Prereq or coreq: 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. Prereq: Admission to graduate program.

558 Neuromuscular and Health Disorders: Educational Implications (3) Neurological impairments, physical disabilities and special health conditions, autism. Investigation of instructional techniques and adaptations.

564 Psychosocial Development of Gifted and Talented Children (3) Phenomena of talent development in context of home, school, and society. Implications of maladjustment. Practices for promoting social and emotional development. Prereq: 451 and 452 or equivalent or consent of instructor.

565 Instructional Systems for the Gifted and Talented (3) Instructional methods and systems evaluated in terms of effectiveness in various educational environments. Prereq or coreq: 564 or consent of instructor.

568 Early Childhood Special Education: Theories and Interventions (3) Theoretical perspectives of early childhood special education; exploration of programmatic 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, telecommunications, 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 universities. Prereq: 9 hours in statistical and research methods. May be repeated. Maximum 9 hours. Satisfactory/No Credit grading only.

630 Internship in Institutional Leadership in Special Education and Rehabilitation (3-9) Advanced level field experiences under supervision of practitioner. Prereq: Consent of instructor. May be repeated. Maximum 9 hours. Satisfactory/No Credit grading only.

SPORT MANAGEMENT (957)

440 Sport Marketing (3) Application of fundamental marketing concepts to sport industry. Marketing research, promotions, fund raising, advertising, and assessment of marketing programs specific to sport. Historical development of sport marketing. Prereq: Marketing 300 and progression to Sport Management.

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 sport events. Emphasis on developing balanced, multifaceted programs that target a variety of constituencies in the sport industry.

500 Thesis (1-15) P/NP only.

501 Special Project (3) Culminating experience for non-thesis major. Research study suitable for publication, or practicum requiring special written work. Prereq: 532.

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. May be repeated. Satisfactory/No Credit grading only.

503 Problems in Lieu of Thesis (2-3) May be repeated. Maximum 9 hours. Satisfactory/No Credit grading only.

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.

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.
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.

532 Research Techniques in Sport (3) Evaluate, compare, and contrast research techniques in sport with consideration for experiences in appropriate review, design, analysis procedures, and proposal development.

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.

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.

553 Case Studies in Sport Management (3) Current issues and problems in sport administration at all levels of amateur and professional sport. May be repeated under different topic. Maximum 9 hours.

554 Readings in Sport Management (3) Survey of pertinent literature in refereed and applied journals and texts.

555 Evaluation Techniques for Sport Managers (3) Review and application of techniques of evaluation appropriate for sport programs, facilities, and personnel.

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.

575 Seminar in Sport Management (1) Selected topics in sport management. May be repeated with consent of instructor. Maximum 3 hours. Satisfactory/No Credit grading only.

580 Special Topics (1-3) Advanced study in selected disciplinary or professional areas of physical education and/or sport. May be repeated.

590 Practicum (3) Practical experience in areas of major interest. May be repeated. Maximum 6 hours. Satisfactory/No Credit grading only.

593 Independent Study (1-3) May be repeated. Letter grade only.

595 Internship (3) Full-time application of previous theoretical and applied knowledge and skills in appropriate sport setting. Satisfactory/No Credit grading only.

SPORT STUDIES (959)

500 Thesis (1-15) P/NP only.

501 Special Project (3) Research study suitable for publication, or practicum requiring special written work.

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. May be repeated. Satisfactory/No Credit grading only.

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.


514 Advanced Philosophy of Sport (3) Major philosophical theories of sport. Various conceptual, moral, aesthetic, and social-political issues.

515 Social Theories of Sport (3) Liberal, democratic and Marxist social theories of sport.

533 Psychology of Sport (3) Social psychological factors influencing human behavior in a sport context; discussion of contemporary theory, research, and methodology. Prereq: General psychology course 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.

535 Health and Exercise Psychology (3) Study and cultural critique of various aspects of health and exercise psychology.

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.

538 Professional Practice Issues in Sport Studies (3) Study and cultural critique of various aspects of professional practice in sport studies.

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.

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.

