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- Security Information
- Drug-Free Campus and Workplace
- Policy for the Administration of Graduate Assistantships

### Student Services

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- Career Services
- Center for International Education
- Child Care
- Dining Services Facilities
- Disability Services
- Graduate Student Association
- Hearing and Speech Services
- Housing
- Minority Student Affairs
- Religious Resources
- Student Counseling Services Center
- Student Health Service
- Vehicle Operation and Parking
- Women's Center

### Colleges

- College of Agricultural Sciences and Natural Resources
- College of Architecture and Planning
- College of Arts and Sciences
- College of Business Administration
- College of Communications
- College of Education
- College of Engineering
- College of Human Ecology
- College of Law
- College of Nursing
- College of Social Work
- College of Veterinary Medicine

### Fields of Instruction

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- Advertising
- Agricultural and Extension Education
- Agricultural Economics and Rural Sociology
- Agricultural and Biosystems Engineering
- Agriculture
- Animal Science
- Anthropology
- Architecture
- Art
- Audiology and Speech Pathology
- Aviation Systems
- Biochemistry and Cellular and Molecular Biology
- Biomedical Sciences
- Botany
- Broadcasting
- Business Administration
- Chemical Engineering
- Chemistry
- Child and Family Studies
- Civil and Environmental Engineering
- Classics
- Communications
- Comparative and Experimental Medicine
- Computer Science
- Counseling Education and Counseling Psychology
- Cultural Studies in Education
- Ecology and Evolutionary Biology
- Economics
- Education
- Education in the Sciences, Mathematics, Research, and Technology
- Electrical Engineering
- English
- Entomology and Plant Pathology
- Exercise Science
- Finance
- Food Science and Technology
- Forestry, Wildlife and Fisheries
- Geography
- Geological Sciences
- Germanic and Slavic Languages
- Health, Leisure, and Safety Sciences
- History
- Holistic Teaching/Learning
- Human Ecology
- Human Resource Development
- Inclusive Early Childhood Education
- Industrial and Organizational Psychology
- Industrial Engineering
- Information Sciences
- Interdisciplinary Programs
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- Language, Communication, and Humanities Education
- Law
- Leadership Studies in Education
- Life Sciences
- Management
- Management Science
- Marketing, Logistics and Transportation
- Materials Science and Engineering
- Mathematics
- Mechanical and Aerospace Engineering and Engineering Science
- Microbiology
- Music
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- Planning
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- Psychoeducational Studies
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Map
University Calendar for 1997-98

**Summer Term 1997**

- June 5 (Thursday) **Classes Begin**
- July 4 (Friday) **Independence Day**
- July 9 (Wednesday) **First Session Ends**
- July 10 (Thursday) **Second Session Begins**
- August 13 (Wednesday) **Second Session Ends**
- August 15 (Friday) **Commencement**

**Fall Semester 1997**

- August 27 (Wednesday) **Classes Begin**
- September 1 (Monday) **Labor Day**
- October 23-24 (Thursday-Friday) **Fall Break**
- November 27-28 (Thursday-Friday) **Thanksgiving**
- December 11 (Thursday) **Classes End**
- December 12 (Friday) **Study Period**
- December 13, 15-18 (Saturday, Monday-Thursday) **Final Exams**
- December 20 (Saturday) **Commencement**

**Spring Semester 1998**

- January 14 (Wednesday) **Classes Begin**
- January 19 (Monday) **Martin Luther King Day**
- March 23-27 (Monday-Friday) **Spring Break**
- April 10 (Friday) **Spring Recess**
- May 4 (Monday) **Classes End**
- May 5-6 (Tuesday-Wednesday) **Study Period**
- May 7-9, 11-12 (Thursday-Saturday, Monday-Tuesday) **Final Exams**
- May 15 (Friday) **Commencement**

**Summer Term 1998**

- June 4 (Thursday) **Classes Begin**
- July 3 (Friday) **Independence Day**
- July 8 (Wednesday) **First Session Ends**
- July 9 (Thursday) **Second Session Begins**
- August 12 (Wednesday) **Second Session Ends**
- August 14 (Friday) **Commencement**

NOTE: Deadlines for degree requirements are at end of section on Degree Program Requirements.
## The University Administration

### Board of Trustees

**Ex Officio Members**

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<tr>
<th>From Anderson, Bedford, Coffee, Franklin, Lincoln, Moore, and Warren Counties</th>
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<td>Jennifer Logan</td>
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<td>Lucy Y. Shaw</td>
<td>June 1, 2002</td>
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### University of Tennessee Administration

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<tr>
<td>Veterinary Medicine</td>
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GRADUATE STUDY
Rules, policies, fees, and courses described in this catalog are subject to change without notice. Refer to inside front cover.
The Graduate School

C. W. Minkel, Associate Vice Chancellor for Academic Affairs and Dean of The Graduate School
Linda R. Painter, Associate Dean of The Graduate School
Michael W. Singletary, Associate Dean of The Graduate School
S. Kay Reed, Assistant to the Dean
Ann L. Lacava, Thesis/Dissertation Consultant
Diana Lopez, Director, Graduate Admissions and Records
Rose Ann Tranthal, Assistant Director, Graduate Admissions and Records

The University of Tennessee is the official land-grant institution for the State of Tennessee, with its main campus in Knoxville. UT Knoxville is the state’s oldest, largest, and most comprehensive institution, and is the only state-supported "Research University I" (Carnegie classification) in Tennessee. A wide range of graduate programs leading to master's and doctoral degrees is available. The University offers master's programs in 79 fields, the Educational Specialist degree, doctoral work in 46 fields, and 2 professional programs. More than 7,000 graduate and professional students are enrolled on and off campus under the tutelage of 1,550 faculty members.

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

The Graduate School includes the Graduate Council; the Graduate School administrative organization, composed of the Graduate Office and the Office of Graduate Admissions and Records; administrators of the various graduate programs; the graduate faculty; and the graduate student body.

The Graduate Council is composed of elected faculty representatives from each college, the Space Institute, and the Graduate Student Association. Ex-officio members include the Dean and Associate Deans of The Graduate School, 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 any other matters of educational policy pertaining to graduate programs. Standing committees include academic policy, appeals, credentials, curriculum, and the Graduate Deans Group.

The Graduate School administration develops procedures to implement policies formulated by the Council, and has primary responsibility for Graduate School admissions and records. 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 by The Graduate School, upon recommendation of the academic unit, and currently enrolled in The Graduate School.

Graduate education has been conducted at The University of Tennessee since 1821. The first known master's degree was awarded in 1827. In 1879 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 Ph.D. 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 programs until the Graduate Council was formed in 1949. More than 7,900 doctoral degrees and 45,600 master's degrees have been awarded to date.

Seven deans have led The Graduate School since 1936: Fred C. Smith, Eugene A. Weeters, Dele K. Wantling, Hilton A. Smith, Jack E. Reese, Margaret N. Perry, and C.W. Minkel. They have strived to maintain the rich heritage and the highest quality of graduate programs at UTK.
# Graduate Majors and Degree Programs

Below is a list of all graduate degree programs offered at The University of Tennessee, Knoxville. A degree is awarded upon completion of a specified program of study in a major field. Degree titles are posted on transcripts and diplomas. Major titles are posted on transcripts. A formally approved subcomponent of a degree program is a concentration. Select ONE of these majors and degrees. Enter your preference on the Graduate School application (orange form) under Type of Admission. Please contact the program you have selected for additional information.

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<thead>
<tr>
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<th>GRE</th>
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## College of Agricultural Sciences & Natural Resources

### Agricultural & Extension Education
- **MS**
- **3**
- X

### Agricultural Economics
- **MS**
- **G**
- **3**
- X

### Animal Science
- **MS**
- **G**
- **3**
- X
- X

### Biosystems Engineering
- **MS**
- **G^3, S^6**
- **3**
- X
- X

### Bioenergy & Natural Resources Technology
- **MS**
- **3**
- X

### Entomology & Plant Pathology
- **MS**
- **3**
- X

### Food Science & Technology^*
- **MS**
- **G**
- **3**
- X

### Forestry^*
- **MS**
- **G**
- **3**
- X

### Ornamental Horticulture & Landscape Design^*
- **MS**
- **3**

### Plant & Soil Science^*
- **MS**
- **G**
- **3**
- X

### Wildlife & Fisheries Science^*
- **MS**
- **G**
- **3**
- X

## College of Architecture & Planning

### Architecture^*
- **MArch +**
- **G**
- **3**
- X

### Planning^*
- **MSP +**
- **G**
- **2**
- X

## College of Arts and Sciences

### Anthropology
- **MA +**
- **G**
- **3**
- X

### Art^*
- **MFA +**
- **3**

### Audiology^*
- **MA**
- **2**

### Biochemistry^*
- **MS +**
- **G**
- **3**
- X

### Botany^*
- **MS**
- **G**
- **3**
- X

### Chemistry^*
- **MS**
- **G**
- **3**
- X

### Computer Science^*
- **MS**
- **G**
- **3**
- X

---

*Note: GRE scores are required for most programs, and specific requirements and evaluation dates are provided for each program.*

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*Please contact the program you have selected for additional information.*
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<td>MA-writing, degree-seeking students only, Admit Fall only, Evaluate Feb 15, (974-6933, <a href="mailto:mlofaro@utk.edu">mlofaro@utk.edu</a>)</td>
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<td>PHD-American, European, Admit Fall only, Evaluate Feb 15, (974-5421, <a href="mailto:phamilto@utk.edu">phamilto@utk.edu</a>)</td>
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<td>MS &amp; PHD-plant physiology &amp; genetics, MS-only-biotechnology, (974-5841, <a href="mailto:mattingly@utk.edu">mattingly@utk.edu</a>)</td>
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<td>MS-applied mathematics, PhD-mathematical ecology, (974-2464, <a href="mailto:gradprogram@novell.math.utk.edu">gradprogram@novell.math.utk.edu</a>)</td>
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<td>First concentration-French, German, Spanish, Second concentration-Applied linguistics, French, German, Italian, Portuguese, Russian, Spanish, (974-3421, <a href="mailto:lauckner@utk.edu">lauckner@utk.edu</a>)</td>
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<td>Accompanying, choral conducting, composition, instrumental conducting, jazz, music education, musicology, performance (organ, piano, strings, voice, winds, percussion), piano pedagogy &amp; literature, sacred music, string pedagogy, theory. Audition required, (974-3331, <a href="mailto:canders@utk.edu">canders@utk.edu</a>)</td>
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<td>X</td>
<td>MA &amp; PHD-medical ethics, philosophy, MA-only-religious studies, Admit Fall only, (974-3255, <a href="mailto:jnolt@utk.edu">jnolt@utk.edu</a>)</td>
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<td>MS &amp; PHD-astrophysics, atomic &amp; low temperature physics, biophysics, chemical physics, condensed matter &amp; surface physics, elementary particle physics, molecular spectroscopy, nuclear physics, theoretical physics, MS-only-geophysics, health physics. Rating forms required only for consideration for teaching assistantships, (974-3342, <a href="mailto:manning@utk.edu">manning@utk.edu</a>)</td>
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<td>Audiology, hearing science, speech &amp; language pathology, speech-language science, (974-5019, <a href="mailto:kgross@utk.edu">kgross@utk.edu</a>)</td>
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<td>Acting, costume design, lighting design, scene design, theatre technology. Audition required, (974-9011, <a href="mailto:cdodd@utk.edu">cdodd@utk.edu</a>)</td>
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**College of Education**

**College Student Personnel**

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**Education**

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**College of Engineering**

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**College of Human Ecology**

**Child & Family Studies*** | MS    | G^1 | 3   | X   |               |                | Track 1-child development, family studies. Track 2-child development. Evaluate Feb 1, June 1 and Nov 1. (974-5316, csteele@utk.edu) |
| Health Promotion & Health Education | MS | 3   | X   |               |                | Evaluate Feb 1, April 1 and Sept 1. (974-5041) |
| Human Ecology** | PHD    | G^2 | 3   | X   | X             |                | Child development, community health, family studies, human resource development, nutrition science, retail & consumer sciences, textile science. Evaluate Feb 1, June 1 and Nov 1. (974-5224, jmoran@utk.edu) |
| Human Resource Development | MS | 3   | X   |               |                | Business & marketing education, family & consumer sciences education, industrial education, organizational learning systems, vocational-technology education, workforce training. (974-2574, hrd@utk.edu) |
| Nutrition** | MS    | G^1 | 3   | X   |               |                | Nutrition science, public health nutrition. Evaluate Feb 1, May 1 and Oct 1. Dual MS-MPH program available. (974-5445, cyates1@utk.edu) |
| Public Health** | MPH | 3   | X   |                |                | Community health education, health planning/administration. Admit Summer and Fall only, Fall deadline - Apr 1, Summer deadline - Feb 1. Dual MS-MPH program available. (974-6674) |
| Recreation, Tourism, & Hospitality Management | MS | G^1 | 3   | X   |               |                | Hospitality management, recreation administration, therapeutic recreation, tourism. (974-6045) |
| Safety Education & Service | MS    | 3   | X   |               |                | Evaluate Feb 1, April 1 and Sept 1. (974-5042) |
| Textiles, Retailing & Consumer Sciences** | MS    | G^1 | 3   | X   |               |                | Retail and consumer sciences, textile science. Evaluate Mar 1 - Fall and Summer, Nov 1 - Spring. (974-2141, nbfair@utk.edu) |

**College of Law**

**Law*** | JD | LSAT | 2   |       |               |                | Advocacy & dispute resolution, business transactions. Contact College of Law for Bulletin. Dual JD-MBA and JD-MPA programs available. |

**College of Nursing**

**Nursing*** | MSN | G^1 | 3   | X   |               |                | MSN-adult health nursing, family nurse practitioner, mental health nursing, nursing administration, nursing of women and children. Evaluate Oct 15 and Feb 15. (974-7606, sthomas@utk.edu) |
| PHD | G^2 | 3   | X   |               |                | PHD-adult health nursing, family nurse practitioner, mental health nursing, nursing administration, nursing of women and children. Evaluate Oct 15 and Feb 15. (974-7606, sthomas@utk.edu) |

**College of Social Work**

**Social Work*** | MSSW | G^1 | 3   | X   | X             |                | MSSW-clinical social work practice, management & community practice. Programs offered in Knoxville, Memphis and Nashville. Evaluate Mar 1, (MSSW-974-6677, nsash@utk.edu) (PHD-974-8481, egaddis@utk.edu) |
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<th>MAJOR</th>
<th>DEGREE</th>
<th>GRE</th>
<th>RATING FORM</th>
<th>DEPT. REQ.</th>
<th>THESIS LANGUAGE</th>
<th>CONCENTRATIONS AVAILABLE/ EVALUATION DATES/PHONE (AREA CODE: 423)</th>
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<td><strong>College of Veterinary Medicine</strong></td>
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<td>Contact College of Veterinary Medicine for application. (974-7263, <a href="mailto:jbraes@utk.edu">jbraes@utk.edu</a>)</td>
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<td>Veterinary Medicine*</td>
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<td>MS &amp; PHD-biochemistry; biophysics; carcinogenesis; cellular, developmental &amp; mammalian biology; genetics; radiation biology. (574-1227, <a href="mailto:rpop@utk.edu">rpop@utk.edu</a>)</td>
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<td>Biomedical Sciences*</td>
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<td><strong>School of Information Sciences</strong></td>
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<td>Corporate information systems &amp; services, electronic publishing, information systems &amp; technology, scientific &amp; technical information, youth services in public &amp; school libraries. Distance education available in TN and VA. Evaluate July 1, Dec 1 and Apr 1. See College of Communications for PHD. (974-2148, <a href="mailto:hoemann@utk.edu">hoemann@utk.edu</a>)</td>
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<td>Only offered at UT Space Institute, Tullahoma, Tennessee. (974-5576, <a href="mailto:potgieter@utk.edu">potgieter@utk.edu</a>)</td>
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<td>Comparative &amp; Experimental Medicine*</td>
<td>MS</td>
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<td>X</td>
<td>X</td>
<td>Admit Fall only. Evaluate Feb 1. Use forms obtained from department. Degree-seeking students only. (974-4843, <a href="mailto:jtrbov@utk.edu">jtrbov@utk.edu</a>)</td>
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- Contact academic program for specific requirements.
- Foreign or computer language.
- International applicants only.
- American applicants only.
- Non-degree students must obtain permission from the department/program head to register for courses in these fields.
- Available for the Academic Common Market to residents of reciprocal states. See Fields of Instruction.

G: GRE General Test.
S: GRE Subject Test.

14
Admission Requirements

Admission to The Graduate School 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. Admission to The Graduate School does not ensure acceptance into a specific degree program nor admission to candidacy for the degree desired.

The Graduate School 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-point scale or equivalent on all graduate work. Many programs require a higher average. Applicants with work experience or who are entering graduate school after a number of years away from an educational institution, usually 5 years, will be given consideration with greater flexibility relative to GPA. An international student graduating from a U.S. 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 the 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 from The Graduate School. An international student may not be admitted on probation.

When a student is admitted to The Graduate School prior to having received the baccalaureate degree, that degree must be awarded before the date of first registration. The Office of Graduate Admissions and Records 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 The Graduate School is a privilege which may be withdrawn by the University or any area of graduate study if it is deemed necessary by the Dean of The Graduate School to safeguard the University's standards.

Application Procedures

Anyone with a Bachelor's degree from a regionally accredited institution or foreign equivalent who wishes to take courses for graduate credit, whether or not the person desires to become a candidate for a degree, must make formal application for admission to The Graduate School 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 The Graduate School:

1. The completed Graduate Application for Admission (inside front cover of the Graduate Catalog).
2. A $15 ($35 effective Fall 1998) non-refundable application fee.
3. One official transcript from all colleges and universities attended.
4. Additional departmental/program requirements (refer to Majors and Degree Programs chart in front of Graduate Catalog). a. Reference letters or rating forms. All program forms should be sent to the college or department.
   b. Scores from the Graduate Record Examination (GRE) or Graduate Management Admission Test (GMAT).
   c. Scores from Test of English as a Foreign Language (TOEFL) if native language is not English (refer to section on English Proficiency).
   Application forms for the above tests can be obtained by writing:

   Educational Testing Service
   Princeton, NJ 08540

   UT Knoxville is an approved testing center for all examinations. Examination results reach the University in approximately six weeks. All of the above documents become the property of the University and will not be returned.

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

Admission Classifications

To earn graduate credit, a student must be admitted by the Dean of The Graduate School enrolled in one of the categories listed below. See Registration and Enrollment Requirements for provisions concerning graduate credit and for special privileges for UT Knoxville seniors and professional students. International students should also refer to the section on Admission of International Students.

DEGREE ADMISSION

Admission to a degree program requires that a person meet the minimum requirements of The Graduate School and any additional program requirements (see Admission Requirements). Refer to the appropriate field of instruction for specific requirements for admission to the degree program.

In addition to meeting the minimum requirements for admission to The Graduate School, 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 degree programs, applications are processed consecutively.

NON-DEGREE ADMISSION

Applicants may apply for non-degree status who, for example:

1. need additional time to fulfill application requirements for a degree program.
2. do not wish to pursue a degree program.

Admission to the non-degree status requires that a person meet the minimum requirements of The Graduate School (see Admission Requirements).

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, but some departments do not permit non-degree students to register for graduate courses (see Majors and Degree Programs chart for information on restricted programs).

There is no specific limit on the number of courses that a student may take in non-degree status. However, before accumulating 15 hours of graduate coursework in this status, the student must either:

1. apply and be admitted to a specific degree program (see Revision of Admission Classification for procedures); or
2. submit a Plan of Study form to the Associate Dean of The Graduate School for approval to continue taking courses in non-degree status. The plan of study must include a stated educational objective and a list of courses proposed to achieve that objective.

A maximum of 15 graduate hours taken before acceptance into a degree program 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 Associate Dean of The Graduate School, or designee, is the advisor.

A student must maintain a 3.0 grade-point average to continue enrollment in non-degree status (see Academic Standards). Admission to non-degree status does not assure admission to a degree program. The student who seeks to enter a degree program will be directed to the appropriate department.

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

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 $15 ($35 effective Fall 1998) application fee, and a Transient Student Certification 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 and Records.
Admission of International Students

The Graduate School accepts only students who have superior records. 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:

a. 14 on a 20-point scale,
b. 80.0 from Taiwanese institutions,
c. 1st Class or Division from Indian institutions,
d. 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 established by The Graduate School.

International students may apply for admission any semester, but normally enter the summer or fall semester. Deadlines for submission of applications are:

- Fall: 1 March
- Spring: 15 July
- Summer: 15 November

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

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

1. A completed application form accompanied by a $15 ($35 effective Fall 1998) non-refundable processing fee. Payment should be made in United States dollars by a cashier's check, money order, or personal check. 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.

2. Official or attested university records, with certified translations if the records are not in English (Notarized copies are not accepted).

3. Certification of English proficiency. Refer to section on English Certification.

4. Documented evidence of financial resources sufficient to support the student, as stated on the financial statement form supplied to the applicant.

5. Additional departmental/program requirements (refer to Majors and Degree Programs chart in front of Graduate Catalog).

- 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 a 1-20 or IAP-66 form needed to obtain a visa. The Graduate School will not issue these forms after the following dates:

- Fall: 15 June
- Spring: 1 November
- Summer: 15 March

The University will not enroll any student who has not been approved initially, or for transfer, by the Immigration and Naturalization Services (INS) to attend UT Knoxville.

An international student may not enroll as a non-degree student nor 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 550 is required for admission consideration. Some departments require higher scores. The score must be no more than two years old. 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 UT I. Refer to section on English Proficiency.

Admission of Faculty and Staff Members

If admissible to The Graduate School, members of the faculty or staff located in Knoxville may take courses as graduate students.

Faculty members of UT Knoxville or the Institute of Agriculture at the rank of assistant professor or above, and members of the administrative staff at UT Knoxville, the UT Central Administration, and the Institute of Agriculture will not normally be admitted to an Ed.D. or Ph.D. degree program at UT Knoxville. Exceptions may be granted on an individual basis upon petition to The Graduate School.

Petitioners must present their request in writing, providing adequate assurance that the residence requirement will be met and that there will be no conflict of academic or administrative interest. Written endorsements must be provided by the respective deans and department heads of the units in which members are employed and in which the doctoral degrees are to be pursued. Requests should be directed to the Associate Vice Chancellor and Dean of The Graduate School.

Readmission

A student who has not attended The Graduate School at UT Knoxville for more than three consecutive terms (including summer) must apply for readmission. A readmission application should be submitted to the Office of Graduate Admissions and Records at least two weeks prior to the desired reentry date. A student who has attended another institution since enrollment at UT 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 Graduate School. 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 from the Office of Graduate Admissions and Records. 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 in The Graduate School for a revision to be processed. Acceptance into a new degree program is contingent upon review and recommendation by that department. If the student is not accepted into the program requested, he/she remains in the former program. The results of each request for program change are communicated to the student by mail.

Registration and Enrollment Requirements

Graduate Credit

To earn graduate credit, a student must be admitted by the Dean of The Graduate School and enrolled in an appropriate status as a graduate student. The registration must reflect the desire for graduate credit, and the course must have been approved by the Graduate Council. Coursework taken in any other status is unacceptable for graduate credit and cannot be changed retroactively to graduate credit. Special privileges are accorded UT Knoxville 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 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 thus will exceed expectations for undergraduates. Graduate and undergraduate completion of the same course will not be considered equivalent, and therefore 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 Associate Vice Chancellor and Dean of The
Graduate School to do so. Criteria for eligibility to teach at the 600 level are available from The Graduate School.

Undergraduate and Professional Students

UT KNOXVILLE SENIORS

Subject to approval by The Graduate School, a senior at UT Knoxville who needs fewer than 30 semester hours to complete requirements for a Bachelor's degree and has achieved a 3.0 average (3.0) may enroll in graduate courses for graduate credit, provided the combined total of undergraduate and graduate coursework does not exceed 15 credit hours per semester. Approval must be obtained each semester at the Office of Graduate Admissions and Records during registration. A maximum of 15 hours of graduate credit can be obtained in this status. Some departments do not permit seniors to register for graduate courses without prior permission (see Majors and Degree Programs chart for information on restricted programs).

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

UT KNOXVILLE VETERINARY MEDICINE STUDENTS

A student in good standing in the College of Veterinary Medicine may enroll in UT Knoxville graduate courses without being admitted to The Graduate School under the following conditions:
1. The student's advisor must approve in advance the student's enrollment in each course.
2. The student may take a maximum of 10 semester hours of graduate courses during the D.V.M. program.
3. Approval must be obtained each semester at registration through the Office of Graduate Admissions and Records. 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 D.V.M. degree and a graduate degree.