542 Sociological Aspects of Sport (3) Social and cultural factors influencing sport and physical education. Pertinent issues and research applications. Prereq: 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) May be repeated. Satisfactory/No Credit or letter grade.

594 Supervised Readings (1-3) May be repeated. Satisfactory/No Credit or letter grade.

595 Special Topics (1-3) Advanced study in selected aspects of sport studies. May be repeated. Maximum 9 hours. Satisfactory/No Credit or letter grade.

600 Doctoral Research and Dissertation (3-15) P/NP only.

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. May be repeated. Maximum 9 hours.
681 Practicum (1-3) Intern experience in areas of major interest. May be repeated.
693 Independent Study (1-3) May be repeated. Satisfactory/No Credit or letter grade.
694 Supervised Reading (1-3) May be repeated. Satisfactory/No Credit or letter grade.
695 Special Topics (1-3) Study for doctoral students in selected aspects of sport studies. May be repeated. Maximum 9 hours. Satisfactory/No Credit or letter grade.

STATISTICS (962)


500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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 not given for both 531 and 537. Prereq: 1 year 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. Prereq: 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 not given for both 531 and 537. Prereq: 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. Prereq: 537 or 532.

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. Coreq: 531, 537 or 571, or consent of instructor.


564 Theory of Statistical Inference (3) Introductory theory underlying common statistical procedures of hypothesis testing and estimation. Prereq: 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. Prereq: 571 or equivalent.


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. Prereq: one year of calculus and a statistics course.


573 Design of Experiments (3) One-way ANOVA, multiple range tests, equal and unequal variances, transformations; factorial experiments, completely randomized designs, analysis of covariance, split-plot and nested designs, fractional factorials, sequential designs. Prereq: 571.

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. Prereq: 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. Prereq: 538 or 572 or consent of instructor.

578 Categorical Data Analysis (3) Log-linear analysis of multidimensional contingency tables. Logistic regression. Theory, applications, and use of statistical software. Prereq: 1 year of graduate-level statistics, regression analysis and analysis of variance, or consent of instructor.


583 Special Topics in Applied Statistics (1-3) May be repeated. Maximum 9 hours.

585 Principles of Statistical Process Management (1-3) Statistical and other techniques applied to management of organizational processes. Prereq: 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. Prereq: Consent of statistics department director of graduate studies. May be repeated. Maximum 2 hours. Satisfactory/No Credit grading only.
592 Internship (1-6) Supervised off-campus experience in application of statistical principles and methods in business, industry, or government. Written and oral report. Prereq: 4 courses in graduate-level statistics or consent of statistics department director of graduate studies. May be repeated. Maximum 6 hours. Satisfactory/No Credit grading only.

593 Independent Study (2-6) Faculty directed readings and investigation of specified topic in probability or statistics. Written report and oral presentation. Prereq: 2 courses in statistics and consent of the statistics department director of graduate studies. May be repeated. Maximum 6 hours. Satisfactory/No Credit or letter grade.

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. Prereq: 572 or 538. May be repeated. Maximum 6 hours.

600 Doctoral Research and Dissertation (3-15) P/NP only.

662 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 resampling techniques. Prereq: Knowledge of programming language and 572 or consent of instructor.


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. Prereq: 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. Prereq: 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, multivariate analysis of covariance, principal component models, factor analysis model, covariance structural models with latent variables, mixture-model cluster analysis. Prereq: 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. 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. Prereq: Consent of instructor. Satisfactory/No Credit or letter grade.

693 Independent Study (1-6) Directed research on subject of mutual interest to student and faculty member. May be repeated. Maximum 6 hours.

THEATRE (976)

420 Special Studies in Acting (3) Content varies. Exercises in selected concentrated areas such as styles, techniques, approaches, e.g., Shakespeare, movement, humor. Prereq: 320 and consent of instructor. May be repeated. Maximum 9 hours.

425 Selected Musical Theatre Techniques (3) Study and practice of musical theatre material: dance and vocal work. May be repeated. Maximum 6 hours.


446 Costume Patterning (3) Draping patterns for period costumes. Cosetery and study of historic patterns 1500-1900. Prereq: 345 or consent of instructor.

450 Special Studies in Entertainment Technology (1-3) Content varies. May be repeated. Maximum 9 hours. Prereq: consent of instructor.

452 Entertainment Technology II (3) Automation systems in live entertainment, including advanced rigging and flying for stage and film. Prereq: 352 or consent of instructor.

454 Scenery Painting (2) Introduction to materials, techniques, and principles of craft. Gaining skill and understanding through studio experience. Prereq: Consent of instructor.

456 Scenic Design II (3) Advanced studies in set design. Prereq: 355 or consent of instructor.

462 Lighting Design II (3) Advanced lighting design theory and practice. Lab and project intensive. Prereq: 362 or consent of instructor.

464 Computer Aided Drafting for the Theatre (3) Introduction to entertainment drafting. Emphasis on 2D graphical standards, drafting techniques, drawing layout and presentation.

470 Playwriting (3) Advanced instruction in writing of plays. Prereq: Consent of instructor.

491 Foreign Study (1-15) See College of Arts and Sciences.

492 Off-Campus Study (1-15) See College of Arts and Sciences.

493 Independent Study (1-15) See College of Arts and Sciences.

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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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. 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. Theatre MFA students only. May be repeated. Maximum 18 hours.

523 Master Class in Performance: Movement (3) Master class in movement techniques. Theatre MFA students only. May be repeated. Maximum 18 hours.

525 Master Class in Performance: Voice (3) Master class in voice and speech techniques. Theatre MFA students only. May be repeated. Maximum 18 hours.

536 Projects in Play Directing (3) Practical work in play direction involving various lengths and kinds of scripts. 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. Prereq: Consent of instructor.

546 Advanced Costume Patterning (3) Advanced studies in pattern period costume. Development of historic patterns through flat pattern method. Prereq: 446.

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. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

550 Special Studies in Entertainment Technology (1-3) Content varies. Prereq: consent of instructor. May be repeated. Maximum 9 hours.

551-552 Structural Design for Stage (3,3) Application of advanced theatre technology and analysis of common building materials to design of safe stage scenery. Must be taken in sequence.

553 Projects in Scenic Design (1-3) Conception and completion of major projects, both hypothetical and actual, in scene design. May be repeated. Maximum 9 hours.

555 Model Building (3) Techniques of model building for scenic designer. Theatre MFA students only. Prereq: 401 and one semester of 580.

556 Drafting (3) Drafting techniques for scenic designer. Theatre MFA students only.

560 Lab Analysis of Realized Lighting Design (3) Realized lighting design projects from concept meeting through opening night. Prereq: Consent of instructor. May be repeated. Maximum 18 hours.

562 Special Problems in Lighting Design (3) Advanced problems in lighting design and theory, problems in Broadway production and touring. Prereq: 462 or consent of instructor.

564 Advanced Computer Aided Drafting for the Theatre (3) Advanced drafting techniques. Emphasis on 3D solid modeling, rendering, and publication. Prereq: 464 or consent of instructor.

580 Design Seminar (1-6) Analysis, research, interpretation, and design of plays in a cross-disciplinary environment. May be repeated. Maximum 18 hours.

584 Photography for the Theatre (3) Photographic techniques for shooting live performance events under challenging lighting environments. Prereq: Consent of instructor.

585 Production Workshops (1-6) Directed experience in production collaborations. Prereq: Consent of instructor. May be repeated. Maximum 12 hours.

587 Computer Aided Rendering for the Theatre (3) Computer rendering programs and their use by theatrical designers. Prereq: Consent of instructor.

593 Independent Study (1-3) Individual or group projects. Available to Theatre MFA students only. Prereq: Minimum of 30 hrs toward MFA degree and consent of advisor. May be repeated. Maximum 9 hours.

THEORY AND PRACTICE IN TEACHER EDUCATION (978)

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

503 Problems in Lieu of Thesis (2-3) May be repeated. Maximum 9 hours. Satisfactory/No Credit grading only.

517 Trends and Issues in Education (3) Examination of contemporary trends and issues in education.

518 Educational Specialist Research and Thesis (3) May be repeated. P/NP only.

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. Prereq: Classroom experience or admission to teacher education program.