UT KNOXVILLE LAW STUDENTS

Subject to approval by The Graduate School and the College of Law, a law student at UT Knoxville may enroll in graduate courses for graduate credit. Approval must be obtained each semester at the Office of Graduate Admissions and Records during registration.

Courses taken for graduate credit may not be used toward both the J.D. degree and a graduate degree. Use of such courses toward the J.D. degree are subject to guidelines approved by the law faculty.

Law Courses

A graduate student may take up to 8 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 an S/NC grade.

If the student earns a 2.0 or better, an S will be recorded on the transcript. Below 2.0, 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 grade-point average, as law courses do not carry graduate credit.

Different rules apply to students enrolled in the Dual J.D.-MBA and J.D.-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 Field of Instruction for graduate credit.

Senior or Disabled Citizens

Legislation gives Tennessee citizens who are 60 years of age or older, 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 either of these conditions is required for enrollment. Students who are 65 or over, or who are totally disabled, and who desire to receive UT credit for their courses, may pay a reduced course fee of $7 per credit hour up to a maximum of $75 for a full-time load. Registration for day and evening classes is handled by the Evening School, 451 Communications and University Extension Building, (423) 974-5361 or 1-800-676-8657.

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, 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.

Short Courses and Workshops

The University offers a wide variety of short courses and workshops for graduate credit. Minimum criteria acceptable for such credit are as follows:
1. 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.

2. For every contact hour, there should be at least two hours of student preparation.
3. For each hour of graduate credit under the semester system, there should be a minimum elapsed time of one week.

Correspondence Study

No graduate credit is accepted at UT 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 Registrar, 209 Student Services Building. To be eligible, a student must be admitted to The Graduate School. 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 transferrable.

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 6 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 by The Graduate School. Scores from the Test of Spoken English (TSE) may be accepted in place of the SPEAK Test.

Prerequisites

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

Advisor/Major Professor

Every graduate student must have an advisor from the major department. This professor advises the student about courses, supervises the student’s research, and facilitates communication within the major department, to other departments and to The Graduate School. The advisor must approve the student’s program each semester. Many departments assign a temporary advisor to the student while the student is becoming acquainted with the institution and determining the focus of research interests, and in which 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

To assist graduate students in other majors, one faculty member in each academic department has been designated as a liaison. The liaison is identified in the list of faculty under each department. The liaison acts as a departmental 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 three. Registration allows use of services such as library checkout, laboratories, and recreation facilities not open to the public. Information concerning registration is available in the Graduate School News and Timetable of Classes each term. Registration is accomplished via telephone. During priority registration, a schedule and 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 Computer Assisted Registration Services Office. (423) 974-2223.

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

Non-degree students in unrestricted programs, (see Majors and Degree Programs Chart) may obtain permission to register from the Office of Graduate Admissions and Records. Non-degree students with no declared major must obtain permission from the department/program head to register for courses in restricted fields.

Course Description

Each course listed in the Graduate Catalog contains information in abbreviated form. The course number indicates the level at which the course is taught. All 500- and 600-level courses are graduate courses. The 400-level courses are upper division courses available for graduate credit only if listed in the Graduate Catalog. To receive graduate credit for these, a student must request registration.

The official course title appears following the course number. Numbers in parentheses following the course title indicate the semester hours credit. If the credit is variable, to be determined in consultation with the instructor, the minimum and maximum are shown (e.g., 2–3). The credit hours are followed by a course description indicating the content to be covered.

Prerequisite courses must be taken prior to the course in question. Corequisite courses may be taken prior to or concurrently with the specific course. Recommended prerequisites should be taken previous but are not mandatory.

Some courses may be repeated for a maximum number of hours allowable toward a degree program. This number is stated for each repeatable course with the exception of Thesis 500, Dissertation 600, and Registration for Use of Facilities 502. Courses may be cross-listed with two or more departments, an arrangement indicated by a parenthetical statement: (Same as Psychology 543). The course description is given only under the primary department.

"S/N only" indicates that the course may be taken only for Satisfactory/No Credit grading. Refer to section on Grades.

A symbol indicating the semester or frequency that the course is normally offered is included at the end of many course descriptions:

- F: Fall
- E: Every semester
- Sp: Spring
- A: Alternate years
- Su: Summer

These codes are indicated only for Knoxville campus classes and are subject to change without notice. The Timetable of Classes, published prior to registration each semester, is the official notification of courses offered for a given semester. Students should contact the appropriate department/program head concerning courses to be offered in future semesters.

Registration and Enrollment Requirements

Conditional Registration

Applicants who appear to meet the admission requirements of The Graduate School 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 must be registered. Normally, students are registered for coursework or thesis/dissertation credit. Non-thesis students or those who have not begun research, but who have completed all coursework requirements, must register for course 502.

Change of 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 during the first 29 calendar days after the beginning of classes.

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.

Course registration may be changed from credit to audit or audit to credit only during the first 29 calendar days after the beginning of classes.

The deadline for all other changes of registration (e.g. from graduate to undergraduate, undergraduate to graduate withdrawal) is approximately 42 calendar days after the first day of classes each semester. (See Graduate School News or Timetable of Classes each term for exact date.) A student may change registration for a course at any time prior to and including this date by accessing the telephone registration system. The student must affirm that the advisor has granted approval of the change. If additional permission is necessary, a student must execute a change of registration in person, at the Registration Services Office. The instructor’s signature is required to add a course, if the course is closed and/or after the first 29 calendar days of classes. The student must sign the form certifying approval of the advisor.

If the student withdraws from a course, or from the University, after the first 29 calendar days of classes and before the change of registration deadline, a grade of W will be entered on the permanent record.

After the change of registration deadline, a student withdrawing from a course or from the University will receive a grade of F unless it can be demonstrated that the request for withdrawal is based on circumstances beyond the student's control.
control. In the latter case, a grade of W will be entered on the permanent record.

To change registration in any way after the deadline, a student must present the request, together with documentary evidence of extenuating circumstances, to the Office of Graduate Admissions and Records. In addition, the student must complete a change of registration form and questionnaire signed by the instructor(s) and advisor as evidence of their knowledge of the request. If the request is approved, the Office of Graduate Admissions and Records will authorize the change on the student’s permanent record.

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 6 semester hours in a 5-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 5-9 semester hours. A student on a part-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 of The Graduate School, which may allow registration of up to 18 hours during a semester.

Grade-Point Average and Grades

A cumulative grade-point average of 3.0 is required on all graduate coursework taken at UT Knoxville to remain in good standing and to receive any graduate degree from the University. All coursework taken for graduate credit is computed into the GPA. Grades in The Graduate School 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. All incompletes must be removed within one semester, excluding the summer term. If a supplementary grade report has not been received in the Office of Graduate Admissions and Records at the end of the semester, the I 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 where NC is received may be repeated for a grade of S. A grade of S/NC is awarded only when indicated in the course description in the Graduate Catalog. The number of S/NC courses in a student’s program is limited to one-fourth of the total credit hours required.
P/NP (carries credit hours, but no quality points), indicates progress toward completion of a thesis or dissertation. NP indicates no progress or inadequate progress.
W (carries no credit hours or quality points), indicates that the student officially withdrew from the course.

No graduate student may repeat a course for the purpose of raising a grade already received, with the exception of NC. 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 and must have approval of The Graduate School. 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 Law under Fields of Instruction for Law grading system.

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 judgements 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. 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 by The Graduate School. 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 for two additional 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 Graduate School if the student’s semester GPA falls below 3.0 in a subsequent semester. When the particular circumstances may be deemed to justify continuation, and upon recommendation of the appropriate academic unit and approval of The Graduate School, 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 The Graduate School. In those cases where the department’s requirements for continuation are more stringent than Graduate School requirements, The Graduate School will evaluate the student’s record to determine whether the student is eligible to apply for a change of status and register in another area of study. Registration for courses in a department from which a student has been dismissed will not be permitted, except by written authorization from that department.

Academic Honesty

Academic integrity is a responsibility of all members of the academic community. An honor statement is included on the application for admission and readmission. The applicant’s signature acknowledges that adherence is confirmed. The honor statement declares 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. Webster’s Ninth New Collegiate Dictionary (1983) defines plagiarism as “stealing or passing off ideas or words of another as one’s own”, “the use of a created production without crediting the source.” Any material taken from another source must be documented, and in no
Degree Program Requirements

A complete list of programs is found under the Majors and Degree Programs chart. For specific degree requirements, consult individual program descriptions and fields of instruction in this Catalog. See also the summary of procedures charts, and refer to the Graduate School News each semester for specific deadlines. 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 School's minimum requirements for degree programs. Refer to the Fields of Instruction for additional program requirements.

Definition of Graduate Terms

Major: The principal educational interest of a student as represented by one of the curricula prescribed by the various units at UT Knoxville. The major specifies the minimal 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. Differ from "concentration" in that a minor is not a subdivision of the major.

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.


Cognate: A limited block of courses or hours required outside the unit in which the major is offered.

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.

Track: A separate route leading to the same degree but with different requirements.

Tool: A limited block of courses or hours required to enhance research or methodological expertise.

Appeals Procedure

The Graduate Council Appeal Procedure can be obtained at the Office of Graduate Admissions and Records. 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 The Graduate School, the Graduate Council, the Chancellor, and ultimately to the President of the University.

The Graduate Council hears appeals concerning the interpretation of and adherence to university, college and department 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 Hilltopics 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 Diversity Resources and Educational Services (DRES).

Transfer Credits

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

1. be taken for graduate credit.
2. carry a grade of B or better.
3. be a part of a graduate program in which the student had a B average.
4. not have been used for a previous degree.
5. be approved by the student's graduate committee and The Graduate School on the Admission to Candidacy form.

Courses transferred to any graduate program will not affect the minimum residence requirements for the program, nor will they be counted in determining the student's grade-point average. Credits transferred from universities outside The University of Tennessee system cannot be used to meet the 500- 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 and/or foreign institution.

MASTER'S DEGREE

A minimum of one-half of the total hours required for a master's degree must be taken at UT Knoxville. A maximum of one-third of the total hours may be transferred from institutions outside The University of Tennessee system, upon request by the academic unit. In addition, the student may transfer courses taken at other campuses of The University of Tennessee.

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 UT Knoxville transcript only after admission to candidacy.

ED.S. DEGREE

A maximum of six semester (nine quarter) hours of coursework beyond the master's degree may be transferred to an Ed.S. 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 UT Knoxville 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 UT Knoxville transcript.

Theses and Dissertations

All theses and dissertations are submitted to The Graduate School Thesis/Dissertation Consultant for examination. The Consultant will review the material and assure that it is attractively presented, free of technical errors in format, suitable for binding, and reflects credit upon the University and The Graduate School. 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 UT Knoxville Guide to the Preparation of Theses and Dissertations (8th ed.) provides the correct format for theses or dissertations. Workshops are held periodically throughout the academic year. The date for each workshop is announced in the Graduate School News.

The thesis/dissertation normally should be written in English. Under exceptional circumstances, another language may be used if prior approval is obtained from The Graduate School.
To meet this requirement, only 6 hours may be counted toward a master's degree program and must be distributed to include one or two minor areas. A student must complete at least 30 hours of graduate coursework, exclusive of course 500, and a minor must include not fewer than 6, nor more than 12, hours of graduate credit.

A request to write in a language other than English should be submitted to the Dean of The Graduate School by the student's thesis committee, with endorsement by the Department Head and Dean of the College, prior to Admission to Candidacy for the degree sought. The request should include a proposal and justification for the exception. In all cases, the thesis/dissertation abstract must be written in English.

A basic principle in graduate education is that theses and dissertations produced by graduate students will be published and made available to the general public 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 Associate Vice Chancellor and Dean of The Graduate School. Should the research become classified in the course of a project, these same persons should be notified immediately so that proper procedures can be assured. Failure to comply with these requirements may lead to rejection of a thesis or dissertation manuscript.

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 M.A. and M.S. degrees, other degrees are offered, including the MBA and the M.S.W.

COURSE REQUIREMENTS

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

At least two-thirds of the minimally required hours in a master's degree program must be taken in courses numbered at or above the 500 level. Only 6 thesis hours may be counted toward this requirement. For coursework taken at other institutions, refer to section on Transfer Credits.

SECOND MASTER'S DEGREES

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 major, one member of the committee must be from the minor department.

ADMISSION TO CANDIDACY

Admission to candidacy reflects agreement among the student, graduate committee, and The Graduate School 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 list all courses to be used for the degree, including transfer coursework. The student must submit this form to the Office of Graduate Admissions and Records no later than commencement day of the semester preceding the semester in which he/she plans to graduate.

THESIS REGISTRATION

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

THESIS

The thesis represents the culmination of an original research project completed by the student. It must be prepared according to the UT Knoxville Guide to the Preparation of Theses and Dissertations (8th ed.). Two copies of the thesis must be approved and accepted by The Graduate School on or before the deadline specified each semester in the Graduate School News. Each copy must include an approval sheet, signed by the members of the master's committee, certifying that they have examined the final copy of the thesis and have judged it to be satisfactory.

FINAL EXAMINATION FOR THESIS AND PROBLEMS IN LIEU OF THESIS

A candidate presenting a thesis or problems 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 candidate's final examination. Except with prior approval from The Graduate School, the examination must be given in University facilities. This examination must be scheduled through the Office of Graduate Admissions and Records at least one week prior to the candidate's final examination. Final examinations not properly scheduled must be repeated. This examination must be held at least two weeks before the final data for acceptance and approval of thesis by The Graduate School. 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 Graduate School, the examination must be given in University facilities. It must be scheduled through the Office of Graduate Admissions and Records in accordance with the deadlines specified in the Graduate School News and will be conducted by the master's committee. Final examinations not properly scheduled must be repeated. Students taking the final examination but not otherwise using University facilities may pay a fee of $135 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 from the time of enrollment in The Graduate School to complete the degree. Students who change degree programs during this six-year period may be granted an extension after review and approval by The Graduate School. In any event, courses used toward a master's degree must have been taken within six calendar years of graduation.

Specialist in Education Degree

The Specialist in Education (Ed.S.) degree is offered with a major in Education. Admission to the Ed.S. program requires acceptance by The Graduate School, and review and acceptance by the department or area in which the student is majoring. It is
recommended that students who apply for the Ed.S. have at least one year of related work experience. Additional information on admission requirements can be obtained from the academic units offering the degree.

COURSE REQUIREMENTS

The student's program involves a minimum of four semesters of study totaling not fewer than 60 semester hours of graduate credit beyond the baccalaureate degree. A minimum of 6 hours is required outside the major academic unit or area.

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 6 graduate hours required outside the major. All prior coursework accepted toward the degree must be related to the student's program objectives. A maximum of 6 hours beyond the master's degree may be transferred from another institution to an Ed.S. program (refer to section on Transfer Credits).

Courses numbered at the 400 level required for certification through UT Knoxville may not be 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.

ED.S 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.

RESIDENCE REQUIREMENTS

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 Ed.S. degree, one semester of residence is required if the student has a master's degree; two consecutive semesters of residence if the student lacks a master's degree.

ADMISSION TO CANDIDACY

Admission to candidacy reflects agreement among the student, graduate committee, and The Graduate School that the student has demonstrated ability to do acceptable graduate work and that normal 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 Graduate Admissions and Records before the student has completed 15 hours of coursework in the Ed.S. 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 units for listings of thesis, problems in lieu of thesis, and non-thesis options. Some units offer only a thesis program.

1. 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.

2. In the thesis program, or problems in lieu of thesis, 6 hours of research credit (518 or 503) must be earned in preparation of an acceptable piece of work. The student must continue to register for thesis or problems while working on the project, including the semester it is accepted by The Graduate School. The thesis must be prepared according to instructions in the UT Knoxville Guide to the Preparation of Theses and Dissertations (8th ed.), and approved by the student's committee prior to submission to The Graduate School for final approval and acceptance.

FINAL EXAMINATION

A candidate presenting a thesis, or problems in lieu of thesis, must pass an oral examination covering the student's research and program of study. A non-thesis student must pass a final written, or written and oral examination, on all work offered for the degree. The examination is not merely a test over coursework, but a demonstration of the candidate's ability to integrate materials in the major and related fields. Each examination must be scheduled through the Office of Graduate Admissions and Records before the deadline and will be conducted in University facilities by the student's committee. Final examinations not properly scheduled must be repeated. In case of failure, the candidate may not be examined 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 Ed.S. degree.

Doctoral Degrees

Two doctoral degree programs are available: Doctor of Philosophy (Ph.D.) and Doctor of Education (Ed.D.). For a list of programs, see Majors and Degree Programs chart. For specific degree requirements, consult individual program descriptions listed by college and field of instruction in this Catalog. See also Summary of Procedures for Doctoral Degrees chart.

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

PROGRAM OF STUDY

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

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

In addition, 24 hours of course 600 Doctoral Research and Dissertation are required. See 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 Graduate School.

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 The Graduate School.

DOCTORAL EXAMINATIONS

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

Diagnostic Examination

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

Qualifying Examination
A written 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 judgement 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 Graduate Admissions and Records Office at least one week prior to the examination and must be conducted in University facilities. Final examinations not properly scheduled must be repeated. 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 The Graduate School. The major professor must submit the results of the defense by the dissertation deadline.

LANGUAGE REQUIREMENTS
Candidates for the Ph.D. degree 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 Graduate Admissions and Records in accordance with the dates and times for the examinations printed in the Graduate School News.

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 course. A student is deemed to have passed a computer language course if the student successfully completes the examination but failed to pass the language exam.

RESIDENCE REQUIREMENTS
Residence is defined as full-time registration for a given semester on the campus where the program is located. The resident 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 in The Graduate School.

ADMISSION TO CANDIDACY
Admission to candidacy reflects agreement among the student, graduate committee, and The Graduate School 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 Ph.D.), 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 UT 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 Graduate School at least one full semester prior to the date the degree is to be conferred.

CONTINUOUS REGISTRATION
The student must register continuously for course 600 (minimum of 3 hours) from the time the doctoral research proposal is approved, and admission to candidacy is accepted. Admission to candidacy and registration for course 600 is required before the dissertation will be accepted.

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, to be made in advance, will be considered by The Graduate School upon written recommendation of the department head.

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. Thus, a student working full time on the dissertation should register for 12 hours of course 600 (or the equivalent). 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.
Summary of Procedures for Master's Degrees and Specialist in Education Degree

<table>
<thead>
<tr>
<th>PROCEDURES</th>
<th>UNDER DIRECTION OF</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admission as a potential degree candidate</td>
<td>Office of Graduate Admissions and Records and Major Department</td>
<td>Prior to completing 15 hours of graduate courses</td>
</tr>
<tr>
<td>Formation of master's/Ed.S. committee</td>
<td>Advisor/Major Professor</td>
<td>Prior to application for admission to candidacy</td>
</tr>
<tr>
<td>Submission of application for admission to candidacy</td>
<td>Master's/Ed.S. Committee</td>
<td>At least one semester prior to graduation*</td>
</tr>
<tr>
<td>Approval of admission to candidacy</td>
<td>The Graduate School</td>
<td>Prior to graduation</td>
</tr>
</tbody>
</table>

**GRADUATION REQUIREMENTS FOR NON-THESIS OPTION**

| Submission of application for diploma                                     | Office of Graduate Admissions and Records                  | At beginning of term of graduation*            |
| Payment of graduation fee                                                 | Bursar's Office                                             | At beginning of term of graduation*           |
| Scheduling of Final Examination                                            | Student, Committee and Office of Graduate Admissions and Records | Not later than one week prior to Final Examination* |
| Final Examination                                                          | Master's/Ed.S. Committee                                    | Not later than three weeks prior to Commencement* |
| Removal of Incomplete(s)                                                  | Instructor of Course                                        | Not later than one week prior to Commencement* |

**GRADUATION REQUIREMENTS FOR THESIS/PROBLEMS OPTIONS**

| Submission of application for diploma                                     | Office of Graduate Admissions and Records                  | At beginning of term of graduation*           |
| Payment of graduation fee                                                 | Bursar's Office                                             | At beginning of term of graduation*           |
| Submission of thesis/problems to master's/Ed.S. committee                 | Student                                                   | At least two weeks prior to Final Examination |
| Scheduling of Final Examination                                            | Student, Committee and Office of Graduate Admissions and Records | Not later than one week prior to Final Examination* |
| Final Examination                                                          | Master's/Ed.S. Committee                                    | Not later than four weeks prior to Commencement* |
| Approval and acceptance of final copy of thesis                           | Master's/Ed.S. Committee and The Graduate School            | After Final Examination and not later than two weeks prior to Commencement* |
| Removal of Incomplete(s)                                                  | Instructor of Course                                        | Not later than one week prior to Commencement* |

*Deadline dates are printed in the Graduate School News each semester, in addition to a separate publication of Deadline Dates for Graduation.
# Summary of Procedures for Doctoral Degrees

<table>
<thead>
<tr>
<th>PROCEDURES</th>
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<tr>
<td>Admission as a potential degree candidate</td>
<td>Office of Graduate Admissions and Records and Major Department</td>
<td>Prior to completing 15 hours of graduate courses</td>
</tr>
<tr>
<td><em>Appointment of doctoral committee</em></td>
<td>The Graduate School on recommendation of department head</td>
<td>Preferably during the first year of graduate study, but at the latest, prior to application for admission to candidacy</td>
</tr>
<tr>
<td><em>Comprehensive Examination</em></td>
<td>Major department</td>
<td>Prior to admission to candidacy</td>
</tr>
<tr>
<td><em>Language examination(s)</em>*</td>
<td>Office of Graduate Admissions and Records</td>
<td>Prior to admission to candidacy</td>
</tr>
<tr>
<td>Submission and approval of application for admission to candidacy</td>
<td>Doctoral Committee and The Graduate School</td>
<td>At least one semester prior to graduation***</td>
</tr>
</tbody>
</table>

## GRADUATION REQUIREMENTS

<table>
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<th>PROCEDURE</th>
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<tr>
<td>Payment of graduation fee</td>
<td>Bursar’s Office</td>
<td>At beginning of term of graduation***</td>
</tr>
<tr>
<td>Submission of dissertation to doctoral committee</td>
<td>Student</td>
<td>At least two weeks prior to Defense of Dissertation Examination</td>
</tr>
<tr>
<td>Scheduling of Defense of Dissertation Examination</td>
<td>Student, Committee and Office of Graduate Admissions and Records</td>
<td>Not later than one week prior to Defense of Dissertation Examination***</td>
</tr>
<tr>
<td>Defense of Dissertation Examination</td>
<td>Doctoral Committee</td>
<td>Not later than four weeks prior to Commencement***</td>
</tr>
<tr>
<td>Approval and acceptance of final copy of dissertation and doctoral forms</td>
<td>Doctoral Committee and The Graduate School</td>
<td>After Defense of Dissertation Examination and not later than two weeks prior to Commencement***</td>
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<td>Removal of Incomplete(s)</td>
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</tr>
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*The order of these items varies with individual programs.
**Not required in some programs.
***Deadline dates are printed in the Graduate School News each semester, in addition to a separate publication of Deadline Dates for Graduation.
Fees and Financial Assistance

Residency Classification for Tuition Purposes

A prospective student who applies to The Graduate School is notified of residency classification (in-state or out-of-state) for tuition purposes. Classification is based on information supplied on the Graduate Application for Admission. A student cannot acquire in-state status on the basis of full-time enrollment at a higher educational institution in Tennessee. Proof of in-state residence is the responsibility of the individual.

A student classified out-of-state who (1) works full-time in the state or at Fort Campbell, Kentucky, and (2) desires to attend UT Knoxville on a part-time basis (maximum 6 hours of coursework per semester), is eligible for a waiver of out-of-state tuition. The student must apply for a waiver prior to the date of registration each semester. Forms are available from the Admissions Specialist in the Office of Graduate Admissions and Records.

A student wishing to appeal a classification should contact the Admissions Specialist, who will provide an application for reclassification and a copy of the State regulations. The application must be submitted on or before the last day of regular registration (the day before classes officially begin) for a given semester, if the student is to be considered for reclassification that semester.

RULES OF RESIDENCY CLASSIFICATION

Intent

It is the intent that the public institutions of higher education in the State of Tennessee shall apply uniform rules, as described in these regulations and not otherwise, in determining whether students shall be classified "in-state" or "out-of-state" for fees and tuition purposes and for admission purposes.

Definitions

(1) "Public higher educational institution" shall mean a university or community college supported by appropriations made by the Legislature of this State.