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 (1-3) Special conferences, workshops, and inservice programs. May be repeated. Maximum 6 hours. Satisfactory/No Credit or letter grade.

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. Prereq: Admission to graduate program.

593 Independent Study (1-3) May be repeated. Satisfactory/No Credit or letter grade.

594 Supervised Readings (1-3) May be repeated. Satisfactory/No Credit or letter grade.

595 Special Topics (1-3) May be repeated. Satisfactory/No Credit or letter grade.

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. Coreq: 553. Satisfactory/No Credit or letter grade.
600 Doctoral Research and Dissertation (3-15) Prereq: Admission to Candidacy. P/NP only.

604 Trans-Departmental Seminar I (1) Introduction to doctoral programs in education: research requirements, academic integrity, the meaning of scholarship in academic and issues/problems in education. Prereq: Admission to a doctoral program or consent of doctoral program coordinator. May not be used to meet 600-level requirement. Satisfactory/No Credit grading only.

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. Prereq: 604. May not be used to meet 600-level requirement.

610 Internship in College Teaching and Supervision (3-9) Supervised practice in college teaching and supervision. Prereq: Admission to doctoral program or consent of instructor. May be repeated. Maximum 9 hours. Satisfactory/No Credit grading only.

617 Trends and Issues in Teacher Education—An Interdisciplinary Perspective (3) Current trends and issues in field of teacher education: elementary education, mathematics education, science education and social science education. Prereq: Admission to doctoral program or consent of instructor.

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. Prereq: Admission to doctoral program or consent of instructor.


689 Internship (1-3) Experiences in application of principles and practices of curriculum development and instructional improvement. Prereq: Program prerequisites and consent of instructor. May be repeated. Maximum 9 hours. Satisfactory/No Credit grading only.

693 Independent Study (1-3) May be repeated. Satisfactory/No Credit or letter grade.

694 Supervised Reading (1-3) May be repeated. Satisfactory/No Credit or letter grade.

695 Special Topics (1-3) May be repeated. Satisfactory/No Credit or letter grade.

URBAN STUDIES (985)

411 The City in the United States (3) (See Political Science 402.)
412 Survey of Planning (3) (See Political Science 403.)
441 Urban Geography of the United States (3) (See Geography 441.)
442 Urban Social Geography (3) (See Geography 442.)
446 Housing (3) (See Political Science 446.)
464 Urban Ecology (3) (See Sociology 464.)

VETERINARY MEDICINE (987)

801-802 Application Based Learning Exercise (ABLE) I, II (1.2) 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. Satisfactory/No Credit grading only.

804-805-806 Application Based Learning Exercise (ABLE) and Clinical Exposure I, II, III (2,2,2) 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. Satisfactory/No Credit grading only.

811 Infection and Immunity II—Bacteriology and Mycology (3) Fundamental aspects of microbiology and cell biology relative 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, immunoprophylaxis, diagnostic testing and specific diseases involving immune system.

814-816 Clinical Correlations and Ethics I, II (1.2) Correlations between basic science material from concurrent courses and practice of veterinary medicine. Thoughts on wide spectrum of current veterinary ethical issues. 816—Student-led discussions follow faculty presentations.


821-822 Veterinary Anatomy I, II (4,4) Lectures, laboratories, and demonstrations are used in an integrated approach to the study of macroscopic (gross) clinically relevant anatomy, including neu- roanatomy, and embryology of common domestic animals. Dissections of embalmed specimens, prosections, plastinated specimens, and radiographs of common domestic species are examined for comparative purposes.

823-824 Physiology I,II (4,4) 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.

825-826 Veterinary Microscopic Anatomy I, II (2,2) Lectures, laboratories, and demonstrations are used in the study of the cell, embryology, and microscopic anatomy of organ systems in common domestic animals to relate structure with function.

827 Special Problems in Animal Science (1-8) Extramural and specially designed study for students interested in select topics in anatomy, histology, and physiology.