(2) "Residence" shall mean continuous physical presence and maintenance of a dwelling within this State, provided that absence from the State for short periods of time shall not affect the establishment of a residence.

(3) "Domicile" shall mean a person's true, fixed, and permanent home and place of habitation; it is the place where he intends to remain, and to which he or she expects to return when he or she leaves without intending to establish a new domicile elsewhere.

(4) "Emancipated person" shall mean a person who is no longer in the care, custody, and control of his or her parent.

(5) "Parent" shall mean a person's father or mother. If there is a non-parental guardian or legal custodian of an emancipated person, then "parent" shall mean such guardian or legal custodian; provided, that there are not circumstances indicating that such guardianship or custodianship was created primarily for the purpose of conferring the status of an in-state student on such emancipated person.

(6) "Continuous enrollment" shall mean enrollment at a public higher educational institution or institutions, in this State as a full-time student, as such term is defined by the governing body of said public higher educational institution or institutions, for a normal academic year or years or the appropriate portion or portions thereof, since the beginning of the period for which continuous enrollment is claimed. Such person need not enroll in summer sessions or other such inter-sessions beyond the normal academic year in order that his or her enrollment be deemed "continuous." Enrollment shall be deemed continuous notwithstanding temporary enrollment occasioned solely by the scheduling of the commencement and/or termination of the academic years, or appropriate portion thereof, of the public higher educational institutions in which such person enrolls.

Rules for Determination of Status

(1) Every person having his or her domicile in this State shall be classified "in-state" for fee and tuition purposes and for admission purposes.

(2) Every person not having his or her domicile in this State shall be classified "out-of-state" for said purposes.

(3) The domicile of an emancipated person is that of his or her parent. Emancipated students of divorced parents shall be classified "in-state" when one parent, regardless of custodial status, is domiciled in Tennessee.

Out-of-State Students Who Are Not Required to Pay Out-of-State Tuition

(1) An unemancipated, currently enrolled student shall be reclassified out-of-state should his or her parent, having therebefore been domiciled in the State, remove from the State. However, such student shall not be required to pay out-of-state tuition nor be treated as an out-of-state student for admission purposes so long as his or her enrollment at a public higher educational institution or institutions shall be continuous.

(2) An unemancipated person whose parent is not domiciled in this State but is a member of the armed forces stationed in this State or at Fort Campbell pursuant to military orders shall be classified out-of-state, but shall not be required to pay out-of-state tuition. Such a person, while in continuous attendance toward the degree for which he or she is currently enrolled, shall not be required to pay out-of-state tuition if his or her parent thereafter is transferred on military orders.

(3) A person whose domicile is in a county of another state lying immediately adjacent to Montgomery County, or whose place of residence is within thirty (30) miles of Austin Peay State University shall be classified out-of-state, but shall not be required to pay out-of-state tuition at Austin Peay State University. Provided, however, that there be no teacher college or normal school within the non-resident's own state, of equal distance to said non-resident's bona fide place of residence.

(4) Part-time students who are not domiciled in this State but who are employed full-time in the State, or who are stationed at Fort Campbell pursuant to military orders, shall be classified out-of-state but shall not be required to pay out-of-state tuition. This shall apply to part-time students who are employed in the State by more than one employer, resulting in the equivalent of full-time employment.

(5) Military personnel and their spouses stationed in the State of Tennessee who would be classified out-of-state in accordance with other provisions of these regulations will be classified out-of-state but shall not be required to pay out-of-state tuition.

(6) A person who is domiciled in the Kentucky counties of Fulton, Hickman, or Graves shall be classified out-of-state and shall not be required to pay out-of-state tuition at The University of Kentucky at Marion if qualified for admission. This exemption is on condition that the University of Kentucky, in return, shall continue to admit Tennessee residents from selected Tennessee counties to enroll at that institution without payment of out-of-state tuition.

(7) Any dependent child not domiciled in Tennessee but who qualifies and is selected to receive a scholarship under the Undergraduate Independent Students Scholarship Act (T.C.A. 49-4-704) because of his or her domicile and who permanently disabled while performing duties within the scope of employment, shall be classified out-of-state but shall not be required to pay out-of-state tuition.

(8) The spouse of a student classified as "in-state" shall also be classified "in-state."

(9) Students not domiciled in Tennessee but who are selected to participate in specified institutional undergraduate Honors Programs shall be classified out-of-state but shall not be required to pay out-of-state tuition.

(10) A person whose domicile is in Mississippi County, Arkansas, or Dunlin County or Pemiscot County, Missouri, and who is admitted to Dyersburg State Community College, shall be classified out-of-state but shall not be required to pay out-of-state tuition.

(11) A person who is not domiciled in Tennessee, but has a bona fide place of residence in a county which is adjacent to the Tennessee state line and which is also within a 30 mile radius (as determined by the THEC) of a city containing a two-year TBR institution and who is admitted to the two-year TBR institution, shall be classified out-of-state but shall not be required to pay out-of-state tuition. The two-year institution may admit only up to three percent (3%) of the full-time equivalent attendance of the institution without out-of-state tuition. (THEC may adjust the number of the non-residents admitted pursuant to this section every three (3) years).

Presumption

Unless the contrary appears from clear and convincing evidence, it shall be presumed that an emancipated person does not acquire domicile in this State while enrolled as a full-time student at any public or private higher educational institution in this State, as such status is defined by such institution.

Evidence to be Considered for Establishment of Domicile

If a person asserts that he or she has established domicile in this State he or she has the burden of proving that he or she has done so. Such a person is entitled to provide to the public higher educational institution by which he or she is employed or enrolled for financial aid, academic credit, or otherwise, any and all evidence which he or she believes will sustain his or her burden of proof. Said institution will consider any and all evidence
provided it concerning such claim of domicile but will not treat any particular type or item of such evidence as conclusive evidence that domicile has or has not been established.

**Appeal**

The classification officer of each public higher educational institution shall be responsible for initially classifying students "in-state" or "out-of-state." Appropriate procedures shall be established by each such institution by which a student may appeal his or her initial classification.

**Effective Date for Reclassification**

If a student classified out-of-state applies for in-state classification and is subsequently so classified, or her in-state classification shall be effective as of the date on which reclassification was sought. However, out-of-state tuition will be charged for any quarter or semester during which reclassification is sought and obtained unless application for reclassification is made to the classification officer on or before the last day of regular registration of that quarter or semester.

**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 1) making the minimum payment, or 2) signing the Confirmation of Attendance form if no fees are due by the student. The schedule will be cancelled if one of the above is not accomplished each term on or before the published due date. This includes graduate assistants, teaching assistants, teaching associates, research assistants, staff, and others whose fees may be billed, prepaid, or waived. Late registration fees are applicable to students who register during Final Registration.

No student is authorized to attend classes who has not registered and satisfied his/her payment of fees.

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

The general fees for graduate students in the 1996-97 academic year are as follows:

<table>
<thead>
<tr>
<th>Fee Type</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Time (9 hours or more)</td>
<td>$1,232</td>
</tr>
<tr>
<td>Part Time (8 hours or less)</td>
<td>$142 per credit (or audit) hour or fraction thereof; minimum charge $142.</td>
</tr>
</tbody>
</table>

**MISCELLANEOUS FEES**

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

**APPLICATION FEE**

Each graduate application for admission must be accompanied by a non-refundable fee of $15 ($35 effective Fall 1998) before it will be processed (fee not required if: 1) former UT Knoxville graduate student; 2) paid to UT Knoxville Graduate School within the previous 12 months; or 3) paid and attended graduate school within UT 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's centralized accounting system that allows students to pay all of their fees and charges with one check by mail. Through VOLXPRESS, students are mailed statements that include their class schedule, drop/add activity, current tuition and fees, fee waiver information, fines and past-due amounts, pending financial aid that can be credited toward their accounts, 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 to the Student Enrollment Services Office to ensure timely receipt of a VOLXPRESS statement. Each Timetable of Classes lists the dates of registration and when and if statements will be mailed.

**IN-STATE FEES Fall 1996**

<table>
<thead>
<tr>
<th>Fee Type</th>
<th>Cost</th>
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</thead>
<tbody>
<tr>
<td>Full Time (9 hours or more)</td>
<td>$140</td>
</tr>
<tr>
<td>Part Time (8 hours or less)</td>
<td>$9</td>
</tr>
</tbody>
</table>

**OUT-STATE FEES Fall 1996**

<table>
<thead>
<tr>
<th>Fee Type</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Time (9 hours or more)</td>
<td>$3,400</td>
</tr>
<tr>
<td>Part Time (8 hours or less)</td>
<td>$378 per credit (or audit) hour or fraction thereof; minimum charge $378.</td>
</tr>
</tbody>
</table>

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

**UNIVERSITY PROGRAMS AND SERVICES FEE**

<table>
<thead>
<tr>
<th>Fee Type</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Time (9 hours or more)</td>
<td>$84</td>
</tr>
<tr>
<td>Part Time (8 hours or less)</td>
<td>$6</td>
</tr>
</tbody>
</table>

Note: The Programs and Services Fee is non-refundable.

The purpose of the University Programs and Services Fee is to provide non-instructional facilities and programs of an educational, cultural, social, recreational, and service nature for UT Knoxville students. The student health fee is included in the full programs and services fee. Refer to Student Health Insurance and Student Health Services for additional information.

All students enrolled in excess of eight semester hours per term are assessed a Programs and Services fee of $140. Part-time students taking fewer than nine semester hours will be assessed at the rate of $9 per semester hour or fraction thereof; minimum charge $9.

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 University Programs and Services Fee and late payment fee, if applicable.

Knoxville campus students taking a course load of 6-8 hours may elect to pay the full programs and services fee or may elect to pay the student health fee ($42 for fall and spring, $33 for summer), plus the appropriate part-time programs and services fee up to the maximum of $140.

Knoxville campus students taking 5 or less hours may elect to pay the student health fee ($42 for fall and spring, $33 for summer) plus the appropriate part-time programs and services fee.

**TECHNOLOGY FEE**

<table>
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<tr>
<th>Fee Type</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Time (9 hours or more)</td>
<td>$100</td>
</tr>
<tr>
<td>Part Time (8 hours or less)</td>
<td>$12</td>
</tr>
</tbody>
</table>

The purpose of the Technology Fee is to provide all students with improved access to the technological infrastructure, resources, and services at UTK.

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.

**MUSIC FEE**

One-half hour lesson per week per semester $60

One-half hour lesson per week $120

Payable by students receiving individual instruction in music.

**MISCELLANEOUS FEES**

Academic areas, such as Art, Chemistry, Bowling and Golf, charge fees per specific course sections. Refunds on these fees are determined by the department.

**GRADUATION FEE**

Master's degree candidates $30

Doctoral degree candidates $75

Doctoral hood rental (optional) $5

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. The doctoral hood rental applies only to those students who have not purchased a doctoral
hood and are participating in the graduation ceremony.

**PROFICIENCY FEES**

Fees for proficiency examinations are $7 per credit hour for graduate students. See Proficiency Examinations for additional information.

**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.

**DEFERRED PAYMENT PLAN SERVICE FEE**

$10 (See Tuition Payment Plans)

The Deferred Payment Fee is assessed when payment of any part of a student's account is deferred, including accounts which must be billed to outside agencies. It is the student's responsibility to pay all obligations promptly.

**PRIORITY REGISTRATION**

For a priority registered student, payment or a Confirmation of Attendance Form is due by the published due date, whether or not the student has received a statement, or the student's schedule will be cancelled. The due date is published in the Timetable available from the Registration Services Office.

**FINAL REGISTRATION LATE FEE**

For a student who registers during Final Registration (including those who were cancelled during priority registration), payment of fees or a Confirmation of Attendance form must be submitted to one of the Bursar's Office locations by the Final Registration due date. This due date will be published in the Timetable available from the Registration Services Office. The Final Registration Late Fee is non-refundable.

Students who register during Final Registration will be assessed a late fee based on the following:

- Beginning of Final Registration through 1st week of classes: $20
- 2nd week of classes: $40
- 3rd week of classes: $60
- 4th week of classes: $80
- After 4th week of classes: $100

Doctoral students who must register retroactively for dissertation credit will be charged a late fee of $35 for each semester of retroactive registration.

**REINSTATEMENT FEE**

$45

VOLXpress accounts which have a balance one month prior to the end of a term will be assessed a reinstatement fee of $45, and grades will be withheld.

**RETURNED CHECK SERVICE FEE POLICY**

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 redeposited. Cash or certified funds are required for payment of the returned check and service charges.

Any student who does not respond within 2 weeks from the date of the first notice may be assessed an additional $10 Service Charge. Failure to clear returned checks will result in the forfeiture of all university services, including the receipt of grades, transcripts, schedule of classes, and check cashing/writing services. Failure to pay may also result in additional late fees, collection costs and reasonable attorney fees.

**TUITION PAYMENTS**

All student fees are due in advance and should be paid in full by the due date shown on the VOLXpress statement and listed in the Timetable of Classes. Failure to receive a statement will not relieve students of their obligation to pay on or before the due date.

**Deferred Payment Plan**

Students in good financial standing will be offered a deferment of up to 90% of the total charges on their VOLXpress statement. The deferred payment may be divided into two equal installments payable on approximately the 28th and 56th day of the term. All financial aid must be applied toward fees before a deferment will be considered. A deferred payment service fee of $10 is assessed on any portion of tuition, fees, and other charges deferred with the approval of the Bursar's Office. An additional $25 late payment charge will be assessed on each monthly 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. In addition, a $45 reinstatement fee will be assessed if fees are not paid by one month prior to the end of the term.

**Room and Board Plan**

Semester room and board charges may be paid in monthly installments. The first month's rent, plus a deposit of one month's rent, is due at the beginning of the semester. The remaining installments are due every four weeks.

**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/lines owed to the University at any time the refund is issued, including outstanding fees due on the Deferred Payment Plan. Any remaining refund balance will be mailed to the student's billing address.

Refund/Charge of Fees for Withdrawal (drop all classes)

After payment of fees and/or a Confirmation of Attendance Form has been submitted by the student, withdrawal for the semester must be by official notification to the Graduate Admissions and Records Office, 218 Student Services Building. Failure to attend class does not automatically withdraw or drop a student from the University or class.

The effective date of withdrawal is the date the Office of Graduate Admissions and Records is notified by completion of the official withdrawal request form. The appropriate percentage of fees (maintenance and tuition) 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 Graduate Admissions and Records 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.

**Financial Aid Withdrawals/Repayments**

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

Refunds and repayments to the Title IV programs are determined according to the formula published in the "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 to the financial aid programs according to the Refund/Repayment Allocation Policy.

For first-time students who withdraw on or before the 60% point of the enrollment period for which they were charged, the school must calculate a statutory pro rata refund and compare this amount to the refund amount from the state and accrediting agency policies. Refunds in accordance with the withdrawal refund policy, must be made after the drop deadline.
Students pay fees computed at the appropriate semester-hour rate as indicated in the fee section for courses dropped during the first 8 business days following the day before the first semester class begins. An 80% refund/20% charge is made for courses dropped between 9 and 10 business days following the day before the first class begins. A 60% refund/40% charge is assessed for courses dropped between 11 and 15 business days. A 40% refund/60% charge is made for courses dropped between 16 and 20 business days. A 100 percent charge is made for courses dropped after 20 days.

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 that the change of registration form is processed or the date the drop was entered on the Registration Telephone System. Any refund due for dropped courses will be made after the drop deadline.

SUMMER TERM FEES AND EXPENSES

Fees and expenses for the summer semester are the same as for other semesters during the academic year, except for University Programs and Services Fees as previously mentioned.

Although the summer term is divided into sessions of varying lengths, tuition and fees are assessed at the regular semester-hour rate up to the maximum charge for a complete regular semester.

The refund policy covering withdrawal and dropped courses for the summer semester is based on the length of the term for the course(s) dropped. Percentages of refunds are based on the date of withdrawal or drop. See Timetable of Classes for specific dates.

WAIVER OF FEES

Graduate assistants, teaching assistants and associates, research assistants, staff, and others whose fees are billed, prepaid, waived, or partially waived confirm their attendance by making payment or signing a Confirmation of Attendance Form by the due date as published in the Timetable of Classes or the schedule will be cancelled. 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 UT spouse/dependent discounts.

STUDENT HEALTH INSURANCE

The University makes available, by contract with an insurance company, group health insurance expressly for students. 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 and otherwise covered are urged to avail themselves of this or comparable insurance, since paying for hospital care is the student’s responsibility.

Information about the insurance is mailed by the company to the student’s home, and participation is solicited. Enrollment in the plan (or alternative coverage) is mandatory for international students. Students may obtain applications from the Student Health Service or the Center for International Education. 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.

IDENTIFICATION CARD

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 accessible through the 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.

To obtain a new VolCard or replace a lost or stolen card, report to the VolCard Office, Room 337, University Center. 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

UT Knoxville 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.

FELLOWSHIPS

The Graduate School administers the Hilton A. Smith Graduate Fellowships, the Herman E. Spivey Graduate Fellowships and the National Alumni Association Graduate Fellowships. These awards are for full-time study at UT Knoxville, 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 are invited to apply for the Hilton A. Smith and National Alumni Association awards if they have a 3.7 grade-point average or above in all previous academic work. Candidates for graduate study in the humanities are invited to apply for the Herman E. Spivey fellowships if they have a 3.7 grade-point average or above in all previous academic work. The Hilton A. Smith and the Herman E. Spivey fellowships include monthly stipends, tuition, and maintenance fees. National Alumni Association scholarships include a stipend presented at the beginning of each semester (Fall and Spring). Application packets are available from November through January in the Office of Graduate Admissions and Records. Completed applications, including all supporting materials, must be submitted by February 15. Offers of awards are announced March 15.

ACADEMIC COMMON MARKET

The Academic Common Market is an agreement among Southern states for sharing unique programs. Participating states can make arrangements for their students who are fully admitted to specific programs at UT Knoxville 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, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia. Nineteen doctoral and twenty-seven master’s programs at UT Knoxville are approved by the Academic Common Market for residents of these states to enroll in in-state tuition rates. Students must be fully admitted to the appropriate degree program, and the letter of certification must be received in the Office of Graduate Admissions and Records no later than the first day of classes for the effective semester.

Residents of state members who seek further information should contact the Admissions Specialist in the Office of Graduate Admissions and Records, 974-3525, or the Southern Regional Educational Board, 592 Tenth Street, N.W., Atlanta, GA 30318-5790, tel. (404) 875-9211, FAX (404) 872-1477.

EMPLOYMENT

The Financial Aid Office 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 are available in academic units, administrative offices, and non-profit agencies.

LOANS

Students must be admitted into a degree program to receive student loans. Five types of loan programs are administered by the Financial Aid office: 1) Federal Perkins Loan (Student Aid Report, SAR, must be on file); 2) subsidized Federal Stafford Loan (SAR must be on file); 3) unsubsidized Federal Stafford Loan (SAR must be on file); 4) FPLUS Loan (requires appropriate loan papers on file); and 5) The University of Tennessee Loan. Processing time varies from one loan program
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 UT Knoxville without the consent of the individual. Release of information to third parties includes directory information such as 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.

Use of Social Security Number

UT Knoxville requires assignment of an individual student number for internal identification of each student's record. The University began using the social security number as the student identification number prior to 1 January 1975; therefore, federal law allows continued use of this number. However, if a student does not desire to use the social security number, notification to the University must be made at the time of application for admission. A student identification number will then be assigned instead. For prompt and accurate retrieval of records and for conducting business about their own records, students and alumni must give their student identification number. Student identification numbers, whether social security or assigned numbers, are used administratively within the University only and are not given to third parties without expressed consent of the student.

All students receiving federal financial aid must have a social security number.

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 educational opportunities or employment opportunities and benefits.

UT Knoxville does not discriminate on the basis of sex or disability in its educational programs and activities, pursuant to requirements of Title VI of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Public Law 92-318, Section 504 of the Rehabilitation Act of 1973, Public Law 93-112, and the Americans with Disabilities Act of 1990, Public Law 101-336. This policy extends both to employment by and admission to the University.

Inquiries concerning Title VI, Title IX, Section 504, and the ADA should be directed to the Office of Diversity Resources and Educational Services (DRES); 1818 Lake Avenue; The University of Tennessee, Knoxville, Knoxville, TN 37996-3650; or telephone (423) 974-2436 (V/TT). Charges of violation of the above policy should also be directed to DRES.

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. Copies of this report are sent to each employee and student of the University each year. Copies are also made available to each applicant for employment and admission. In addition, 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, 413 Student Services Building.

Drug-Free Campus and Workplace

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

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

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

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

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

Employees and their families needing treatment information should call the following numbers: The Personal Office, Employee Assistance Program, or the State of Tennessee Employee Assistance Program (800-468-8369). 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
Policy for the Administration of Graduate Assistantships

PREAMBLE

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

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

- Tennessee Conference of Graduate Schools

DEFINITION

An assistantship is a financial award to a graduate student for part-time work in teaching, administration or research while pursuing study toward an advanced degree. Appointments are normally on a one-fourth to one-half time basis, and the annual stipend is payable in either nine or twelve monthly installments. In addition to the stipend, Graduate Teaching Assistants, Graduate Teaching Associates, Graduate Assistants, and Graduate Research Assistants are entitled to a waiver of fees for the period of appointment in accordance with university policy. University fees include a maintenance fee (required of all students) and a program and services fee. The waiver of fees for assistantships applies to maintenance and tuition fees only; it does not include the program and services 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 adhere to the UTK Faculty Handbook's four categories of assistantships. All departmental guidelines should reflect the descriptions provided in the Handbook (1996, p.35):

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.

2. 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 Graduate School. 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 academic home of a graduate student who has not declared a major is the Graduate School.

QUALIFICATIONS OF GRADUATE ASSISTANTS

Graduate assistants must be currently enrolled in the Graduate School (as fully-admitted degree-seeking students, provisional 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

Any 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 experi-
enced in the teaching discipline, receive regular in-service training, and be evaluated regularly.

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

Implementation of the SACS 18-hour Requirement at UTK

The appropriate Department Head has responsibility for certifying that the 18-hour requirement is met by 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 PAF form. This is forwarded to the Office of Human Resource Management. Exceptions should be noted on this form, but a memo and appropriate documentation should be forwarded to the Graduate Office, 404 Andy Holt Tower.

COMPETENCY IN ENGLISH

The University of Tennessee 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 comprehension in the classroom teaching by taking the SPEAK Test administered by The Graduate School. The Test of Spoken English (TSE) may be taken in lieu of the SPEAK Test. The results of this test will be communicated by The Graduate School 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 UTK, 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 exempted 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

1. As specified in the Personnel Policies and Procedures Manual (Section 100 105-P3, 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 programe work. Efforts between graduate assistants and their supervisors should be focused on the goal of satisfactory performance in both these areas.

2. 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, working 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. If the student feels that a resolution should be sought beyond the Department/College level, the Graduate School should be contacted. The Graduate School will follow established procedures outlined in the Graduate Council Appeals Procedure and/or Hilltops.

3. Graduate assistants' benefits as employees of the University of Tennessee, 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 statutory required payments which include Workers' Compensation" (Section 100 105-P2-3).

4. Graduate student assistantship appointments (Graduate Assistants, Graduate Teaching Assistants, Graduate Teaching Associates, and Graduate Research Assistants) are of two types: "academic year" and "twelve months or other." Students on academic year appointments for the Fall and Spring terms receive 12 equal monthly payments for the 9 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 7 equal monthly payments for the January-July period and 5 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 months or other 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., disapproval 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 the year only, the student should be informed of 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.

The maximum number of years that a graduate assistant can be appointed to an 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. Some units may have maximum time limits that are less than those stated above. Requests for an extension beyond the maximum terms here specified must be made in writing by the academic unit to the Associate Vice Chancellor and Dean of the Graduate School.

5. 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 Hilltops. 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).

Ninety days leading to dismissal for cause must be described in writing to the assistant being dismissed. This latter 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's supervisor is responsible for reviewing the evaluation, and the graduate assistant's immediate 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., disapproval 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 the year only, the student should be notified of 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.

The maximum number of years that a graduate assistant can be appointed to an 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. Some units may have maximum time limits that are less than those stated above. Requests for an extension beyond the maximum terms here specified must be made in writing by the academic unit to the Associate Vice Chancellor and Dean of the Graduate School.

5. 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 Hilltops. Additional rights and responsibilities of graduate students are found on the student's copy of the admission status form.
assistant should know that the immediate supervisor is the person to whom first contact is to be made in job-related questions/direc-
tions; followed in turn by a general department/school/college supervisor of graduate assistants (where one exists), the appropriate project director, department head, dean of the college, and Graduate School officials.

ORIENTATION/TRAINING OF GRADUATE TEACHING ASSISTANTS AND GRADUATE TEACHING ASSOCIATES

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

There are several kinds of training that should occur beyond the initial orientation/training. Such training is usually specific to a particular job function. The Graduate School provides a seminar for Graduate Teaching Assistants and Graduate Teaching Associates who will be teaching at the University of Tennessee, Knoxville. Presented in several formats, this seminar includes attention to styles of learning and other student characteristics, communicating in the classroom, leading discussions, lecturing, directing laboratory work, using media and computers, designing syllabi, constructing and using tests, grading, evaluating courses and instructors, and similar topics. 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, Knoxville adheres to the following resolution by the Council of Graduate Schools:

Acceptance of an offer of financial aid (such as graduate scholarship, fellowship, traineeship, or assistantship) for the next academic year by an actual or prospective graduate student completes an agreement which both student and graduate school expect to honor. In those instances in which the student accepts the offer before April 15, and subsequently desires to withdraw, 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 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

Black Cultural Center

The Center is the focal point of the University's effort to retain African-American students and to provide awareness and recognition of the accomplishments of African-Americans. The Center fulfills this role through a number of services and programs. These include free tutoring, group study sessions, workshops, a collection of African-American books and magazines, and a computer lab. Typical of its cross-campus work is sponsorship of Black History Month activities, the Martin Luther King Jr. Celebration and various festivals which promote awareness of African-American contributions.

The Center is located at 812 Volunteer Boulevard. The University community is encouraged to visit the facility and take advantage of the opportunities provided by the Center.

Career Services

Career Services, located in Dunford Hall, 974-5435, is a university-wide department providing career-related assistance to UT Knoxville students through a wide range of programs and services. Included in the services offered are a Career Carnival, an annual career fair providing opportunity to speak informally with representatives from 60-80 different companies about their entry level jobs and hiring practices; a Graduate School Information Day, an annual fair to which a number of graduate schools provide information for advanced study; a nonprofit career fair involving representatives from numerous area nonprofit organizations; employer information which includes types of majors sought, job descriptions, career profiles, annual reports and other pertinent information for hundreds of companies that recruit at UT; and workshops providing instruction in skills and tactics for successful interviewing, resume preparation, business and dining etiquette, and other topics.

On-campus interviews are scheduled during the year, and require an orientation workshop for registration and participation. Thousands of interviews are scheduled each year which include approximately 275 companies, government agencies and school systems. Two job newsletters are published biweekly, one for positions in education and one for business, industry, and government. Career Services also administers a Credentials Service for doctoral candidates. Setting up a credential file is a simple process involving the submission of a resume and academic transcript, along with letters of recommendation. An alumni placement service offers assistance in the job search after graduation. Also thousands of resumes are referred directly to employers every year to assist students and recent alumni in their job-seeking activity.

Career Services registrants have access to video conferences, interview, resume access via the World Wide Web, and other state-of-the-art forms of placement assistance.

Center for International Education

The Center for International Education (CIE), 1620 Melrose Avenue, telephone 974-3177, promotes and supports all aspects of international education and international exchange at UT Knoxville, both for American students and faculty and for students and faculty from other countries. The administration of official linkage agreements between UT Knoxville and institutions of higher education in other countries is coordinated by CIE.

American students: CIE provides information and advice about study-abroad options open to UT Knoxville students, including the exchange programs it administers between UT Knoxville and universities in thirty countries on six continents. CIE coordinates campus administration of such international grants and scholarships for students as the Fulbright, Rhodes, and Marshall programs, and provides information about other sources of funding for overseas study and research, including the Rotary Foundation, St. Andrews, and German Academic Exchange Service (DAAD) grants. Within its library on study, work and travel abroad, CIE has information about student summer job programs in nine countries.

International students and scholars: CIE provides information and assistance in matters relating to United States visa regulations, to UT Knoxville requirements for international students, and to UT Knoxville academic policies and registration procedures. It publishes The Link, a newsletter for UT Knoxville's international students and scholars and International Perspective for faculty and professional staff, and administers the insurance policy required of all international students at the University.

International student advisors are available to discuss academic and personal concerns. Orientation programs conducted at the beginning of each term facilitate adjustment to the campus and community, as does the international student orientation camp prior to the fall term.

The new International House, 1623 Melrose Avenue, is CIE's on-campus social, recreational, and programming center that serves as a meeting place for international and U.S. students, faculty and staff.

International students seeking admission to UT Knoxville should write directly to the Office of Graduate Admissions and Records.

Child Care

The Child Development Laboratories, operated by the Child and Family Studies department within the College of Human
Ecology, currently offer child care programs for young children ages six weeks to five years. 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.

**Dining Services Facilities**

University-operated dining services facilities are air-conditioned, conveniently located in relation to residence halls, and serve nourishing food at reasonable prices. The University recognizes the educational role that its food service facilities play in student life and group living. The Dining Services Department employs a skilled dietetic and management staff to ensure that the student gets the highest quality meal at the lowest possible cost.

Room and board meal arrangements offer the best combination of balanced, nutritious meals, carefully planned and served at a reasonable charge to the student. Meal plan arrangements are Seven Star Dining (seven day meal plan, Monday-Sunday noon), and Ten Star (10 meals per week, Monday-Sunday with $300 per semester in a debit bonus account). For students not participating in a meal plan, meals can also be obtained from cafeterias operated on a cash basis.

The Department of Dining Services offers additional dining options. (1) The All Star account debit plan where students make a minimum deposit of $300, receive a bonus, can make purchases at any Dining Services location. (2) The All Star Plus Debit Account requires a minimum deposit of only $100. There is no bonus with this plan regardless of the size of the deposit. All Star Plus can be used at all campus dining facilities PLUS laundries, UT Bookstore, and selected vending areas as well as all other participating campus locations. (3) The Dining Club account works just like a charge card. No money is deposited in advance, and no bonus is associated with this account. Food may be purchased at any Dining Services location, and monthly statements are sent to students or parents.

For the late evening snack or morning coffee break, popular spots on campus are the bakery outlets, delicatessens and grill operations. Students are invited to take advantage of the special "theme" meals offered in the University dining facilities throughout the year.

For additional information, offices are located at 405 Student Services Building, (423) 974-4111.

**Disability Services**

Disability Services (DS) seeks to eliminate the barriers that students with disabilities encounter and to work with them to achieve and maintain individual autonomy. The program's primary objective is to provide these students with access to the academic, social, cultural, and recreational opportunities of the University. Prospective students are encouraged to contact DS personnel so that they can be assured that the campus facilities and services are adequate to meet their needs. The staff can be of service to the students to the extent that their individual needs are made known. Contact with the students prior to registration enables DS staff to better access the need for interpret-ers, readers, accessible facilities, and other support services. Van service is also provided to those individuals with mobility limitations whether permanent or temporary. Documentation of disability from an attending physician or the Student Health Center is required.

Participation in the services program is on a voluntary basis; confidentiality is maintained. Faculty, staff and students using any services are encouraged to contact the Office of Disability Services. Notice of necessary arrangements can be made. The office is located at 191 Hoskins Library.

**Graduate Student Association**

As one of the five branches of the Student Government Association, the Graduate Student Association provides a vehicle for responsible and effective student participation in the organization of student activity at UT Knoxville. Each spring term, general campus elections are conducted to elect members of the GSA. The Graduate Student Association officers and representatives are elected from the graduate programs. Offices of the GSA are located in room 442 University Center. For more information, stop by the office or call (423) 974-2277.

**Hearing and Speech Services**

The Hearing and Speech Center, located at the corner of Yale Avenue and Stadium Drive, offers complete diagnostic and treatment services to all University students with speech and language disorders/differences and/or hearing disorders. Services are available to any student who has paid the full University Programs and Services Fee or, if part-time, any student who has paid the optional student health service fee.

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**

**UNIVERSITY APARTMENTS**

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. Information and application for these facilities may be secured from the Department of University Housing, 405 Student Services Building.

**RESIDENCE HALLS**

The Department of Residence Halls provides housing on-campus for single graduate students. Graduate students desiring the same priority for housing in residence halls as undergraduate students. All of the residence halls are conducive to academic achievement and personal development. However, many graduate students choose to live in Melrose or the Apartment Residence Halls, since they remain open between the Fall and Spring semesters. Melrose Hall is arranged into smaller communities of six to ten students with personal responsibility emphasized. The Apartment Residence Hall provides apartment-style living for four students. An attempt is made to assign graduate students together to the extent possible. It is the responsibility of each resident to maintain the apartment to University standards. Applications and further information can be obtained from the Department of University Housing, 405 Student Services Building.

**Minority Student Affairs**

The Office of Minority Student Affairs is designed to enhance the quality of life for minority students. Working in conjunction with other campus and community groups, the office helps identify, encourage, and assist students who have academic potential and motivation to develop their talents at UT Knoxville. housed within the Black Cultural Center, the office furnishes information about educational, employment and financial opportunities, and offers tutorial services, workshops, and career development programs.

**Student Counseling Services Center**

The Student Counseling Services Center (SCSC) provides a variety of services for students with personal and academic concerns.
to promote academic performance, increase personal growth and contribute to the mental health of the entire community. Services include: crisis intervention, group therapy, individual therapy, academic courses, outreach programs and consultation.

To access services, students may come in for an intake interview Monday-Friday from 10:00-11:30 a.m. and 1:00-3:30 p.m. The Center is located at 900 Volunteer Blvd. and can be reached at 974-2196 or see our web page at http://funnelweb.utcc.utk.edu/-counsel/.

**Student Health Service**

Health services provided by the University are available to any student who has paid the health fee (either through paying the full University Programs and Services Fee or, if taking fewer than 9 hours, paying the optional health fee). These outpatient services are available continuously throughout every term.

The Health Service has a regular staff of primary care physicians, nurses, laboratory and x-ray technicians of Tennessee licensure. Outpatient services in the fields of family practice, internal medicine, pediatrics and psychiatry are available on a full-time basis. Appointments may be made by calling 974-3648. Specialty consultants in dermatology, surgery, sports medicine, and gynecology are available on campus through referral by a staff physician. Care beyond that provided by the regular staff can be arranged. Those students requiring allergy injections may arrange to receive them at the Clinic.

Virtually all medical services at the campus clinic except lab tests performed off campus are provided to eligible students at no additional cost.

The primary clinic at 1818 Andy Holt Avenue maintains scheduled daytime hours Monday through Friday. After-hours care (nights, weekends, and holidays) is available through the emergency room at The University of Tennessee Medical Hospital; insurance reimbursement is accepted as payment in full for all services except inpatient care and specialty consultation. Transportation service for the campus is provided by the Campus Police or Van Pool.

All students are strongly encouraged to ensure personal immunity to measles. Immunity may be assumed if the student either: was born prior to 1957; had a confirmed case of measles; was immunized with a live vaccine after 1979; or received two measles vaccinations since the age of twelve months. The vaccine may be received at cost at the campus health clinic.

Students requiring hospitalization are generally admitted by an appropriate specialist to The University of Tennessee Memorial Hospital unless other arrangements are desired. Since inpatient care is sometimes necessary, it is important for the student to have hospitalization insurance. Student group health insurance is available and may be purchased during a designated period at the beginning of each term.

Health Service personnel will cooperate with students and family physicians in ensuring the continuity of quality health care during the university career.

**Vehicle Operation and Parking**

The University of Tennessee endeavors to provide adequate facilities for vehicles operated by students and staff. However, areas available for parking are limited. To reduce traffic congestion within the campus area, large student parking areas are located on the perimeter of the campus. Free bus service is provided from the Main Campus to the Agricultural Campus and Perimeter Lot located off Concord Street behind Tyson Park. Also, bus service is provided to Married Student Housing Units at a nominal fee.

Each person who operates a motor vehicle in connection with attendance or employment at the University must register that vehicle with the Parking Services Office. There is no charge for vehicle registration; however, a parking permit is required for parking on all University lots, streets, parking structures, or leased lots with the following exceptions:

1. Staff and students with current UT Knoxville motor vehicle registration tags in their vehicles may park in any unreserved area (except those around residence halls) between the hours of 10 a.m. and 7 a.m., Monday through Friday, and 12 noon Saturday to 7 a.m. Monday.

2. General parking is permitted in staff areas around the residence halls between 5 p.m. and 3 a.m. After this time, vehicles without permits for these areas may be towed.

3. Staff and students with current UT Knoxville parking permits may park in unreserved staff areas around the academic buildings from 5 p.m. to 7 a.m.

4. Overnight parking is not permitted in the Student Commuter Parking Areas nor in the Student Aquatic Center Parking Area.

5. At times, certain areas will be reserved for parking for special events, such as athletic events, conferences, etc. Parking for these events will be by special parking permit for the specific event.

A University Traffic and Parking Authority determines parking policy, traffic regulations, and fees. This information is published each year in the "University Traffic and Parking Regulations", and is available at registration at the Parking Services Office, 1411 White Avenue, at the Campus Information Center at Circle Park, and at the vehicle point of registration.

**Women's Center**

The Women's Center provides essential informational and referral services to UT 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.
COLLEGES
Colleges

College of Agricultural Sciences and Natural Resources

John Riley, Dean
Gary Schneider, Associate Dean

Departments
Agricultural and Extension Education
Agricultural Economics and Rural Sociology
Agricultural and Biosystems Engineering
Animal Science
Entomology and Plant Pathology
Food Science and Technology
Forestry, Wildlife and Fisheries
Ornamental Horticulture and Landscape Design
Plant and Soil Science

The College of Agricultural Sciences and Natural Resources began in 1869 when the University was designated as Tennessee's Federal Land-Grant Institution. As such, the University was enabled for the first time to offer instruction in agriculture. Graduate instruction began as early as 1889. The College is not only an academic unit of The University of Tennessee, Knoxville campus, but is also (with the Agricultural Experiment Station, the Agricultural Extension Service and the College of Veterinary Medicine) one of the four administrative units of The University of Tennessee's Institute of Agriculture.

There are many shared resources and positive interactions between various units of the Institute. For example, most of the faculty in the College of Agricultural Sciences and Natural Resources hold joint appointments in the Agricultural Experiment Station and are actively involved in significant basic and applied research in agriculture and the associated natural resources. On campus and field research laboratories are utilized in the instructional programs of the College; extension and research activities provide many students excellent part-time job opportunities. Very significant is the fact that the Agricultural Experiment Station provides more than 100 graduate research assistantships to support graduate students.

The unique association the College has with the UT Knoxville campus and the other units of the Institute of Agriculture makes it possible for the College to offer comprehensive high quality graduate programs.

Graduate programs of the College of Agricultural Sciences and Natural Resources are designed to prepare men and women for positions of leadership in industry, state and federal government, teaching, research, and extension.

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 minors and majors are available in Agricultural Economics, Agricultural and Extension Education, Animal Science, Biosystems Engineering, Biosystems Engineering Technology, Entomology and Plant Pathology, Food Technology and Science, Ornamental Horticulture and Landscape Design, and Plant and Soil Science. Majors only are available in Forestry and Wildlife and Fisheries Science, and minors are available in General Agriculture and Rural Sociology. The minor in General Agriculture requires 12 hours of coursework. A complete listing of majors is shown on the Majors and Degree Programs Chart.

DOCTORAL PROGRAMS

Graduate study leading to the Doctor of Philosophy degree in Agricultural Economics, Animal Science, Biosystems Engineering, Food Technology and Science, and Plant and Soil Science is offered in the college.

College of Architecture and Planning

Marleen Davis, Dean
William J. Lauer, Associate Dean
David A. Patterson, Acting Director
Jon P. Coddington, Graduate Program Head, Architecture

Schools
Architecture
Planning

Facilities for Research and Service
Center for Research, Service and Inquiry

The College of Architecture and Planning was formed in 1990 with the union of the School of Planning and the School of Architecture into a new academic unit. Both schools are committed to preparing students to work with the planning, design or management of our built environment. The college provides an administrative umbrella for academic programs which share many common objectives and methods, yet retain distinctive identities with their professions.

Most states require that an individual intending to become an architect hold an accredited degree. There are two types of degrees that are accredited by the National Architectural Accrediting Board: (1) The Bachelor of Architecture, which requires a minimum of five years of study, and (2) The Master of Architecture, which requires a minimum of three years of study following an unrelated bachelor's degree or two years following a related preprofessional bachelor's degree. These professional degrees are
structured to educate those who aspire to registration/licensure as architects.

The four-year, preprofessional degree, where offered, is not accredited by NAAB. The preprofessional degree is useful for those wishing a foundation in the field of architecture, as preparation for either continued education in a professional degree program or for employment options in architecturally related areas.

The UT Knoxville School of Architecture offers a program of professional studies which prepares its graduates for the practice of architecture. This is accomplished through a five-year Bachelor of Architecture degree program or through the Master of Architecture degree program for students already having a baccalaureate degree.

The School of Planning offers a program of studies which prepares its graduates for professional practice in urban or regional planning. This is accomplished through a two-year master's degree program. The school also manages the undergraduate program in Urban Studies which awards a Bachelor of Arts degree.

The faculty and students of both units cooperate in a variety of ways, including joint field projects, guest lectures, service on thesis projects, etc. This expands the resources of talent available to students. The college also has a research and public service arm, the Center for Research, Service and Inquiry.

The offices of the dean and other college staff are located at 217B Art and Architecture Building.

### 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 U.S.
- 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-eight academic disciplines leading to seven advanced degrees: M.A., M.S., M.F.A., M.Mus., M.Mus. (P.M.A.), and Ph.D. See the Majors and Degree Programs chart for specific majors and degrees.

### 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 provides for 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 member and the departments concerned prior to embarking upon their study. Credit per semester will vary from 1-15 hours. The maximum credit which may be applied toward a degree in the college is established in each individual case by the department in which the student is working.

### College of Business Administration

C. Warren Neel, Dean
Michael J. Stahl, Associate Dean
Jan R. Williams, Interim Associate Dean
William F. Fox, Director, Center for Business and Economic Research
John E. Riblett, Director, Management Development Center
Gary N. Dicer, Interim Associate Dean and Director, Graduate Business Programs

#### Departments

- Accounting and Business Law
- Economics
- Finance
- Management
- Management Science
- Marketing, Logistics and Transportation
- Statistics

#### Facilities for Research and Service

Center for Business and Economic Research
Management Development Center

The College of Business Administration was originally the School of Commerce, dating back to 1919. Commerce was changed to Business in 1937 and gained college status in 1947. The college-wide MBA program was approved in 1966 and the doctoral program in 1971.

Graduate programs of the College of Business Administration are designed to prepare men and women to assume positions in the increasingly complex world of business and industry, teaching and research, and government.

Viewing the business firm as operating in dynamic social, political, and economic environments that demand leaders capable of dealing with innovation and rapid change, the College places central importance on development of students' thought processes and leadership potential. Emphasis is focused on flexibility of mind, receptivity to new ideas, and capacity to adapt one's reasoning powers. Our objective is to encourage the student to develop the ability to reason analytically and logically, and to develop a commensurate plan of action.
Above all else, we strive to instill the irreplaceable desire to continue to learn and grow in knowledge throughout the student's life. The College of Business Administration has made a commitment to total quality management by integrating the principles of productivity through quality and statistical process control throughout the graduate curriculum. 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.

**GRADUATE PROGRAMS**

The College of Business Administration offers programs leading to five advanced degrees: the Doctor of Philosophy with majors in Business Administration, Economics, and Management Science; the Master of Arts with a major in Economics; the Master of Science with a major in Statistics; the Master of Accountancy; and the Master of Business Administration. The Department of Management and the Department of Psychology in the College of Liberal Arts jointly offer an interdisciplinary program in Industrial and Organizational Psychology leading to the Master of Science and Doctor of Philosophy degrees (see Industrial and Organizational Psychology). Also, the Department of Management Science coordinates an interdisciplinary program leading to the Master of Science (see Management Science). The two College-wide programs, the MBA and the Ph.D. in Business Administration, are described in Business Administration, Fields of Instruction. Descriptions of other degree programs are under the appropriate departmental or program headings.

**FINANCIAL ASSISTANCE**

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 Office of Graduate Business Programs in the College of Business Administration.

Applications must be received by March 1 for consideration of assistantships and fellowships to be awarded for the following fall term.

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**College of Communications**

Dwight L. Teeter, Jr., Dean
Herbert H. Howard, Associate Dean for Graduate Studies
Roxanne Hovland, Associate Dean for Undergraduate Studies

**Departments and Schools**

- Advertising
- Broadcasting
- Journalism

**Facility for Research and Service**

Communications Research Center (CRC)

The College of Communications grew out of the School of Journalism, which was originally located in the College of Business Administration. The master's program began in 1966 under Journalism and 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.

Communications media are a vital force in today's complex society. Specialization, gaps among segments of society, and the nature of world conflict point to the need for more understanding of how people communicate. Educating men and women in the perceptive understanding of the communications media is a necessity. The graduate programs in the College acquaint students with the nature of communications and prepare them for professional work in many fields.

The College of Communications offers the Master of Science and the Doctor of Philosophy degrees with a major in Communications.

In addition, Communications 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 Communications.

The M.S. program is accredited by the Accrediting Council on Education in Journalism and Mass Communication. The College is a member of the Association of Schools of Journalism and Mass Communication and the Broadcast Education Association. For application forms and other information about the M.S. and Ph.D. programs in Communications, write to Associate Dean for Graduate Studies, College of Communications, 426 Communications Building, The University of Tennessee, Knoxville, TN 37996-0347.

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**College of Education**

C. Glennon Rowell, Interim Dean
Thomas W. George, Associate Dean for Student and Academic Services
Carol E. Kasworm, Associate Dean for Research and Technology

**Units**

- Counselor Education and Counseling Psychology
- Cultural Studies in Education
- Education in the Sciences, Mathematics, Research, and Technology
- Exercise Science
- Holistic Teaching/Learning
- Inclusive Early Childhood Education
- Language, Communication and Humanities Education
- Leadership Studies in Education
- Psychoeducational Studies
- Rehabilitation, Deafness, and Human Services
- Sport and Physical Activity

**Facilities for Research and Service**

- Bureau of Educational Research and Service
- Center for Environmental/Energy/Science Education
- Center for Literacy Studies
- Center for Physical Activity and Health
- Cognitive Enrichment Network Project
- Institute for Assessment
- Institute for Educational Innovation
- Instructional Services Center
- Project INFOE
- Public Schools for Cooperative Research
- Reading Center
- State Testing and Evaluation Center
- Tennessee Internship Consortium in Professional Psychology

Education programs were first offered at the graduate level in 1905 by the School of Education. Through the Summer School of the South, the programs thrived, and the School became a College in 1926. The Ed.D. program was established in 1950, and the college-wide Ph.D. program began in 1979.

The College of Education, as a professional school, promotes critical inquiry, reflection, and social action through interdisciplinary studies. Its graduates are prepared to work in a changing multicultural world in leadership roles in educational programs and institutions, health and social institutions, and private and corporate sectors. The College is committed to providing lifelong learning for both faculty and students by promoting courses of study that involve students and faculty in academic peer relationships that stress shared responsibility for learning and for the discovery of new knowledge. The faculty is committed to research, scholarship, and creative work that results in superior teaching and service to the community and to the professions. The College is committed to work towards equity and economic and social justice within the University community and throughout the broader society.

Beginning in 1991, the faculty of the College of Education initiated planning new approaches to organization, new approaches to working with students, and new approaches to working with colleagues in teaching and the other professions served by the college. The purpose of the restructuring process was to enable the College to better meet the needs of students, faculty, and constituent groups in the 21st century.

As a result of this process, the College, previously organized into seven departments, is now organized into eleven faculty/program units.

The College of Education holds membership in the American Association of Colleges for Teacher Education and in the Holmes Group. All certification and degree programs through the
The College had its beginnings in the University when surveying was introduced into the curriculum in 1838. The first two professional degrees, Civil Engineer and Mining Engineer, were established in 1879 at the same time that the Board of Trustees authorized the establishment of a graduate school. Known as Mechanic Arts originally, Engineering became a college in 1904.

The purpose of the College of Engineering is to educate men and women to the high levels of research, technical competence, and social understanding that will enable them to fulfill their responsibilities as professional engineers. Graduate programs of the College of Engineering provide opportunities for advanced study leading to the Master of Science and the Doctor of Philosophy degrees. For a listing, consult majors and degrees available on the Majors and Degree Programs chart.

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, mechanical engineering, metallurgical engineering, engineering management, and mathematics and physics. All programs lead to the Master of Science degree. Also, Ph.D. programs are available in many of these fields. Information may be obtained from the Registrar, The University of Tennessee Space Institute, Tullahoma, TN 37388.