831 Physical Diagnosis (1) Basic care, feeding, restraint, and handling 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 and detriments of disease in 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.

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.

840 Integumentary System (3) Pathophysiology, special pathophysiology, medicine and surgery of diseases of integumentary system. Laboratory 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.

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 pathobiology: 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 pathobiology relative to etiology and natural behavior of various neoplasms of animals; 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.

878-879 Elective Clinical Rotation I, II (2,2) 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.

886-889 Clinical Rotation in Radiology and Pathology I, II (4,4) Two weeks in each discipline. Clinical training in radiographic techniques and interpretation, including ultrasonography. Post-mortem examination and laboratory diagnostics: clinical pathology and introductory histopathology of biopsy specimens.

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.

898-899 Externship I, II (2,2) 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 of wildlife damage control, forest, farmland, wetland wildlife habitat management, identification of wildlife field sign, wildlife capturing techniques and management plan preparation. Weekend field trips. 1 hour and 1 lab or field. Prereq: Forestry, Wildlife and Fisheries 317 or consent of instructor.

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. 1 hour and 1 lab or field. Prereq: Forestry, Wildlife and Fisheries 317 or consent of instructor.

443 Fisheries Science (3) Quantification and management of freshwater fisheries: population estimation, age and growth, biological assessment, and stocking. 2 hours and 1 lab. Prereq: Forestry, Wildlife and Fisheries 317 or consent of instructor.

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. 2 hours and 1 lab. One weekend field trip required. Prereq: Forestry, Wildlife and Fisheries 317 or consent of instructor.

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. 2 hours and 1 lab. Prereq: Forestry, Wildlife and Fisheries 317 or consent of instructor.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

512 Seminar in Wildlife and Fisheries Science (1) Current developments in wildlife and fisheries science. Required of all graduate students in residence in fall. May be repeated. Maximum 2 hours. Satisfactory/No Credit grading only.

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. Prereq: Consent of instructor.

525 Endangered Species Management and Conservation of Biodiversity (2) Status, ecology and management of endangered wildlife and plant species. Historic aspects, policy implications and philosophical issues surrounding recovery efforts. Approaches to monitor and manage for biodiversity. Prereq: 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. Prereq: 1 yr biology, 444 or 445, or consent of instructor. (Same as Comparative and Experimental Medicine–Veterinary Medicine 530.)

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. Prereq: Senior or graduate standing in life sciences.

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. Prereq: Consent of instructor.

540 Predator Ecology (2) Dynamics of terrestrial vertebrate predator populations in human-altered and relatively unaltered environments. Prereq: 444 or 445 or consent of instructor.

545 Advanced Population Analysis (2) Detail characteristics, assumptions, goals, methods, and current technologies for fish and wildlife population analysis. Use of computers. Prereq: Animal Science 571 or Statistics 538 or consent of instructor.

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. Prereq: Forestry, Wildlife and Fisheries 410 or Geography 411 or consent of instructor.

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. Prereq: Senior or graduate standing in life sciences.

555 Fish Culture (3) Principles, concepts and techniques of culturing economically important fish and shellfish species. 2 hours and 1 lab. Prereq: 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. Prereq: 443 or consent of instructor.

560 Advanced Topics in Wildlife and Fisheries Science (1-3) Recent advances and concepts, research techniques and analysis of current problems. Prereq: 443, 444, 445, or consent of instructor. May be repeated. Maximum 6 hours.

593 Independent Study in Wildlife and Fisheries Science (1-4) May be repeated. Maximum 6 hours.
WOMEN’S STUDIES (994)

400 Topics in Women’s Studies (3) Content varies. May be repeated.

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 (4) Explores issues surrounding sexuality, gender and cinema from points of view of feminist film criticism. Writing-emphasis course. (Same as Cinema Studies 469.)

483 African-American Women in American Society (3) (See African and African-American Studies 483.)

510 Special Topics (3) May be repeated. Maximum 6 hours.

543 Women, Sport, and Culture (3) (See Sport Studies 543.)

593 Independent Study (1-6) Prereq: Consent of Chair of Women’s Studies
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