College of Human Ecology

Jacquelyn O. DeJonge, Dean
James D. Moran III, Associate Dean: Graduate Studies
Jackie H. McInnis, Associate Dean: Academic Administration

 Departments

Child and Family Studies
Health, Leisure, and Safety Sciences
Human Resource Development
Nutrition
Textile, Retail and Consumer Sciences

Facilities for Research and Service
Center of Excellence for Materials Processing
Child Development Laboratories
Institute for Tourism and Leisure Industries
Small Animal Research Laboratory
Textiles and Nonwovens Development Center

Human Ecology brings together the natural and social sciences to enhance the well-being of individuals and families across the life span.

The University of Tennessee was one of the first institutions of higher education in the South to offer home economics, with the first class being offered in 1897. Initially called a School of Home Economics, it combined with Agriculture in 1947 to become the College of Agriculture and Home Economics. In 1959, the two colleges became separate units, although they continue to share resources. In 1965 the name was changed to Human Ecology, reflecting its focus on people interacting with their environments. Graduate study in Human Ecology prepares the student for teaching, research, and public service in colleges and universities or managerial positions in government, business, and industry.

The Master of Science degree is offered with majors in Child and Family Studies, Health Promotion and Health Education, Human Resource Development, Nutrition (including public health nutrition), Recreation, Tourism and Hospitality Management, Safety Education and Service, and Textiles, Retailing and Consumer Sciences; the Master of Public Health degree is offered with a major in Public Health; and the Doctor of Philosophy degree is offered with a major in Human Ecology and concentrations in child development, community health, family studies, human resource development, nutrition science, retail and consumer sciences, and textile science. For additional information, contact the Associate Dean of Graduate Studies, College of Human Ecology, The University of Tennessee, Knoxville, TN 37996-1900, (423) 974-5224.

FACILITIES FOR RESEARCH AND SERVICE

The Small Animal Research Lab, housed in the Jessie Harris Building, has received certification by the American Association for Accreditation of Laboratory Animal Care (AAALAC). Renovated in 1985, it has strict environmental controls, an operating theater and diet preparation room.

The College of Human Ecology participates with the College of Engineering in the Center of Excellence for Materials Processing. These research efforts in Textile Science are also supported by the Textiles and Nonwovens Development Center (TANDEC). The Child Development Laboratory (CDL) serves as a research and training facility for students in the College.

The mission of the Institute of Tourism and Leisure Industries is to serve as a catalyst for stimulating economic growth by providing a medium through which tourism and leisure industries can collectively develop and focus on strategies that will address how to improve the economic climate and overall quality of life in the region.

Refer to the section on Facilities for Research and Service for additional information.
law as an implement of societal control 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 PROFESSIONAL PROGRAM

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 cooperative 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. While proper consideration is given to the problems of Tennessee law, the course of study is conducted with a view toward providing an awareness and understanding of the regional and national perspective to prepare students for service in any state.

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 PROGRAM

Two dual degree programs are available in conjunction with the College of Law: the J.D.-MBA program with the College of Business Administration and the J.D.-M.P.A. program with the Department of Political Science. Refer to details under the respective field of instruction.

Graduate students in other disciplines may also take law courses upon approval of the College of Law and the major professor. See Law under Fields of Instruction.

College of Nursing

Joan Creasla, Dean
Martha Alligood, Director of Master's Program
Sandra P. Thomas, Director of Doctoral Program
Mary Anne Modrin-McCarty, Director of Undergraduate Program

Facilities for Research and Service
Center for Nursing Practice
Center for Nursing Research

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 1986. More specific information about the programs may be obtained under Nursing, Fields of Instruction, or by contacting the Director of M.S.N. or Ph.D. Program, The University of Tennessee, College of Nursing, 1200 Volunteer Blvd., Knoxville, TN 37996-4110, (423) 974-4151.

MASTER OF SCIENCE IN NURSING

The general purpose of the M.S.N. program is to prepare nurses at the graduate level to function as advanced practitioners, teachers, or managers in a variety of health care or educational settings. The program is accredited by the National League for Nursing and is unconditionally approved by the Tennessee Board of Nursing. Students admitted to the program select a concentration in adult health nursing, family nurse practitioner, mental health nursing, nursing administration, and nursing of women and children.

THE DOCTORAL PROGRAM

The College of Nursing offers a doctoral program leading to the Ph.D. with a major in Nursing. The doctoral program prepares nursing scholars capable of integrating research, theory, and practice into their roles as researchers, educators, and/or administrators. This unified program offered jointly with The University of Tennessee, Memphis College of Nursing enables students to complete all or part of the program at either site. The dissertation must be completed in its entirety at one site.

College of Social Work

Charles Gilsson, Acting Dean
William J. Bell, Associate Dean, Nashville
Jeanette Jennings, Associate Dean, Knoxville
Hisashi Hirayama, Associate Dean, Memphis
Paul M. Campbell, Director, Office of Social Work Research and Public Service

The College of Social Work began as the Nashville School of Social Work, founded in 1942 under the auspices of Vanderbilt University, Scarritt College, and George Peabody College. It joined the University of Tennessee in 1951. By 1974 the three branches, located in Nashville, Memphis and Knoxville, offered the two-year master's program. The doctoral program was inaugurated in 1980. In 1986 the B.S.S.W. program was added, and the School achieved college status.

The University of Tennessee College of Social Work is the only graduate professional social work education program in Tennessee and offers the full continuum of social work education degrees at the baccalaureate, master's and doctoral levels.

Social work is a helping profession 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 Ph.D. program is available only in Knoxville. A special bulletin describing facilities, admission, fees, and degree requirements is available from the College of Social Work, Henson Hall, Knoxville, TN 37996-3333.

College of Veterinary Medicine

Michael Shires, Dean
James J. Brace, Associate Dean

Departments

Animal Science-Veterinary Medicine
Comparative Medicine
Large Animal Clinical Sciences
Microbiology-Veterinary Medicine
Pathology
Small Animal Clinical Sciences

The College of Veterinary Medicine, established in 1974, offers a professional curriculum leading to the Doctor of Veterinary Medicine (D.V.M.) degree. The college offers graduate studies leading to the Master of Science and the Doctor of Philosophy degrees. 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 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.

Excellent research opportunities exist for veterinarians—research directly benefiting animals and research conducted with animals which benefit humans. Such opportunities are available at colleges and universities and with governmental agencies, private research institutions and biological and pharmaceutical companies.
FIELDS OF INSTRUCTION
FIELDS OF INSTRUCTION
Fields of Instruction

Accounting and Business Law
(College of Business Administration)

MAJORS

Accounting .............................................. M.Acc.
Business Administration ......................,....Ph.D.

Keith G. Stanga, Head

Professors:
Anderson, Kenneth E., CPA,
Ph.D. ................................................. Indiana
Dittrich, Norman E. (Emeritus), CPA,
Ph.D. ............................................ Ohio State
Fisher, Bruce D., LL.M ......... George Washington
Herring, Hartwell C., III, CPA, Ph.D. .... Alabama
Kiger, Jack E. (Warren L. Slagle Prof. of Acct),
CPA, Ph.D. .................................... Missouri
Read, W. H. (Emeritus), CPA,
MBA .............................................. Northwestern
Reeve, James M. (Distinguished Prof.), CPA,
Ph.D. ............................................ Oklahoma State
Roth, Harold P., CPA, Ph.D. .............. VPI
Stanga, Keith G. (Arthur Andersen Prof.), CPA,
Ph.D. ........................................... Louisiana State
Williams, Jan R. (Ernst & Young Prof.), CPA,
Ph.D. ........................................... Arkansas

Associate Professors:
Gatian, Amy W., Ph.D. ....................... VPI
Massingale, Cheryl S., J.D ............ Tennessee
Murphy, Daniel, CPA, Ph.D. ......... North Carolina
Posey, Imogene A., CPA, M.S. ......... Tennessee
Townsend, Richard L., CPA, Ph.D. ........ Texas

Assistant Professors:
Ayers, Susan, CPA, Ph.D. ............. Arizona State
Behn, Bruce K., CPA, Ph.D. ............. Arizona State
Carcello, Joseph V., CPA, Ph.D. . Georgia State
Hethcox, Kathleen B., Ph.D. ........... Oklahoma

THE MASTER OF ACCOUNTANCY PROGRAM

The objective of the M.Acc. program is to provide persons who have a high level of ability and motivation with the depth and understanding of accounting that will enhance their probability of success in a career in professional accounting. Moreover, the student’s educational experience should develop perspectives toward the discipline of accounting in a manner that will enable the student to spearhead innovation and change in response to needs in public accounting, industry, and government.

Admission Requirements

Application deadlines for international students are: Fall and Summer, January 15. Application deadlines for U.S. citizens and permanent residents are: Fall and Summer, March 1. The program is designed both for students who have completed an accredited baccalaureate degree program with a major in Accounting and others. Those with outstanding undergraduate records in areas other than accounting may earn the M.Acc. degree by completing prerequisites in accounting and by including courses in other business and related disciplines to supplement the applicant’s undergraduate background. Students entering the program should be computer literate and are expected to have completed coursework in calculus, principles of accounting, and introductory economics.

In addition to the general admission requirements for The Graduate School, M.Acc. applicants are required to take the Graduate Management Admission Test (GMAT) and submit information on forms provided by the College of Business Administration. Applicants whose native language is not English must submit results of the Test of English as a Foreign Language (TOEFL).

Course 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.

A student with an undergraduate degree in accounting can usually complete the program in about three semesters. A student without an undergraduate accounting degree can usually complete the program in four semesters. For students with an undergraduate accounting degree, the requirements are:

Accounting Core (9 hours): 511, 513, Business Law 511.

Accounting Concentration (9 hours): Three concentrations are available:
3. Taxation: 531, 532, 533, 534, 539.
Students must take at least three courses from the same concentration and one of the course numbers must end with 9.

Accounting Electives (6 hours): Elective courses to be taken from concentration courses listed above.

Non-accounting Electives (6 hours): Non-accounting courses taken in either other business or non-business areas, upon approval of M.Acc. advisor.

For students without an undergraduate accounting degree, the requirements are:

Prerequisites: Accounting 311, 341, 431, Management 301, 401, Finance 301, all for undergraduate credit.

Accounting Core (9 hours): 511, 513, Business Law 511.

Accounting Concentration (9 hours): Three concentrations are available:
3. Taxation: 531, 532, 533, 534, 539.
Students must take at least three courses from the same concentration and one of the course numbers must end with 9.

Required Additional Courses (12 hours):
Marketing 510, Accounting 411, 414, and 521.

Transfer Credits

A maximum of six semester hours taken at other AACSB accredited institutions that otherwise conform to the transfer policy of The Graduate School may be credited toward M.Acc. degree requirements.
Other Requirements
To qualify for the degree, a student must maintain a B average (3.0) or above in the core and concentration area accounting courses and a B average or higher in the overall 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: 516, Research in Financial Accounting and Auditing; 539, Tax Policy and Special Topics; and 549, Systems Policy.

BUSINESS ADMINISTRATION CONCENTRATION
For complete listing of Ph.D. program requirements, see Business Administration. Ph.D. Concentration: Accounting.

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 Ph.D. accounting program advisor.

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.

ACADEMIC COMMON MARKET
An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.Acc. program in Accounting is available to residents of the state of West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

Accounting

GRADUATE COURSES
411 Financial, Compliance, and Operational Auditing (3) Role of auditing in society from an internal and external perspective, the IIA Code of Ethics, the IIA Standards for the Professional Practice of Internal Auditing, auditing methodology, role of internal control and statistical sampling in auditing, fraud auditing, operational auditing, compliance auditing, and applications of auditing procedures to specific transaction cycles. Prereq: Principles of Managerial Accounting.

414 Financial Reporting by Business and Non-Profit Organizations (3) Continuation of 311: Labilities, stockholders’ equity, earnings, accounting changes and error corrections, aggregation issues, international accounting, and government financial statements. Prereq: Corporate Financial Reporting with a C or better.

415 Governmental and Nonprofit Accounting (3) Contemporary issues in theory and practice of governmental accounting principles; environment of state and local government; governmental authorities; fund accounting; accounting for non-governmental non-profit entities. Prereq: 414 or consent of instructor.

451 Operational Auditing and Consulting (3) Approaches to evaluate an entity’s efficiency and effectiveness in variety of settings and techniques used in consulting to provide entity competitive advantage.

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 completion. May not be used toward degree requirements. May be repeated. S/N only. E


512 Advanced Auditing (3) Theory and concepts underlying practice of internal and external auditing, fraud auditing, audit reporting, and other current auditing issues. Prereq: Auditing for M.Acc. program or consent of instructor.

513 Advanced Auditing (3) Theory and concepts underlying practice of internal and external auditing, fraud auditing, audit reporting, and other current auditing issues. Prereq: Auditing for M.Acc. program or consent of instructor.

514 Auditing Practice (3) Design and performance of audits in computerized environments. Relationships among design of internal control, internal control effectiveness, and controls. Emerging issues in variety of auditing contexts, highly automated situations. Prereq: 512 and admission to M.Acc. program.

516 Seminar in Professional Accounting Practice (3) Topics in financial reporting and auditing: taxation of business enterprises and emerging professional accounting standards. Development of written and communication skills. Prereq or coreq: 511 and admission to M.Acc. program.

517 Seminar in Accounting and Auditing Policy (3) Current issues in financial reporting and auditing policy development and regulation. Prereq: 516 or consent of instructor.

518 Seminar in Professional Accounting Practice (3) Topics in financial reporting and auditing: taxation of business enterprises and emerging professional accounting standards. Development of written and communication skills. Prereq or coreq: 511 and admission to M.Acc. program.


521 Seminar in Advanced Managerial Cost Accounting (3) Analysis of traditional and activity-based costing concepts and current issues; impact on development of practice of managerial and cost accounting. Approaches to management accounting, decision and control models, and planning and control under conditions of uncertainty. Prereq: Cost and Managerial Accounting and admission to a graduate business program or consent of instructor.

522 Budgetary Planning and Control Systems (3) Alternative approaches to formulation and use of planning and control systems to meet organizational objectives. Control systems and corporate structure, discretionary expense controls, transfer pricing, and control in manufacturing, service, and not-for-profit organizations. Prereq: Admission to a graduate business program or consent of instructor.

531 Tax Research, Methods, and Procedures (3) Development of expertise in tax research using authoritative sources through available technologies. Advanced study of tax accounting methods, periods, procedures, and review of fundamental tax concepts to provide foundation for tax practice. Prereq: 431 and admission to M.Acc. program.

532 Corporate Taxation and Reorganizations (3) Organization and structure, distributions, liquidations, reorganizations, and special problems in taxation of corporations and shareholders. Prereq: Admission to M.Acc. program or consent of instructor. Prereq or coreq: 551.

533 Taxation of Partnerships and S Corporations (3) Formation, operation, termination, and special problems of partnerships. Election for S Corporations, and comparison of partnerships and S Corporations. Prereq: Admission to M.Acc. program or consent of instructor. Prereq or coreq: 551.

534 Family Tax Planning (3) Review and analysis of laws pertaining to inter vivos and post-mortem property transfers and taxation of estates. Financial planning techniques and strategies used to furnish family tax planning objectives. Prereq or coreq: 551.

539 Tax Policy (3) Basic concepts of tax policy: complexity, efficiency, equity, alternative tax bases, and political process. Current issues in tax policy and strategy: organizational forms, governmental policies, tax bases, tax rates, and selected other topics. Prereq: 431 and admission to M.Acc. program.

541 Database Systems (3) Design, implementation, and use of database systems for collection, organization, and retrieval of economic information. Prereq: Accounting Information Systems and admission to a graduate program or consent of instructor.

542 Systems Analysis and Design (3) Analysis and design of information systems for management and distribution of economic information about organizations. Prereq: Accounting Information Systems and admission to a graduate program or consent of instructor.

543 Systems Issues and Policies (3) Seminar in emerging topics in management systems and knowledge-based systems. Prereq: 541 and admission to a graduate program or consent of instructor. Prereq or coreq: 545.

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 M.Acc. program or consent of M.Acc. advisor.

593 Individual Research in Accounting (3) Directed research in topic of mutual interest. Prereq: Admission to M.Acc. program or consent of M.Acc. advisor. May be repeated. Maximum 6 hrs.

594 Graduate Seminar in Accounting (3) Topics vary. Prereq: Admission to M.Acc. program or consent of instructor.

600 Doctoral Research and Dissertation (3-15) P/NP only. E


619 Doctoral Research in Accounting (3) Study of research methodology and application of various research methods in accounting literature. Prereq: Consent of Ph.D. program advisor.

621-22 Accounting Colloquium (1, 1) Research and discussion of contemporary issues in practice of accounting and accounting theory. Prereq: Consent of Ph.D. program advisor. May be repeated. S/N only.

Business Law

GRADUATE COURSES
511 Business Law and Professional Responsibility (3) Legal framework and ethical implications of business transactions. Principles and practices in law of contracts, commercial transactions, property, trusts, estates and professional responsibility. Prereq: Legal Environment of Business and admission to M.Acc. program or consent of instructor. Not available for students with credit for 401.

Advertising

(College of Communications)

MAJOR

DEGREES

Communications ........................................ M.S., Ph.D.

Ronald E. Taylor, Head
The Department of Advertising offers a concentration area for the master's degree with a major in Communications and participates in the interdisciplinary doctoral program. See Communications for additional information.

GRADUATE COURSES

480 Special Topics (3) Topics vary: advanced media strategy, advanced creative strategy, direct marketing, and advertising and social issues E

510 Advertising and Society (3) Analysis of advertising as an institution in a free-enterprise democratic society and its relation to social, legal, cultural, and economic institutions F

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. F

530 Advertising Research (3) Nature, scope, and applications of research function to advertising decisions. Market segmentation, copy appeals, media strategy. Prereq: Statistics 201 or equivalent. Sp

540 Advertising Planning (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. Sp

597 Independent Study (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

Aerospace Engineering
See Mechanical and Aerospace Engineering

Agricultural and Extension Education

(College of Agricultural Sciences and Natural Resources)

MAJOR DEGREE

Agricultural and Extension Education M.S.

Roy R. Lessly, Head

Professors:
Carter, Ceci E., Jr. (Emeritus), Ph.D. ................... Ohio State
Dickson, Lewis H. (Emeritus), Ed.D. .............. Cornell
Lessly, Roy R. (Liaison), Ed.D. ....................... Oklahoma State
Tod, John D., Ed.D. ................................. Illinois

Associate Professor:
Waters, Randol G., Ph.D. ............................. Penn State

The Department of Agricultural and Extension Education offers a program leading to the 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 the Agricultural Extension Service. 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 School and those stipulated by the department.

THE MASTER'S PROGRAM

Thesis Option:
A candidate for the master's degree who elects the thesis option must successfully complete:
1. 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.
2. A minimum of 20 hours of graduate credit in courses numbered at or above the 500 level.
3. 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.
4. A minimum of 3 hours of graduate credit in coursework in either research methodology or statistics.
5. A final oral examination.

Non-Thesis Option:
A candidate for the master's degree who elects the non-thesis option must successfully complete:
1. A minimum of 36 hours of graduate credit in courses approved by the student's advisory committee.
2. A minimum of 24 hours of graduate credit in courses numbered at or above the 500 level.
3. 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.
4. A minimum of 3 hours of graduate credit in coursework in either research methodology or statistics.
5. A creative component designed by the student and approved by the student's advisory committee for 3 hours of graduate credit.
6. A written and oral comprehensive examination.

GRADUATE COURSES

411 Fundamentals of Agricultural Extension (3) History, philosophy, organizational structure, clientele served, major areas of program emphasis, teaching methods, and relationships with other educational agencies. Graduate credit for non-majors only. Sp

500 Thesis (1-15) (P/NP only. E

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. S/N/C only. E

521 Extension Program Planning (2) Methods of developing county extension programs: sources of essential basic information, determination of problems and needs of people, functions of lay people and various groups of extension workers. Use of committees, step-by-step planning procedures, coordinated county and state plans and characteristics of effective programs. Prereq: 411 or consent of instructor. Sp

522 Extension Teaching Methods (2) Teaching-learning methods and techniques applicable to extension work, interpersonal relationships and relative effectiveness. Result demonstrations, method demonstrations, meetings, tours, audio-visual aids. Prereq: 411 or consent of instructor. Sp

523 Extension Program Evaluation (2) Principles, instruments and techniques of identifying, gathering, analyzing and using data to appraise planning and teaching and to determine progress of clientele. Prereq: 411, 521, or consent of instructor. Sp

524 Research Methodology (3) Social research design, hypothesis testing, sampling, survey construction, scaling, interviewing, data coding, basic descriptive and relational statistics, and presentation of results. Prereq: 436, 523, or consent of instructor.

525 Curriculum Planning in Agricultural Education (3) Models, principles and procedures for developing curricula in agricultural education and scheduling learning activities for planned instructional program. Prereq: 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. Prereq: 411 or 436 or consent of instructor.

527 Adult Education and Strategies for Teaching (3) Psychological, philosophical and sociological theories for adult education in agriculture; methods and strategies for organizing classes and teaching adults. Prereq: 411 or 436 or consent of instructor.

528 Advanced Techniques for Teaching Agricultural Mechanics (3) Teaching techniques; determining needed competencies, organizing and managing agricultural mechanics facilities. Prereq: 435, 436 or consent of instructor.

529 Supervised Occupational Experiences in Agricultural Education (3) Historical and philosophical bases for supervised occupational experience programs and organizational programs and procedures for conducting programs for farm and off-farm agricultural occupations. Prereq: 435, 436 or consent of instructor.

530 Special Topics in Agricultural and Extension Education (1-3) Current issues. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E

531 Extension History, Philosophy and Objectives (3) Historical and philosophical foundation of multi-level 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. Prereq: 411 or consent of instructor. Sp

532 Managing Extension Organizations, Programs and Personnel (3) Theory and principles of management for individuals and organizational effectiveness. Prereq: 521, 531, or consent of instructor. Sp

593 Special Problems in Agricultural and Extension Education (1-4) Special research and/or special reports based on supervised independent study. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E
Agricultural Economics and Rural Sociology

(College of Agricultural Sciences and Natural Resources)

MAJOR DEGREES

Agricultural Economics ......................... M.S., Ph.D.

Handy Williamson, Head

Professors:

Badenhop, M. B. (Emeritus), Ph.D. ............ Purdue
Brooker, J. R. (Liaison), Ph.D. .................... Florida
Cleland, C. L. (Emeritus), Ph.D. ............... Wisconsin
Eastwood, D. B., Ph.D. ............................ Tufts
English, B. C. Ph.D. ............................... Wisconsin
Keller, L. H. (Emeritus), Ph.D. ............... Kentucky
Knott, R. H., Ph.D. ............................... Kentucky
Leuthold, F. O., Ph.D. ............................ Wisconsin
McLemore, D. L., Ph.D. ......................... Michigan
McManus, B. R. (Emeritus), Ph.D. ......... Purdue
Martin, J. A. (Emeritus), Ph.D. ............... Minnesota
Mundy, S. D., Ph.D. ............................... Tennessee
Orr, R. H., Ph.D. ................................. Illinois
Park, W. M., Ph.D. ............................... Virginia Tech
Pentecost, B. H. (Emeritus), J.D. .......... Tennessee
Ray, Daryll E. (Bernard Blasingame Chair of Excellence), Ph.D. ......... Iowa State
Riley, John B., Ph.D. .............................. Oklahoma State
Roberts, R. K., Ph.D. .............................. Iowa State
Sappington, C. B. (Emeritus), Ph.D. ...... Illinois
Thuten, T. J. (Emeritus), Ph.D. ............. Purdue
Williamson, H., Ph.D. ............................ Missouri

Associate Professors:

Jensen, K. L., Ph.D. .............................. Oklahoma State
Pompeii, G. K., Ph.D. ............................ California (Davis)

Assistant Professors:

Jaks, Paul M., Ph.D. ............................. NC State
Larson, J. A., Ph.D. ............................... Oklahoma State
Stokes, J. R., Ph.D. ............................... Texas A&M

The Department of Agricultural Economics and Rural Sociology offers programs of graduate study leading to the Ph.D. and M.S. The doctoral program includes concentrations in agricultural marketing and price analysis, agricultural policy, farm management and production economics, natural resource economics, and rural development. The M.S. program may be completed under a thesis option with concentrations in agricultural economics or rural sociology. A non-thesis option is available with a concentration in agricultural economics only. For specific information, contact the department head.

THE MASTER'S PROGRAM

Thesis Option

A candidate for the master's degree must complete a minimum of 33 hours of graduate credit in courses approved by the student's master's committee. Six hours of thesis may be counted toward this requirement. At least 27 hours of graduate credit must be earned in courses numbered at or above the 500 level. In the agricultural economics concentration, 15 hours of agricultural economics, 6 hours of economic theory and 6 hours of quantitative methods are required. In the rural sociology concentration, at least 12 hours of graduate credit in courses approved by the student's committee is required. Six hours of course work in the student's concentration are required. Each student must successfully complete a final oral examination.

Non-Thesis Option

A minimum of 36 hours of graduate coursework is required. At least 30 hours must be in courses numbered at or above the 500 level. The program must include a minimum of 21 hours in agricultural economics and 6 hours of quantitative methods. In the agribusiness concentration, 6 hours of internships are required. In the agricultural economics concentration, 6 hours of economic theory are required. Each student must successfully complete both written and oral comprehensive exams.

Minor

A minor will include 6 hours of coursework in the department, at least 3 hours in 500- or 600-level courses. The student's committee must include a member of the faculty from the department who will be responsible for designing courses required for the minor.

THE DOCTORAL PROGRAM

A minimum of 72 hours of graduate credit beyond the B.S. degree, including 24 hours of dissertation research, but excluding any master's research credit, is required. A minimum of 27 hours of agricultural economics, 15 hours of economic theory, and 9 hours of quantitative methods are required. The program must include a minimum of 9 hours in courses numbered at or above the 600 level (excluding dissertation credits). Qualifying exams are required in macroeconomic and microeconomic theory. Comprehensive exams include three written exams and one oral exam. Written exams are in general agricultural economics, quantitative methods, and the area of concentration.

Minor

A minor will consist of a minimum of 9 hours of coursework taken in the department and approved by the minor professor. At least 6 hours of credit in the minor area must be in 500- and 600-level courses.

MINOR IN ENVIRONMENTAL POLICY

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

Agricultural Economics

GRADUATE COURSES

412 Agricultural Finance (3) - Microfinance, financial objectives, acquisition of debt and equity funds, capital investments, capital allocation, credit analysis, borrower and lender loan application analysis, insurance strategies, computer applications, and sources of agriculture credit, and financial intermediation. Prereq: Intermediate Agricultural Economics or consent of instructor. Sp

420 International Agriculture Trade and Marketing (3) - Real and monetary aspects of international trade and foreign agricultural commodity flows; partial equilibrium analysis of international trade in agricultural products; institutional aspects of international marketing of agricultural products. Prereq: Intermediate Agricultural Economics or consent of instructor. F

430 Agricultural Policy (3) - Values, goals and policy processes. Economic rationale and effects of policy. Historical development and current characteristics of commodity, credit, food, and trade policy. Prereq: Intermediate Agricultural Economics or consent of instructor. F

440 Agricultural Production Economics (3) - Application of microeconomic theory to problems of resource allocation, enterprise selection, scale of operation of agricultural firms; economic interpretation of technical agricultural production relationships. Prereq: Intermediate Agricultural Economics or consent of instructor. F

442 Agribusiness Management (3) - Advanced decision analysis in farm and agribusiness settings. Planning and organizing functions, analyzing investment alternatives, evaluating budgets and financial statements, assessing profitability and solvency, use of computers in business decisions. Prereq: Farm Business Management and Microcomputer Applications to Problem Solving or consent of instructor. F

450 Agricultural Price Analysis (3) - Analysis of demand and supply mechanisms in agriculture; price determination, economic equilibrium, temporal price patterns; pricing institutions. Prereq: Intermediate Agricultural Economics, Marketing of Agricultural Products and Statistical Methods. F

460 Rural Economic and Community Development (3) - Historical and theoretical perspective on problems facing rural communities; linkages between farm and nonfarm sectors; models and tools for analyzing rural development. Prereq: 210 or consent of instructor. F

470 Natural Resource Economics (3) - Nature of natural resource economic relationships as basis for natural resource use; externalities in natural resource use; factors influencing environmental quality; alternative public policy for influencing natural resource use or improving environmental quality. Prereq: 210 or consent of instructor. Sp

500 Thesis (1-15) - P/NP only. E

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. S/NC only. E

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 and Intermediate Microeconomics or equivalent. F

522 Mathematical Programming Methods in Agricultural Economics (3) - Linear, integer and quadratic programming techniques with empirical applications to problems of firm and region; profit maximization, cost minimization, transportation, risk, allocation over space and time. Prereq: Consent of instructor. Sp

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: Statistics 461 or consent of instructor. F

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. F

540 Advanced Agricultural Production Economics (3) - Theoretical and empirical concepts in agricultural resource allocation; evaluation of both static and dynamic issues; decision theory with application to agricultural firms; aggregate impact of firm decisions on industry. Prereq: 440 or equivalent. Sp

550 Advanced Agricultural Marketing (3) - Analysis of structure, conduct and performance of agricultural marketing systems; application of price theory and concepts to existing circumstances in agricultural industries; examination of methods used to evaluate conduct and performance; analysis of transportation issues and location
theory. Prereq: Economics 311 or consent of instructor. Sp.

560 Advanced Rural Economic Development (3) Theoretical and empirical perspectives on process of economic development; analyze role of agriculture; sectoral interdependence and trade in development; application of theory to specific development issues. Prereq: 460 or consent of instructor. Sp.

570 Advanced Natural Resource Economics (3) Analysis of natural resource allocation issues; applied welfare economics, external effects and evaluation of public policy. Prereq: 470 and Economics 511 or consent of instructor. H.

593 Special Topics in Agricultural Economics (1-3) Topics to be assigned. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. S/NC only. E.

595 Professional Internship (6) Supervised internship experience with appropriate agribusiness firm.

600 Doctoral Research and Dissertation (3-15) P/NP only. E.

620 Advanced Quantitative Methods (3) Discussion and evaluation of advanced statistical and mathematical techniques in current agricultural economics research. Prereq: 522, 554, and Economics 881-82, or consent of instructor. Sp.

640 Agricultural Supply Analysis (2) Critical evaluation of both the theoretical and empirical procedures used for estimating agricultural supply relationships, using regression techniques, production functions, mathematical programming, firm growth models and simulation in supply analysis. Prereq: 540 or consent of instructor. Fa.

652 Consumer Demand and Food Consumption (2) Simultaneity of consumer decision making; food demand, constraints on demand, complete demand system models. Prereq: Economics 511 and 512 or consent of instructor. Sp.

670 Seminar in Natural Resource Economics (2) Issues in natural resource economics. Current literature; evaluation of theory, methodology and public policy as related to allocation of natural resources. Prereq: 570 or consent of instructor. Su.

Rural Sociology

GRADUATE COURSES

480 Technological and Community Change (3) Analysis of communication processes whereby new technology spreads within a farm population and analysis of social institutions related to change in rural communities. Prereq: Rural Sociology or consent of instructor. (Same as Sociology 480.) Sp.

580 Advanced Rural Sociology (3) Application of sociological concepts and theory to analyze changing structure and function of rural life in U.S. and developing countries. Demographic changes, rural social, and community indicators, and rural development processes. Prereq: 380 or equivalent. (Same as Sociology 580.) Sp.

593 Special Topics in Rural Sociology (1-3) Current sociological issues involving application of sociological theory. Prereq: 380 or consent of instructor. May be repeated. Maximum 9 hrs. (Same as Sociology 593.) E.

Agricultural and Biosystems Engineering

(College of Agricultural Sciences and Natural Resources)

MAJORS DEGREES

Biosystems Engineering M.S., Ph.D.

Biosystems Engineering Technology M.S.

C. Roland Mote, Head

Professors:

Bledsoe, B. L., PE, Ph.D. Oklahoma State

Henry, Z. A., PE, Ph.D. NC State

Luttrel, D. H. (Emeritus), Ph.D. Iowa State

McCaw, J. J. (Emeritus), PE, Ph.D.

Michigan State

Associate Professors:

Buschermohle, Michael J., Ph.D. Clemson

Freeland, R. S., PE, Ph.D. Tennessee

Grande, G. F., Ph.D. Tennessee

Hart, W. E., Ph.D. Purdue

Willerson, J. B., Ph.D. Purdue

Yoder, D. C., Ph.D. Tennessee

Yoder, R. E., Ph.D. Colorado State

Assistant Professors:

Burns, R. T., Ph.D. Tennessee

Hubert, G. J., Ph.D. Illinois

Raman, D. R., Ph.D. Cornell

Womac, A. R., Ph.D. Tennessee

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. Each applicant will be advised about any prerequisite courses before entering a program. The student's program of study must be approved by the department and must include the requirements of The Graduate School.

Personnel and graduate coursework.

Raman, D. R., Ph.D. Tennessee

Hart, W. E., Ph.D. Purdue

Willerson, J. B., Ph.D. Purdue

Yoder, D. C., Ph.D. Tennessee

Yoder, R. E., Ph.D. Colorado State

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

The Master's Programs

Biosystems Engineering

Applicants who have not previously earned a degree from a professionally accredited program within the U.S. must submit scores from the GRE general examination. Applicants accepted into the program must complete at least 30 semester hours to earn a degree. Of these 30 hours, 20 must be in courses numbered 500 or greater (6 hours of thesis plus 14 hours of other courses). Other specific requirements for the 30 hours are:

Non-Thesis Option: A non-thesis option in Biosystems Engineering Technology is available to qualified students. Applicants who have not previously earned a degree from a professionally accredited program within the U.S. must submit scores from the GRE general examination. Applicants accepted into the program must complete at least 33 semester hours to earn a degree. Of these 33 hours, 20 must be in courses numbered greater than 500. Other specific requirements for the 33 hours are:

Coursework in computational methods (mathematics, computer science, statistics, or any course containing appropriate computational components that may be approved by the department)

In addition to completing the 33 semester 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.

THE DOCTORAL PROGRAM

Departmental Requirements

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. Scores on the GRE general and engineering subject examinations also are required for applicants who have not received a degree from an ABET-accredited engineering program.

To earn a degree, each doctoral student must complete at least 75 hours of approved graduate credit (beyond the baccalaureate degree) in Biosystems Engineering and supporting areas (engineering, computational methods, agricultural and biological sciences, and other related areas). Of the 75 hours, 48 must be in courses numbered greater than 500 (including 24 hours of course 600) and 6 hours of courses at UTK numbered greater than 600.

Other specific requirements for the minimum 75 hours are:

- Major subject courses: 18 hours
- Coursework in computational methods (mathematics, computer science, statistics, or any course containing appropriate computational components that may be approved by the department): 9 hours
- Program electives: 21 hours
- Seminar (504, 505 or equivalent courses): 3 hours
- 600 Dissertation: 24 hours

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 School.

Biosystems Engineering

GRADUATE COURSES

413 Component Design and Machine Synthesis (3) Synthesis of design: structural, kinematical, power, control-system development; preparation of design drawings, specifications, model of device, written and oral report on project. Prereq: Engineering Design Fundamentals. 1 hr and 2 labs. S

423 Irrigation and Waste Management System Design (3) Design of irrigation and agricultural waste management systems with consideration given to livestock waste characteristics, climate, water quantity, system characteristics, and impact on crop yield and water quality. Prereq: Soil and Water Conservation and Engineering Lab, 1 hr and 2 labs. F

430 Mobile Hydraulics Power System Design (3) Functional and operational characteristics of mobile hydraulic systems components and subsystems; analysis and synthesis of power transmission and control circuits. Prereq: Fluid Mechanics or Hydraulics. 2 hrs and 1 lab. Sp, A

431 Bioprocess System Design and Analysis (3) Design of processes involving storage and handling systems for biological materials. Mass and energy balances, product and waste characterization, equipment specifications, economic analysis, safety, and human factors. Design content: 3 hrs. Prereq: Processing Food and Biological Materials, 1 hr and 2 labs. Sp

451 Electronic Systems (4) Basic electronics with biological applications. Analog and digital electronics; sensors and controlling physical and environmental parameters; sensor selection and interfacing; signal conditioning; process control, laboratory experiments and design projects. Prereq: Circuits and Electro Mechanical Components. 3 hrs and 1 lab. Sp

500 Thesis (1-15) P/NP only. E

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. S/NC only. E

504 Professional Development Seminar (1) Planning and executing research program; ethics and professionalism; departmental procedures and resources. (Same as Biosystems Engineering Technology 504.) S/NC only F

505 Professional Communications Seminar (1) Refers, reports and discussion of ideas, recent advances and current topics; presentations by students. Should be taken in last full semester before graduation. Prereq: 504. May be repeated in doctoral program. Maximum 2 hrs. (Same as Biosystems Engineering Technology 505.) S/NC only. E

510 Similitude in Design and Research (3) Dimensional analysis; governing equations; theory of models; true, distorted, dissimilar models; prediction equations; interpretation of data; applications to machinery, soil and water structures, agricultural buildings and other agricultural engineering select problems. Prereq: Engineering Science and Mechanics 321, 341. 2 hr and 1 lab. F, A

525 Soil Erosion and Sediment Yield (3) (Same as 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 hrs. E

541 Principles of Compost Engineering (3) Comprehensive study of composting: survey of installed systems; thermodynamics of composting; biology of composting; kinetics, feedback control; temperature; aeration; substrate characteristics; process kinetics; and odor control. Design component. Prereq: Thermodynamics, heat and mass transfer. F

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. Prereq: 451 or Electronics and Computer Circuits or equivalent. 2 hrs and 1 lab. (Same as Environmental Engineering 543.) F

545 Monitoring Hydrologic Phenomena (3) Application of instrumentation theory to monitoring hydrologic phenomena; strengths and weaknesses of common measurement and strategies: equipment operation and solution of environmental monitoring problems. Prereq: 543. 2 hrs and 1 lab. (Same as Environmental Engineering 545.) Sp, A

550 Selected Topics (1-3) Lecture/group discussion on specialized topics. May be repeated. Maximum 6 hrs. E

552 Biological Treatment Theory (3) (Same as Environmental Engineering 552.)

575 Applied Microbiology and Bioengineering (3) (Same as Chemical Engineering 575, Environmental Engineering 575, and Microbiology 575.)

600 Doctoral Research and Dissertation (3-15) P/NP only. E

620 Computer Simulation of Agricultural Systems (3) Scientific approach to simulation; system definitions and boundaries, formation of models, algorithms and solution techniques, encoding of prediction equations, algorithms, and solution of model output; verification and calibration of simulation model results. Prereq: Basic Engineering 101, 201 or equivalent. 2 hrs and 1 lab. F, A

630 Feedback and Control Systems (3) Differential equations for physical systems: solutions, transforms, and system response. Types of control, frequency response, system compensation, and system analysis. Application to agricultural systems. Prereq: 451, Mathematics 231, Basic Engineering 101, 201, or equivalent. 2 hrs and 1 lab. F, A

650 Selected Topics (1-3) Lecture, group discussion, and individual study on specialized developments. May be repeated. Maximum 6 hrs. E

Biosystems Engineering Technology

GRADUATE COURSES

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, reaction systems, and materials handling. Prereq: Introductory Physics, Basic Calculus. 2 hrs and 1 lab. F

432 Agricultural Machinery and Tractors (3) Agricultural machinery and power units; adaptation to agricultural practices; management considerations; field efficiencies; capabilities; adjustment and servicing. Prereq: Basic Calculus or Finite Mathematics or equivalent. 2 hrs and 1 lab. Sp

442 Agricultural Waste Management and Pollution Control (3) Basic principles of waste renovation fundamentals; characteristics of animal manure; techniques for collection, transporting, storing, and utilizing livestock waste. Prereq: Basic Calculus or Finite Mathematics or equivalent. 2 hrs and 1 lab. F

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. Prereq: Introductory Physics or consent of instructor. 2 hrs and 1 lab. Sp

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. Prereq: Physics 212 or consent of instructor. 2 hrs and 1 lab. Sp

500 Thesis (1-15) P/NP only. E

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. S/NC only. E

504 Professional Development Seminar (1) (Same as Biosystems Engineering 504.)

505 Professional Communications Seminar (1) (Same as Biosystems Engineering 505.) S/NC only. E

506 Physical Phenomena (3) Properties of materials, fundamentals of hydraulics, principles of electricity, thermal phenomena; applications in biological systems. Prereq: Consent of instructor. F

508 Special Problems in Biosystems Engineering Technology (1-3) Individual studies of current problems. May be repeated. Maximum 6 hrs. E

514 CAD Applications to Biosystems Engineering (3) Use of CAD software to create drawings of components, machinery systems, flow charts, and process diagrams relevant to biosystems. Prereq: Admission to degree program or consent of instructor; proficiency in use of personal computers. F

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. Prereq: 506. 2 hrs and 1 lab. Sp, A

532 On-Site Domestic Water Supply and Wastewater Renovation (3) Basic ground water hydrology, selection and design of pumps and delivery systems, and point-of-use water treatment processes, soil-based wastewater renovation principles, and design and operating criteria for on-site wastewater renovation systems. Prereq: 506. 2 hrs and 1 lab. F, A
Agriculture
(College of Agricultural Sciences and Natural Resources)

GRADUATE COURSES

512 Teaching Internship in Agriculture (1) Supervised experience in teaching; test preparation and evaluation of agriculture students. May be repeated. Maximum 6 hrs.

Animal Science
(College of Agricultural Sciences and Natural Resources and College of Veterinary Medicine)

MAJOR DEGREES
Animal Science .................................................. M.S., Ph.D.
Veterinary Medicine ............................................. D.V.M.

Kelly Robbins, Head

Professors:
Barth, K. M. (Emeritus), Ph.D. ................. Rutgers
Bell, M. C. (Emeritus), Ph.D. ...................... Oklahoma State
Biemer, J. K. (Emeritus), Ph.D. ................. Ohio State
Cambria, C. C. (Emeritus), Ph.D. .......... Iowa State
Erickson, B. H. (Emeritus), Ph.D. ............. Kansas State
Godkin, J. D. (Liaison), Ph.D. .................... Massachusetts
Hall, O. G. (Emeritus), Ph.D. ..................... Iowa State
Hansard, S. L. (Emeritus), Ph.D. ............... Florida
Henry, R. W., D.V.M., Ph.D. ....................... Ohio
Lidvall, E. R. (Emeritus), M.S. ................. Tennessee
McDonald, T. P. (Emeritus), Ph.D. .......... Tennessee
McClure, J. B. (Emeritus), Ph.D. .............. Florida
Miller, J. K., Ph.D. ......................................... Georgia
Murphee, R. L. (Emeritus), Ph.D. ............... Wisconsin
Oliver, S. P., Ph.D. ........................................ Ohio State
Richardson, D. O., Ph.D. ............................ Ohio State
Robbins, K. R., Ph.D. ...................................... Illinois
Saxton, A., Ph.D. ............................................ NC State
Shirley, H. V. (Emeritus), Ph.D. ................. Illinois
Schutz, T. W., Ph.D. ....................................... Tennessee
Simms, M. H., Ph.D. ....................................... Louisiana
Tugwell, R. L. (Emeritus), Ph.D. .............. Kansas State

Assistant Professors:
Grizzle, J. M., Ph.D. ......................... Florida
Hollingsworth-Ward, Ph.D. ................. Nebraska
Mathew, A. G., Ph.D. ......................... Purdue
Mendis-Handagama, L. C. .................... Monash
Schrick, F. N., Ph.D. ............................... Clemson
Smalling, J. D., Ph.D. ......................... Texas A&M

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 M.S. level, areas of concentration are nutrition, breeding, physiology (reproductive, mammary, and metabolic), and management with orientation towards beef cattle, dairy cattle, swine, and poultry. Students with a major in management concentration must complete at least 12 hours each at the 500 and 600 level in the respective concentration or closely related area. Students in the management concentration must complete Animal Science 586 and 9 hours at the 500 or 600 level in the two non-management concentrations for a total of 12 hours (including 581).

5. A minimum of 1 hour of Agriculture 512 in addition to that required at the M.S. level.
6. A minimum of 6 hours in 400-, 500-, or 600-level statistics courses approved for the ICPSG.

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.

GRADUATE COURSES

420 Advanced Reproduction (3) Collection, preservation, and preparation of ova, spermatozoa and embryos; application of methods of artificial insemination and techniques of artificial insemination and embryo transfer; herd sire and dam evaluation; pregnancy determination; gestation and parturition; infertility; and advances in through 2000. Prereq: 300 or equivalent. F

430 Advanced Ration Formulation (2) Advanced ration 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. Prereq: 330 or equivalent and introductory computer science course. F

440 Advanced Animal Breeding (2) Computer simulation of genetic improvement for multiple traits in swine, beef, and dairy cattle; evaluation of alternative breeding strategies; industrial programs in swine, poultry, sheep, and dairy cattle; breeding, improvement, and utilization. Prereq: 340 or equivalent. 1 hr and 2 lab. F

481 Beef Cattle Production and Management (3) Integration of principles of nutrition, breeding, physiology, and marketing into comprehensive production and management programs. Programs of industry, enterprise establishment, systems of production, production practices, and compatibility of production programs. Management evaluated in terms of production responses and economic return. Prereq: Completion of 300-level core courses or equivalent and consent of instructor. 2 hrs and 1 lab. F

482 Dairy Cattle Production and Management (3) Integration of principles of nutrition, breeding, physiology, and marketing into comprehensive production and management programs. Programs of industry, enterprise
Anthropology

MAJOR

DEGREES

Anthropology .......................................................... M.A., Ph.D.

Jan F. Simek, Head

Professors:

Bass, William M. (Emeritus), Ph.D. Pennsylvania
Faulkner, Charles H., Ph.D. .................. Indiana
Jantz, Richard L., Ph.D. .................. Kansas
Klopke, Walter E., Ph.D. .................. Missouri
Logan, Michael H., Ph.D. ............... Pennsylvania
Parnell, Paul W. (Emeritus), Ph.D. ........ Texas & M
Simek, Jan F., Ph.D. ............... SUNY Binghamton
Wheeler, Margaret C. (Emeritus), Ph.D. ....... Yale

Associate Professors:

Harrison, Faye V., Ph.D. ............... Stanford
Harrison, Ilene E., Ph.D. ............. Syracuse
Howell, Benita J., Ph.D. ............... Kentucky
Kniebgs, Lyle, Ph.D. .............. Northwestern
Kramer, Andrew (Liang), Ph.D. ........... Michigan
Krop, Gerald F., Ph.D. ............... Washington State

Assistant Professor:

Marks, Murray K., Ph.D. ............... Tennessee

Research Associate Professor:

Chapman, Jefferson, Ph.D. ............... North Carolina

The Department of Anthropology offers both the M.A. and Ph.D. degrees with concentrations in archaeology, biological anthropology, cultural anthropology, and zooarchaeology. Additional information on the Anthropology graduate program may be obtained from the department brochure or by contacting the Anthropology Department.

THE MASTER’S PROGRAM

Students wishing to enter the Master of Arts degree program with a major in Anthropology should have an undergraduate GPA of 3.5 in the major, a 3.3 overall, and hold a bachelor’s degree from an accredited university with a major in Anthropology. Applicants 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).

Animal Science—Veterinary Medicine

See College of Veterinary Medicine and Comparative and Experimental Medicine

52 Anatomy of Domestic Carnivores (4) Gross dissection by systems and regions of dog with comparison to cat. Prereq: Consent of instructor. 1 hr. F

55 Comparative Anatomy (3) Comparative and experimental medicine—Veterinary Medicine 552. F

552 Comparative Anatomy (4) Gross dissection by systems and regions of dog with comparison to cat. Prereq: Consent of instructor. 1 hr. F

55 Comparative Hematology (3) Morphology, physiology, and development of blood and blood forming organs. Similar techniques and equipment. Prereq: Undergraduate physiology and/or consent of instructor. 2 hrs. F

57 Design and Analysis of Biological Research (3) Experimental design and procedures: selection of experimental units, analysis and interpretation of data, statistical techniques, and interpretation of variance and covariance structures. Prereq: Plant and Soil Science 571 or equivalent; knowledge of software package on micro- or mainframe computer. (Same as Plant and Soil Science 571.) Sp.

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. Prereq: 571 or equivalent. 2 hrs and 1 lab. F

581 Advanced Livestock Management (3) Objective functions to evaluate alternative livestock production management policies. Systems approach to analysis and management of reproductive management programs. Genetic improvement policies, alternative feeding systems, nutrition for health and production programs. Consideration of time, risk, and uncertainty in livestock production. Tools, linear programming, as aids in decision-making and resource allocation. Prereq: Management, economics, computer science, statistics. 2 hrs and 1 lab. Sp.


600 Doctoral Research and Dissertation (3-15) P/NP only. E

621 Advanced Topics in Animal Physiology (4) Recent advances and concepts, research techniques, current problems. May be repeated. Maximum 6 hrs. E

631 Advanced Topics in Animal Nutrition (1-4) Recent advances and concepts, research techniques, current problems. May be repeated. Maximum 6 hrs. E

66 Advanced Mineral-Vitamin Nutrition (4) Chemical forms, digestion, absorption, intermediary metabolism, deficiencies, excesses and interaction of minerals and vitamins. Prereq: 533 or 534, and Biochemistry and Cellular and Molecular Biology 410 or Nutrition 511 or consent of instructor. Sp.

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 hrs. (Same as Comparative and Experimental Medicine—Veterinary Medicine 651.) E

652 Disorders of the Endocrine System (2) Pathological and physiological aspects of diseases, endocrine glands of various animal species. Prereq: 521 or consent of instructor. (Same as Comparative and Experimental Medicine—Veterinary Medicine 652.) Sp.

Animal Science—Veterinary Medicine

See College of Veterinary Medicine and Comparative and Experimental Medicine
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, M.A. students should plan to begin their studies in the Fall semester.

**M.A. Requirements**

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

1. Selection of an M.A. 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.
2. A minimum of 30 credit 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
3. 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.
4. During the first year, comprehensive Graduate Evaluation Examinations (GEEs) are required of all M.A. students and are based on the content of the core courses. These examinations are given as the final examination in each core class (during regularly-scheduled final periods) and are graded by all faculty within the appropriate subdiscipline for each course. At the end of the first year, all M.A. students will be 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.
5. All M.A. 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 501 in the Fall semester of each year and fulfill all requirements for the course defined by the instructor. Materials covered by visiting lecturers may appear on the GEE.
6. A graduate-level introductory statistics course, usually Statistics 537.
7. 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).
8. 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.
9. Two copies of the thesis are to be provided to the department and to all members of the student's M.A. committee.

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

**THE DOCTORAL PROGRAM**

In addition to The Graduate School requirements, requirements for the Ph.D. degree with a major in Anthropology, in the appropriate sequence of completion, are as follows:

**Admission:**

- Admission to the Ph.D. program is contingent upon completion of ALL requirements prior to that level. Master's thesis candidates at UTK who are conditionally accepted into the Ph.D. program can enroll as doctoral students the semester following conferment of the M.A. degree. 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 Ph.D. program is based upon the applicant's academic record and credentials, but also on an individual's interest and faculty areas of research. Applicants will not be admitted to the Ph.D. program unless appropriate faculty members are available to chair and serve on the doctoral committee. Doctoral program applicants should consult 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 Ph.D. degree program should meet the same academic standards as M.A. program applicants and furnish the same materials (see The Master's Program).

**Doctoral Committee:**

- A doctorate 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 competencies on which the student will be examined, a brief delineation of the fields by the student, approved by the members of the committees, is presented to the department head and the student's major professor. As early as possible, but no later than one full semester after admission to candidacy, the student shall formally present a written dissertation proposal to the department head and advisor.

**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.

**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 satisfied by:
  1. Successful performance on a language examination administered by the appropriate language department. A student electing this alternative should consult with the advisor; or
  2. 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.
  1. **Written Comprehensive Examination:**
     - When the Ph.D. 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.
  2. **Oral Comprehensive 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 Graduate School, the student is admitted to candidacy for the Ph.D. 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 written papers as a dissertation is not a formal option for the Anthropology Department.

**ACADEMIC COMMON MARKET**

- An agreement among southeastern states for sharing graduate programs allows the residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.A. program in Anthropology is available to residents of the states of Louisiana (concentration in zooarchaeology only), Virginia (concentration in zooarchaeology or cultural anthropology), or West Virginia. The Ph.D. program is available to residents of Alabama, Louisiana, Mississippi, or West Virginia.

Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.
GRADUATE COURSES

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 and their application 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 folklife 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, ethnographic, and contemporary cases. Prereq: 130.

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 political and economic structures and systems within modern states. Prereq: Cultural anthropology or consent of instructor.

415 Ethnographic Research (3) Conceptual and practical exploration of research methods and techniques cultural anthropologists use in fieldwork. Prereq: Cultural Anthropology 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: Historic Archaeology.

440 Cultural Ecology (3) Concepts and methods in studying dynamic patterns of prehistoric and present-day cultures and their environments: ecological theory, methods of analysis, and review of selected case studies. Prereq: 120, 130, 410, or consent of instructor.

462 Early European Prehistory (3) Origins and evolution of human culture in Europe through beginnings of settled life. Palaeolithic 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 economy to rise of States. Mesopotamia, Indus Valley, 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 prehistoric and historic cultures; 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: Historic Archaeology.

480 Human Osteology (4) Intensive examination of human skull. Prereq: 110 and consent of instructor. 3 hrs and 1 lab.

481 Museology I: Museums, Purpose and Function (3) (Same as Art 481.)

482 Museology II: Exhibition Planning and Installation (3) (Same as Art 482.)

484 Museology III: Field Projects (1-12) (Same as 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. E

501 Graduate Research (1-15) Independent investigation of special problems in anthropology. May be repeated. Maximum 9 hrs.

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. S/NC only. E

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, ethnography, comparative social organization, religion, and art. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

512 Urban Studies in Anthropology (3) Process of urbanization examined cross-culturally; theory and method in researching urban communities; urban problems and applied anthropology.

513 Rural Studies in Anthropology (3) Theory, method, and ethnographic research on selected problems and aspects of traditional agrarian life in U.S. and peasant societies. Prereq: Cultural area course or equivalent. May be repeated. Maximum 6 hrs.

514 Anthropology of Development (3) Application of anthropological theory, methods, and findings to contemporary development programs. Analysis of anthropologists' roles, values, and ethical issues in selected case studies. Survey of anthropologists' work in non-academic settings.

515 Medical Anthropology (3) Cultural impact on disease patterns, 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 social stratification, including face-to-face, 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. Interactions 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, and methods of presenting faunal data. May be repeated. Maximum 6 hrs.

521 Laboratory Studies in Zooarchaeology (3) Examination and comparison of skeletons of major vertebrate groups, shells of terrestrial and aquatic molluscs, 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 6 hrs.

522 Seminar in Archaeology (3) Theoretical and practical issues in contemporary archaeology: ethnarchaeology, paleoethnobotany, taphonomy, ceramic analysis, agricultural origins, and regional archaeological cultures. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

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 hrs.

531 Quantitative Methods in Archaeology (3) Application of quantitative techniques to archaeological data critically examined through literature and problem solving. Basic and advanced statistical analyses and other mathematical methods. Prereq: Consent of instructor.

580 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.

581 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 9 hrs.

582 Problems in Old World Archaeology (3) (Same as Classics 562.)

583 Lithic Artifact Analysis (3) Methods for analyzing prehistoric stone tools in practical laboratory/lecture format. Stone tool production, use, stylistic variability, and discard processes.

584 Archaeology of Southeastern United States (3) Archaeological research on prehistoric American Indian cultures in Southeastern United States; Tennessee prehistory.

585 Advanced Human Variation (3) Genetic and morphological variation among extant human groups; relationships of variation to geography, ecology and subsistence.


588 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.

589 Anthropometry (3) Techniques of measuring and describing skeletal material and human subjects: practical applications to growth, nutrition, and human engineering. Prereq: Consent of instructor.

590 Method and Theory in Biological Anthropology (3) Current methods of analysis in biological anthropology and of past and current history of theoretical perspectives. Paleanthropology, 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. E

601 Advanced Graduate Research (1-6) Independent investigation of special problems in anthropology by advanced graduate students. May be repeated. Maximum 12 hrs. Only 3 hrs may count toward 600-level requirement.

610 Seminar in Cultural Anthropology (3) Selected topics, primarily for doctoral students in cultural anthropology. May be repeated. Maximum 6 hrs.

611 Theory in Cultural Anthropology (3) Critical evaluation of current issues in theory and data interpretation, primarily for doctoral students in cultural anthropology.

660 Advanced Seminar in Archaeology (3) Selected topics in prehistoric and historic archaeology. May be repeated. Maximum 6 hrs.

690 Selected Topics in Physical Anthropology (3) For doctoral students in biological anthropology. May be repeated. Maximum 6 hrs.

691 Selected Topics in Paleopathology (3) May be repeated. Maximum 6 hrs.
Architecture

(College of Architecture and Planning)

MAJOR

Architecture ........................................ M.Arch.

Marleen K. Davis, Dean
William J. Lauer, Associate Dean
Jon P. Coolidge, Graduate Program Head

Professors:
Anderson, G. I., M.Arch. ................. Illinois
Conley, G. (Emeritus), B.Arch. .......... Harvard
Davis, Marleen, M.Arch. ...................... Harvard
Grieger, F., M.Arch. ......................... Pennsylvania
Kaplan, M., M.Arch. ......................... Cornell
Kelso, R. M., M.A. ............................. Tennessee
Kersavage, J. A., D.Sc. ....................... South Cal
Kinzy, S. A., Ph.D. .............................. SUNY (Buffalo)
Lauer, W. J. (Liaison), M.S.Arch. Engr. .... Iowa State
Lester, A. J. (Emeritus), M.Arch. ......... Virginia
Lizon, Ph., Ph.D. ................................. MIT
Moffett, M. S., Ph.D. ......................... MIT
Rabun, J. S., M.A. ............................... Texas
Robinson, M. A., M.Arch. ................. Pennsylvania
Rudd, J. W., M.A. .............................. Northwestern
Shell, W. S., M.S.Arch. ....................... Columbia
Watson, J. S., M.Arch. ....................... Pennsylvania
Wodehouse, L. M. (On leave), Ph.D. ..... St. Andrews

Associate Professors:
Coddington, J., M.Arch. ..................... Pennsylvania
Davis, T. K., M.Arch. ......................... Cornell
Martelis, W. E., B.Arch. ..................... California
Schimmenti, M. M., M.Arch. ............. Florida

Assistant Professors:
Almy, D. J., III, M.Arch. .................... Texas
Fox, L. D., M.Arch. ............................ Cranbrook
French, R. C., B.Arch. ....................... Tennessee
Livingston, M., M.F.A. ....................... Wisconsin
Moir-McClean, T. W., M.Arch. .......... Michigan
Ware, S. M., M.F.A. ........................... Tennessee

MAJOR

Architecture ........................................ M.Arch.

Marleen K. Davis, Dean
William J. Lauer, Associate Dean
Jon P. Coolidge, Graduate Program Head

Professors:
Anderson, G. I., M.Arch. ................. Illinois
Conley, G. (Emeritus), B.Arch. .......... Harvard
Davis, Marleen, M.Arch. ...................... Harvard
Grieger, F., M.Arch. ......................... Pennsylvania
Kaplan, M., M.Arch. ......................... Cornell
Kelso, R. M., M.A. ............................. Tennessee
Kersavage, J. A., D.Sc. ....................... South Cal
Kinzy, S. A., Ph.D. .............................. SUNY (Buffalo)
Lauer, W. J. (Liaison), M.S.Arch. Engr. .... Iowa State
Lester, A. J. (Emeritus), M.Arch. ......... Virginia
Lizon, Ph., Ph.D. ................................. MIT
Moffett, M. S., Ph.D. ......................... MIT
Rabun, J. S., M.A. ............................... Texas
Robinson, M. A., M.Arch. ................. Pennsylvania
Rudd, J. W., M.A. .............................. Northwestern
Shell, W. S., M.S.Arch. ....................... Columbia
Watson, J. S., M.Arch. ....................... Pennsylvania
Wodehouse, L. M. (On leave), Ph.D. ..... St. Andrews

Associate Professors:
Coddington, J., M.Arch. ..................... Pennsylvania
Davis, T. K., M.Arch. ......................... Cornell
Martelis, W. E., B.Arch. ..................... California
Schimmenti, M. M., M.Arch. ............. Florida

Assistant Professors:
Almy, D. J., III, M.Arch. .................... Texas
Fox, L. D., M.Arch. ............................ Cranbrook
French, R. C., B.Arch. ....................... Tennessee
Livingston, M., M.F.A. ....................... Wisconsin
Moir-McClean, T. W., M.Arch. .......... Michigan
Ware, S. M., M.F.A. ........................... Tennessee

MASTERS OF ARCHITECTURE PROGRAM

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.

Admission Requirements

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

For Track 1 applicants, a bachelor's degree with a 3.0 GPA from a regionally accredited college or university is required. International applicants must have an equivalent 4-year degree and a score of at least 3.0 on the General Test of the Graduate Record Examination. Applicants must submit three letters of recommendation. A personal on-site interview is desirable but not mandatory. For those applicants from accredited 4+2 architecture programs, a portfolio is required in addition to the above requirements.

For Track 2 applicants, a Bachelor of Architecture degree from an NAAB accredited program, or a foreign equivalent, with a GPA of at least 3.0 may be considered for conditional admission when evidence of exceptional promise is identified. Undergraduate work must include at least twelve quarter hours of humanities, a basic understanding of physical principles, systems and analytical procedures and an understanding of mathematical principles and analytical procedures, as well as a general understanding of the use of computers. The School requires a separate application for Architecture including an essay and three letters of recommendation. A personal on-site interview is desirable but not mandatory. For those applicants from accredited 4+1 architecture programs, a portfolio is required in addition to the above requirements.

For Track 2 applicants, a Bachelor of Architecture degree from an NAAB accredited program, or foreign equivalent. 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 with a separate application 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.

Degree Requirements

Track 1 requires a minimum of 42 semester hours of undergraduate preparation and 60 semester hours of graduate coursework, taking approximately 3 1/2 years of full-time study. A minimum of 4 hours of architectural electives or approved electives from another discipline must be taken at the 500 level or above.

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

Both tracks require 6 hours of Thesis 500 with a public presentation and oral defense of the thesis. Retention in the program is contingent upon evidence of satisfactory progress toward the degree. Each student's progress will be reviewed each semester by the Graduate Program Committee. Any questions regarding progression will be handled by the Graduate Program Advisory Committee.

For further information, contact the School of Architecture.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.Arch. program in Architecture is available to residents of the states of Kentucky. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

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 & Indigenous Architecture (3) Building responsive to climate, material availability, and economic level, as designed by anonymous builders. Prehistoric to present world. Mesoamerican, Mediterranean, Hindu, and Muslim architectural traditions of China, India, and Japan.

413 Tennessee Architecture (3) History of settlement patterns and building in Tennessee. Reading assignments, lectures, discussion, and field trips. Historical research using primary material.

414 History of Architectural Technology (3) Building materials and construction techniques from antiquity to present.

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 American Architecture, 1840-1940 (3) Stylized periods from Gothic Revival through twentieth century.

421 History of Landscape Architecture (3) Intellectual, societal, and geographical influences that provide historical and geographic basis for design throughout history. Selected examples of landscape architecture analyzed in terms of design.

422 Modern East European Architecture (3) Twentieth-century architecture in Russia, Czechoslovakia, Poland, Hungary, East Germany, Romania, Bulgaria, Yugoslavia.

425 Special Topics in Architecture (1-6) Faculty initiated courses. Topics vary. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

433 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: Computer Applications in Design I or consent of instructor. Sp

434 Building Energy Analysis (3) Balancing heat flow through external skin of residential and commercial buildings. Local climate evaluation. Site planning, building site and orientation, window area, wall treatment, insulation, and external design elements. Energy use quantity methods and economic analysis of energy efficient design features. Architectural program analysis of external and internal load dominated buildings. Prereq: 341.

444 Advanced Environmental Control Systems (3) In-depth analysis and innovative concepts in design of heating, ventilating, and air conditioning. Prereq: 341.

445 Advanced Lighting (3) In-depth analysis and innovative concepts in design of lighting. Prereq: 342.

453 Architectural Development (3) Principles and practice of architect as developer. Impact of economics, technology, and urban policy on design and development of real estate. Open to all students.

695 Gross Human Anatomy (9) Skeleton, muscles, and cardiovascular system. Dissection of cadavers. Prereq: 480 or Human Biology. 5 hrs and 5 labs.
571 Architectural Design Studio/Seminar I: Environmental Forces (6) Environmental factors influencing regional character of architecture. Examination of associated natural forces and cultural interpretation. Readings and discussions; application in design studio to specific projects. Prereq: Principles in Architectural Design, 1 hr and 5 labs.


573 Architectural Design Studio/Seminar III: Cultural Aesthetics (3) Role of cultural influences on architectural form. Investigations into relationships between place and culture and impact on architectural character. Analysis and design with urban context. Readings and discussions: process of formal synthesis in design studio. Prereq: 572 1 hr and 5 labs.


591 Foreign Study (1-9)

592 Off-Campus Study (1-9)

593 Independent Study (1-9)

Art

(MAJOR)

Art ......... M.F.A.

Professor:

Norman Magden, Head

Art

Blain, Sandra J., M.F.A. ................. Wisconsin
Brakke, P. M., M.F.A. .................. Yale
Clarke, R.A. (Emeritus), M.S. ........ Wisconsin
Cleaver, Dale G. (Emeritus), Ph.D. ....... Chicago
Daehnert, R. H. (Emeritus), M.F.A. ...... Wisconsin
Darrow, J. F., Ed.D. ........................ Illinois State
Falsetti, Joseph S., M.S. ............... Ohio State
Goldenstein, Martin B., M.F.A. ......... Nebraska
Kanney, William C., M.F.A. ............ Wisconsin
Lee, B., M.F.A. ............................. Yale
Leland, W. E., M.F.A. ................... Tennessee
Livingston, P. R., M.F.A. ............... Wisconsin
Lyons, B. (Liaison), M.F.A. ............. Arizona State
Magden, Norman, Ph.D. Case Western Reserve
Martinson, Fred, Ph.D. ........................ Chicago
Metros, Susan E., M.F.A. ............. Michigan State
Moffat, Thomas, Ph.D. .................. Chicago
Peacock, D., M.F.A. ..................... Iowa
Riesing, T. J., M.F.A. ..................... Nebraska
Stewart, F.C., M.F.A. .................... Claremont
Yates, S., M.F.A. ......................... North Carolina (Greensboro)

Associate Professors:

Habel, Dorothy, Ph.D. ...................... Michigan
LeFevre, Richard, M.F.A. ................ Rochester IT
Longobardi, Pam, M.F.A. ............... Montana State
Neff, A., Ph.D. .............................. Pennsylvania
Staples, Carolyn, M.F.A. ............... Michigan State
Wilson, D. F., M.F.A. ..................... California (San Diego)

Assistant Professor:

Brogden, Sally B., M.F.A. ....... NY State College of Ceramics (Alfred)
Art 59

Art Design/Graphic

GRADUATE COURSES


451 Advanced Graphic Design (3) Theory and techniques of visual problem-solving as applied to advanced applications of graphic design. Prereq: Intermediate Graphic Design II.


453 Advertising Illustration (3) Media and techniques as applied to advertising illustration. Prereq: Black and White Illustration and successful completion of any portfolio review.

454 Editorial Illustration (3) Media and techniques as applied to editorial illustration for books, magazines, and newspapers. Prereq: Black and White Illustration and successful completion of any portfolio review.

456 Graphic Design Practicum (3-12) Practical work experience in graphic design field. Only by prearrangement with department; Prereq: Senior standing and consent of instructor. May be repeated. Maximum 12 hrs.

459 Special Topics in Graphic Design (3) Student-or instructor-initiated course offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 12 hrs.

550 Studies in Graphic Design/ Illustration History (3) Design and illustration ca. 1650 to present. Prereq: M.F.A. candidate or consent of department. May be repeated. Maximum 6 hrs.

551 Graphic Design II (2-6) May be repeated. Maximum 10 hrs.

552 Graphic Design II (2-5) May be repeated. Maximum 10 hrs.

553 Computer Enhanced Design (2-6) Prereq: Consent of instructor. May be repeated. Maximum 10 hrs.

554 Special Topics in Graphic Design (2-6) Prereq: Consent of instructor. May be repeated. Maximum 10 hrs.

555 Independent Study (1-15) See College of Arts and Sciences.

556 Visiting Artist Seminar (2) Contemporary art issues brought to light by contemporary artists. May not be used toward art history requirement. May be repeated. Maximum 8 hrs.

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 hrs. S/NC only. E

Art History

GRADUATE COURSES

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) Development 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: Western Art I and II, or consent of instructor.


476 History of 20th-Century Painting and Sculpture in Europe (3) Cezanne, Van Gogh, Gauguin, Symbolism, Fauvism, German Expressionism, Cubism, Futur-
Art

Art Media/Photography

GRADUATE COURSES


432 Modern Art and Film (3) History of development and interaction between visual arts and dramatic arts within context of modern art history. (Same as Cinema Studies 477.)

435 Cinematography as Art (3) Continued development of concepts and techniques for creation of film as art form. Prereq: 432. May be repeated. Maximum 9 hrs.


437 Special Topics in Photography (3) Student- or instructor-initiated course offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 12 hrs.

440 Special Topics in Media Arts (3) Student- or instructor-initiated course offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 12 hrs.

442 Large Format Photography II (4) Studio course that continues exploration of use of large format camera in photography. Prereq: Digital Photography I and consent of instructor. Maximum 10 hrs.

449 Special Topics in Sculpture (3) Student- or instructor-initiated course offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 12 hrs.

Art Painting

GRADUATE COURSES

419 Painting IV (6) Individual concepts and personal expression with varied media. Prereq: 313. May be repeated. Maximum 12 hrs.


419 Special Topics in Drawing and Painting (3) Student- or instructor-initiated course offered at convenience of department. Prereq: Consistent with department. May be repeated. Maximum 12 hrs.

513 Graduate Painting I (2-6) May be repeated. Maximum 10 hrs.

514 Graduate Painting II (2-6) May be repeated. Maximum 10 hrs.

515 Graduate Watercolor I (2-6) May be repeated. Maximum 10 hrs.

516 Graduate Watercolor II (2-6) May be repeated. Maximum 10 hrs.

593 Independent Study (1-15) May be repeated. Maximum 60 hrs.

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 hrs. S/NC only. E

Art Printmaking

GRADUATE COURSES

462 Intaglio II (2-6) Exploration of individual projects through advanced color printing methods and combinations with other print media. Prereq: Intermediate Intaglio or consent of instructor. May be repeated. Maximum 12 hrs.

464 Screen Printing III (2-6) Individual development of screen printing problems and techniques: development of image and personal concept. Prereq: Intermediate Screen Printing or consent of instructor. May be repeated. Maximum 12 hrs.

531 Photography (12-6) May be repeated. Maximum 10 hrs.

532 Photography II (2-6) May be repeated. Maximum 10 hrs.

535 Media Arts I (2-6) May be repeated. Maximum 10 hrs.

536 Media Arts II (2-6) May be repeated. Maximum 10 hrs.

577 Studies in Media as Art (3) Selected topics in theory and history of media as art form. Prereq: Modern Art and Film or consent of instructor. May be repeated. Maximum 9 hrs.

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 hrs. S/NC only. E

Art Sculpture

GRADUATE COURSES

441 Advanced Sculpture (3-6) Individual development of sculptural problems and techniques. Prereq: 6 hrs of 300 level sculpture. May be repeated. Maximum 12 hrs.

449 Special Topics in Sculpture (3) Student- or instructor-initiated course offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 12 hrs.

541 Graduate Sculpture II (2-6) May be repeated. Maximum 10 hrs.

542 Graduate Sculpture II (2-6) May be repeated. Maximum 10 hrs.

593 Independent Study (1-15) May be repeated. Maximum 60 hrs.

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 hrs. S/NC only. E

Arrowmont

GRADUATE COURSES

Courses listed below offered periodically only at the Pi Beta Phi Arrowmont School of Crafts, Gatlinburg, Tennessee. Courses may be repeated. Upon admission to the M.F.A.
program at UT Knoxville, a student may apply to certain graduate courses taken at Arrowmont toward the degree, subject to the approval of the student's graduate committee.

400 Special Topics (2-4) Student- or instructor-initiated course offered at convenience of department. May be repeated.

410 Drawing (2-4) Intermediate to advanced. May be repeated.

420 Ceramics (2-4) Intermediate to advanced. May be repeated.

430 Photography (2-4) Intermediate to advanced. May be repeated.

440 Metal Design (2-4) Intermediate to advanced. May be repeated.

450 Enameling (2-4) Intermediate to advanced. May be repeated.

460 Fiber (2-4) Intermediate to advanced. May be repeated.

480 Painting/Watercolor (2-4) Intermediate to advanced. May be repeated.

490 Wood (2-4) Intermediate to advanced. May be repeated.

### Astronomy

See Physics and Astronomy

### Audiology and Speech Pathology

(College of Arts and Sciences)

**MAJORS**

<table>
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<tr>
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<th>DEGREES</th>
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<tr>
<td>Audiology</td>
<td>M.A.</td>
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<tr>
<td>Speech and Hearing Science</td>
<td>Ph.D.</td>
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<tr>
<td>Speech Pathology</td>
<td>M.A.</td>
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</tbody>
</table>

Patrick J. Carney, Head

Professors:

Asp, Carl W., Ph.D. ....................... Ohio State

Burchfield, Samuel B., Ph.D. ......... Michigan State

Carney, Patrick J. (Liasison), Ph.D. .... Iowa

Gordon, Pearl A., Ph.D. .................. Tennessee

Hedrick, Mark, Ph.D. ..................... Vanderbilt

Krishnan, Ravi A., Ph.D. .................. Texas

Nabelek, Igor V. (Emeritus), Sc.D. ...... Prague

Patrick J. Carney, Head

Silverstein, B. (Emeritus), Ph.D. ........ Illinois

White, Joseph D., Ph.D. ............. Northwestern

Associate Professors:

Fodor, G., Ph.D. .......................... West Virginia

Gonzalez, L., Ph.D. ...................... Texas

Ward, Jacki L., Ph.D. .................... Pittsburg

Swanson, Lori A., Ph.D. .................. Purdue

**THE MASTER'S PROGRAM**

A major is offered in Audiology or in Speech Pathology. A minor is offered in each of the two areas when approved by the department.

THE DOCTORAL PROGRAM

The Ph.D. program in Speech and Hearing Pathology is designed to develop individuals for professional careers in a variety of positions including research and college teaching. The concentration areas are speech and language pathology, audiology, speech-language science, and hearing science. The program is research-oriented with a strong emphasis on processes involved in normal, deviant, 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:

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

The program will normally consist of three or more years of graduate study beyond the master's degree. The program will normally consist of three or more calendar years of graduate study beyond the master's degree with an average of 36 semester hours in speech/language pathology program or 39 semester hours in the audiology program of approved graduate credit and pass a final written examination.

**GRADUATE COURSES**

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<tr>
<td>430</td>
<td>Problems in Speech Pathology (1-3) Prereq: Consent of instructor.</td>
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**ACADEMIC COMMON MARKET**

An agreement among southern states for sharing graduate programs allows legal residents of Tennessee to enroll in certain programs at UT Knoxville on an in-state tuition basis. The Ph.D. program in Speech and Hearing Science is available to residents of the states of Alabama, Arkansas, Kentucky, or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

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<td>400</td>
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<td>410</td>
<td>Drawing (2-4) Intermediate to advanced. May be repeated.</td>
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b. a minimum of 6 semester hours in topic(s) of related interest;

c. 3 semester hours in 611; and

d. 3 semester hours in supervised teaching experience.

5. A comprehensive examination to demonstrate knowledge in the concentration area and an examination of research competence.

6. A final oral examination.

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<td>Clinical Practice (1) Prereq: Consent of instructor.</td>
</tr>
<tr>
<td>433</td>
<td>Observation of Clinical Practice (1) Prereq: Consent of instructor.</td>
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5. A comprehensive examination to demonstrate knowledge in the concentration area and an examination of research competence.

6. A final oral examination.
511 Introduction to Research in Speech and Hearing (3) Analysis of research techniques, fundamentals of statistics, application and interpretation of a proposal and hypothetical pilot research project.

512 Clinical Practice in Audiology (1-4) Prereq: 473 and 494. May be repeated. Maximum 6 hrs.

513 Clinical Practice in Audiology: Off-Campus Sites. (1-4) Prereq: Consent of instructor.

514 Practicum in Verbo-Tonal Habilitation (1-4) Prereq: 494, 595, or consent of instructor. May be repeated. Maximum 6 hrs.

515 Practicum in Aural Rehabilitation (1-4) Prereq: 473 and 494. May be repeated. Maximum 6 hrs.

517 Instrumentation in Audiology and Speech Pathology (3) Presentation in audiological and speech pathology; laboratory assignments for familiarization of students with instruments for measuring speech and hearing processes.

520 Aphasia (3) Historical review of aphasia literature, theories of production, aphasic classification and terminology, tests and rationale for testing, etiology, therapy considerations and prognosis for recovery. Prereq: 506 or equivalent or consent of instructor.

522 Seminar: Articulation and Voice Disorders (3) Current research in diagnosis and management of articulation and voice disorders. Prereq: Undergraduate courses in articulation and voice disorders or consent of instructor.

524 Traumatic Brain Injury (3) Advanced neurogenics: cognitive-linguistic emphasis. Medical and speech-language pathology rehabilitation issues associated with traumatic brain injury (TBI) related to adult TBI population. Prereq: Consent of instructor.

531 Seminar on Stuttering (3) Current significant research in stuttering. Prereq: 431 or consent of instructor.

532-33-34 Advanced Clinical Practice in Speech-Language Pathology (1-4, 1-4, 1-4) Prereq: 434 or equivalent and consent of instructor. 534 may be repeated. Maximum 6 hrs each. Enrollment for less than 2 hrs must have prior departmental approval.

535-36-37 Advanced Clinical Practice in Speech-Language Pathology: Off-Campus Sites (1-4, 1-4, 1-4) Prereq: 100 hrs clinical experience, consent of instructor. May be repeated. Maximum 6 hrs each. Enrollment for less than 2 semester hrs must have prior departmental approval.

538 Advanced Clinical Practice in Speech-Language Pathology: Public Schools (1-4) May be repeated. Maximum 6 hrs each. Enrollment for less than 2 hrs must have prior departmental approval.

539 Motor Speech Disorders (3) Neuromotor organization for speech production; types of motor speech disorders and associated neuromuscular symptomatology; diagnostic and management of motor speech disorders. Prereq: 506.


542 Hearing Disorders (3) Effects of heredity, development, aging, disease, and physical agents on hearing. Prereq: 473 or equivalent or consent of instructor.

543 Amplification Technology (3) Description of hearing aid circuits, components and performance characteristics. Electroacoustic and real-ear analysis of hearing aids. Coupler material and geometry effects. Practical experience in troubleshooting, repair, and construction of hearing aids. Prereq: 473 and 507 or equivalents or consent of instructor.


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 Advanced Audiology (3) Theoretical bases for behavioral audiology and acoustic immittance measurment. Prereq: 473 or equivalent or consent of instructor.

547 Special Problems in Audiology (1-3) Prereq: 473 or equivalent and consent of instructor. May be repeated. Maximum 6 hrs.

548 Special Study in Audiology (1-3) Special reading, consultation, and research activities in field of audiology. May be repeated. Maximum 6 hrs.

549 Hearing Science (3) Study of psychoacoustic phenomena and how they relate to perception and diagnostic audiology. Prereq: 473, 507, and 546 or equivalents or consent of instructor.

550 Seminar in Audiology (1-3) Significant research in various areas of audiology. Prereq: Consent of instructor. May be repeated. Maximum 10 hrs.

552 Seminar in Speech Pathology (2-3) Current significant research in speech pathology. Topics vary. Prereq: 8 hrs in speech pathology. May be repeated with consent of department. Maximum 3 hrs.

555 Special Problems in Speech-Language Pathology (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

556 Independent Study in Speech-Language Pathology (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

557 Management and Supervision for Speech-Language-Hearing Professionals (3) Management system, accountability, performance appraisal and clinical supervision for audiologists and speech language pathologists interested in private practice, supervision or administrative positions.

562 School Language Disorders (3) Assessment and remediation strategies for specifically-language-impaired children (ages 3-5). Techniques for special populations. Prereq: 461 or equivalent or consent of instructor.

563 Practical Applications of Language Habilitation Techniques (3) Identification and treatment of communicative disorders in infants and toddlers: family-centered intervention and family systems. Prereq: 461 or equivalent or consent of instructor.

565 School-Age Language Disorders (3) Review of current literature on assessment and intervention techniques for school-age language learners. Prereq: 461 or consent of instructor.

574 Pediatric Audiology (3) Theoretical and practical considerations in evaluation and treatment of hearing loss in infants and children. Audiological intervention in case management of hearing impaired child: amplification, educational alternatives, and state and federal guidelines.

575 Electrophysiological Assessment of Auditory Function (3) Auditory-evoked potentials and their anatomical origin. Use of various evoked potentials in evaluation of auditory function and determination of site(s) of lesion. Prereq: 473, 507, and 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. Prerequisites: Electromyography. Prereq: 507, 542, 546, and 576 or equivalents or consent of instructor.

579 Psycholinguistic Concepts in Speech Pathology (3) Psycholinguistic concepts and information theory in studying the normal and abnormal nature of certain disorders of language. Prereq: Consent of instructor.

582 Speech and Language Services in School (3) Organization and implementation of speech and language programs in schools.

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 Advanced 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: Phonetics and Acoustics of Speech, 473 and 494 or equivalents or consent of instructor.


599 Electrophysiological Assessment of Auditory Function (3) Auditory-evoked potentials and their anatomical origin. Use of various evoked potentials in evaluation of auditory function and determination of site(s) of lesion. Prereq: 473, 507, and 546 or equivalents or consent of instructor.

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 non-speech and speech stimuli. Prereq: 517.

603 Language Science (3) Seminar in theories and paradigms of research on acquisition and use of language: phonology, syntax, semantics and pragmatics. Prereq: Graduate standing and consent of instructor.

607 Advanced Anatomy and Physiology of the Ear (3) Anatomy and physiology of the normal ear, pathophysiology of vestibular system and other systems that contribute to balance. Prerequisites: Electromyography. Prereq: 507.

609 Seminar in Speech Science (2) Experimental arctic phonetics, psycholinguistics, speech synthesis, perception and intelligibility of speech, communication theory, and psycholinguistic measurement of speech and language. Topics vary. Prereq: 501 or consent of instructor. May be repeated. Maximum 6 hrs.

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.

625 Advanced Seminar in Neurologically-based Communication Disorders (3) Topics 529, 530, 531, 532, 533, 534, and 535, or consent of instructor. May be repeated. Maximum 6 hrs.

655 Practicum in College Teaching (1-3) Supervised experience in college teaching. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. S/NC only.

656 Directed Research (1-4) Participation in ongoing or non-dissertational research. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

657 Directed Study in Speech Pathology (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

658 Directed Study in Audiology (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

659 Directed Study in Speech Science (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

660 Directed Study in Hearing Science (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

661 Advanced Seminar: Language Disorders in Children (3) Topics vary. Prereq: 565 or consent of instructor. May be repeated. Maximum 6 hrs.

662 Advanced Seminar in Speech and Language (2) Topics vary: aberrations of voice, articulation, speaking time and rhythm, language development or use, and language symbolism. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.
Aviation Systems
(UT Space Institute)

MAJOR DEGREE
Aviation Systems ......................... M.S.

R. D. Kimberlin, Program Chair

Professors:
Collins, F. G., Ph.D. ....................... California
Kimberlin, R. D. (Liaison), Ph.D. ........ Tennessee
Mason, A. A. (Emeritus), Ph.D. .......... Tennessee
PALUDAN, C. T., Ph.D. .................. Denver
Wu, J. M., Ph. D. ......................... Cal Tech
Young, R. L. (Emeritus), Ph. D. ......... Northwestern

Associate Professors:
Lewis, William D., Ph.D. ................. Tennessee
Soltes, U. P., Ph.D. ...................... Tennessee

The University of Tennessee Space Institute offers a program leading to the Master of Science degree in a major in Aviation Systems. The Aviation Systems program is designed for those who possess a Bachelor's degree in engineering or science and wish to study under a "system philosophy" toward careers in research and development or administration in areas pertinent to aviation. Current emphases include flight testing, aircraft design, aviation meteorology, air traffic control, and air transportation.

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 Graduate School 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 aeronautical fundamentals, aircraft propulsion, and performance; and some understanding of economics.

Both thesis and non-thesis programs are available. The thesis program involves a minimum of 30 semester hours credit while the non-thesis program involves a minimum of 33 semester hours credit.

THESIS OPTION
The thesis program involves satisfactory completion of the following requirements:
Research and Development Specialization
1. Twelve hours of 500-level courses in the major field of aviation systems.
2. Six hours in industrial engineering (engineering management).
3. Six hours of electives from the major field, mathematics or engineering.
4. Six hours of Aviation Systems 500 demonstrating the ability to conduct and report on an independent investigation.

Administration Specialization
1. Twelve hours of 500-level courses in the major field of aviation systems.
2. Three hours in industrial engineering (engineering management).
3. Three hours in economics or finance.
4. Six hours of electives selected from the major field, mathematics or engineering.
5. Six hours of Aviation Systems 500 demonstrating the ability to conduct and report on an independent investigation.

NON-THESIS OPTION
The non-thesis program will be permitted in special circumstances and involves satisfactory completion of the following requirements:

Research and Development Specialization
1. Twelve hours of 500-level courses in the major field of aviation systems.
2. Six hours in industrial engineering (engineering management).
3. Twelve hours of electives in the major field, mathematics or engineering.
4. Three hours of an assigned project under Aviation Systems 550.
5. A comprehensive final written examination on all coursework submitted for the degree and defense of the project course paper.

Administration Specialization
1. Twelve hours of 500-level courses in the major field of aviation systems.
2. Three hours in industrial engineering (engineering management).
3. Three hours in economics or finance.
4. Twelve hours of electives in the major field, mathematics or engineering.
5. Three hours of an assigned project under Aviation Systems 550.
6. A comprehensive final written examination on all coursework submitted for the degree and defense of the project course paper.

ACADEMIC COMMON MARKET
An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UTK on a tuition basis. The M.S. program in Aviation Systems is available to residents of the states of Arkansas, Florida, Mississippi, Virginia, or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES
500 Thesis (1-15) P/NP only. E
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 (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. S/NC only. E
504 Airports and the Community (3) Structure of airports and their communities. Technology and economics of cargo, baggage, ticket and passenger handling. Airport management, economics and logistics, interfaces with community. Plans and programs and developments for collecting and distributing passengers and freight from various types of airports. Types of airport developments and their projections. Prereq: 501.
505 Governmental Policies for Aviation (3) Theoretical and legal basis for economic and governmental regulation of aviation. Problems and legislative development of air vehicle regulatory agencies. Organizational structure, administrative and enforcement procedures. Prereq: 501.
506 Aircraft Design (3) Process design, 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 processes.
510 Special Topics in Aviation Systems (3) Current problems. Prereq: Consent of instructor. May be repeated with consent.
550 Project in Aviation Systems (3) Enrollment limited to Aviation System students in non-thesis program. May be repeated. Maximum 3 hrs allowed toward degree.
559 Measurement Science II (3) Same as Nuclear Engineering 588. Mechanical and Aerospace Engineering 586.

Biochemistry and Cellular and Molecular Biology
(College of Arts and Sciences)

MAJOR DEGREES
Biochemistry ........................................... M.S., Ph.D.

John W. Koontz, Head

Professors:
Bagby, R. M., Ph.D. ............................. Illinois
Carlson, J. G. (Emeritus) (Distinguished Prof.), Ph.D. ........ Pennsylvania
Chen, T.-T., Ph.D. ............................... Florida
Churchich, Jorge E., Ph. D. ............... Sheffield
Handel, Mary Ann (Distinguished Prof.), Ph.D. .............. Kansas State
Jeon, K. W., Ph. D. ............................... London
Joshi, J. G. (Emeritus), Ph. D. ............. Poona
Kennedy, J. R., Ph. D. ......................... Iowa
Liles, J. N. (Emeritus), Ph. D. ............. Ohio State
MacCabe, J. A., Ph. D. ....................... California (Davis)
MONTGOMERY, J. R., Ph. D. ............... Rochester
Roth, L. Evans, Ph. D. ....................... Chicago
SALO, T. P. (Emeritus), Ph. D. .......... Michigan
Shivvers, C. A., Ph. D. ...................... Michigan State
Welch, H. G. (Emeritus), Ph. D. .......... Florida
Whitson, G. L., Ph. D. ...................... Iowa
WICKS, WESTLEY, D., Ph. D. .......... Harvard
REQUIREMENTS FOR 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:

1. One year of general biology or the equivalent.
2. A minimum of 8 semester hours of approved biology courses beyond the introductory level and including the subject areas of genetics, cell biology and physiology.
3. Two years of chemistry including one year of general chemistry and one year of introductory organic chemistry with laboratory.
4. At least one semester of biochemistry.
5. One year of calculus.
6. One year of physics.
7. Graduate Record Examination scores;

and

and

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.

THE MASTER'S PROGRAM

1. Biochemistry and Cellular and Molecular Biology 511-12, 515-16, and 517.

2. Completion of course requirements as determined by the candidate's faculty committee.

3. Achievement of a 3.0 or better GPA in all courses taken for graduate credit.

4. At least 6 hours of advanced seminar courses from the following: 601 through 611.

5. Six hours of master's research and a thesis.

6. A final examination that covers both the thesis endeavor and the subject matter of the course requirements.

THE DOCTORAL PROGRAM

1. Biochemistry and Cellular and Molecular Biology 511-12, 515-16, and 517.

2. At least two 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.

3. At least 6 hours of topics offered in 615.

4. Participation in 601 and 603 during the entire period of residence. Participation in one other seminar or journal club each semester in residence.

5. Comprehensive examination, taken before the end of the third year of study.

6. A dissertation reporting the results of original and significant research carried out during the term of candidacy.

7. 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 Ph.D. 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:

1. The 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
2. Publication of at least one full-length paper in a major scientific journal as senior author.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. program in Biochemistry is available to residents of the state of Kentucky. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

403 Advanced Genetics Laboratory (2) Experiments illustrating methods in modern genetics; techniques in classical, cytological, and developmental genetics. Model organisms; Drosophila and mouse. Prereq: General Genetics and Organic Chemistry.

410 Cellular and Comparative Biochemistry (4) Eucaryotic behavior, chemistry and structure of proteins; enzyme behavior and biological function; catabolism and energy capture; synthesis; transcription; translation; protein synthesis, and biochemical genetics; regulation of biological processes. Prereq: Organic Chemistry and General Biology. 3 hrs and 1 discussion. F, Sp


421 Cell and Tissue Structure and Function (4) Study of animal cells and tissues at light and electron microscope levels. Prereq: Cell Biology. 2 hrs and 2 labs.


449 Laboratory in Physiology (2) Prereq or coreq: 440 or 445.

465 Human Genetics (3) Genetic and molecular principles and problems of human inheritance. Prereq: General Genetics.

471-81 Biophysical Chemistry (3,3) Biophysical principles with applications to biological systems. 471 Thermodynamics; chemical equilibrium and 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: Calculus, Organic Chemistry, General Biology or consent of instructor. (Same as Chemistry 471-81). F, Sp

480 Physiology of Exercise (3) (Same as Exercise Science 480.)

500 Thesis (1-15) P/NP only. E

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. S/U only. E

511 Advanced Protein Chemistry and Biopolymers (3) Advanced protein chemistry and biopolymer structure and function; the progression: protein structure and function; membrane structure and function; signal transduction and cell regulation; cellular organization and membrane biogenesis; eicosanoids; and cell mitosis; cell-cell interactions and tissues. Prereq: Prior knowledge of cell biology and biochemistry and consent of instructor. (Same as Biological Sciences 512.)

512 Advanced Molecular Biology (3) Regulation of nuclear acid expression and protein activity. Nuclear acid structure and function; replication and repair of nuclear acids; gene expression; protein synthesis; post-translational protein modification; mitosis and meiosis; cell cycle and cell growth. Prereq: 511 or consent of instructor. (Same as Life Sciences 512.)

515 Experimental Techniques 1 (4) Modern experimental methodology and instrumentation lab, cell growth; spectrophotometry; microspectrophotometry, acid purification and analysis; protein assays; enzyme purification; electrophoresis; computer analysis of nuclear acid and protein sequences. Lecture and theory; lab to accompany two lab periods per week. Primarily for departmental graduate students. Prereq: Consent of Instructor. F

516 Experimental Techniques 11 (3) 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. Sp

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 (1-5) Selected directed readings or special course in topics of current interest. Consult department listing for offerings. May be repeated with consent of instructor. Maximum 6 hrs. S/U only.

525 Graduate Research Participation (5-12) Tutorial laboratory experience. May be repeated. Maximum 12 hrs. E

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. Prereq: 490 or consent of instructor. Recommended prereq: 410. 2 hrs and 1 lab.

556 Advanced Concepts in Structural Biology/ Biochemistry (3) Concepts related to structural biology/biochemistry 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) Basic concepts in toxicology; molecular toxicology and data evaluation; reproductive toxicology; mutagenesis, teratogenesis, carcinogenesis, pathogenic changes and environmental impact. Prereq: 410, Organic Chemistry or consent of instructor. (Same as Ecology and Evolutionary Biology 561.) F

562 Introduction to Electron Microscopy - Transmission Electron Microscopy (4) Practical application to techniques for preparation of biological samples for viewing in the transmission electron microscope. Use of microscope and ancillary equipment, darkroom techniques, preparation of materials for publication and special problems. Admission limited only to departmentally approved graduate students. (Same as Botany 510.) 23- hr lab. Sp
Biomedical Sciences

(Office of the Vice Chancellor for Academic Affairs)

MAJOR

Biomedical Sciences ......................... M.S., Ph.D.

Raymond A. Popp, Director

Professor:

Olin, Donald E., Ph.D. ...................... Rockefeller Popp, Raymond A., Ph.D. ............... Michigan

Research Professor:

Olin, Ada L., Ph.D. ......................... New York

Assistant Research Professor:

Hauser, Loren, Ph.D. ....................... California (Irvine)

Shared faculty are drawn from the Oak Ridge National Laboratory.

The University of Tennessee-Oak Ridge Graduate School of Biomedical Sciences, located within the Biology Division of Oak Ridge National Laboratory, offers programs leading to the Master of Science and the Doctor of Philosophy. The National Laboratory is a well-known center of basic research. The school utilizes the staff and facilities of this laboratory and thus brings directly into the mainstream of full-time graduate study in the life sciences the talent and expertise of that staff, as well as the most advanced research methods and technology.

The program of study, which incorporates a high faculty-to-student ratio, is based on intensive graduate courses supplemented by tutorial instruction, participation in a wide variety of seminars, and a heavy emphasis on communication skills, research training, and independent study. The program encourages students to pursue graduate studies to the limits of their abilities.

Each student's curriculum is planned to meet individual needs, with the aim of giving: (1) strength in the basic sciences; (2) perception of the biomedical sciences as a whole; and (3) experience and training in a chosen specialty.

The concentration areas available for master's thesis and Ph.D. dissertation work are biochemistry, biophysics, carcinogenesis, genetics, cellular, developmental and mammalian genetics, and radiation biology. Included are such subjects as immunology, protein and enzyme chemistry, nucleic acid chemistry, cytology, radiation and environmental biology, virology, developmental biology, experimental pathology, microbial and mammalian genetics, mutagenesis, structural biology, and genomic analysis.

ADMISSION REQUIREMENTS

A bachelor's degree or its equivalent is required. Students with M.S., D.V.M., or M.D. degrees are also encouraged to apply. Completed applications, Graduate Record Examination scores and letters of reference should be sent to the address below. The student will need preparation in biology, calculus, physics, and organic chemistry. It is recommended that deficiencies in preparation, as identified in the admission process, be eliminated prior to entrance.

Requests for application forms, information on admission, financial support, and housing should be sent to: University of Tennessee-Oak Ridge Graduate School of Biomedical Sciences, Biology Division, ORNL, Box 2009, Oak Ridge, Tennessee 37831-8077.

THE DOCTORAL PROGRAM

1. Satisfactory (B grade or better) completion of the following core courses or their equivalent: Biochemistry (511); Biophysical Biochemistry (514); Genetics (515); Advanced Protein Chemistry and Cellular Biology (512); Computing for the Life Sciences (523); and Survey of Statistical Methods (530).

2. Three semesters of Biomedical Sciences Laboratory (531-32-33).

3. Participation in at least one of the seminars during each term of residence after the first year is strongly recommended.

4. Satisfactory completion of formal advanced courses in the areas of the student's interests. The number and nature of the required advanced courses will vary depending upon the student's background and area of specialization.

5. Passing both written and oral comprehensive examinations.

6. A dissertation reporting the results of original and significant scientific research. A minimum of 24 semester hours of course 600 is required.

7. A final oral examination on the dissertation.

8. A final formal presentation of the dissertation research.

SPECIAL MASTER OF SCIENCE DEGREE PROGRAM

The graduate faculty has designed a Master of Science program in Biomedical Sciences primarily to fill the need for a degree within the Oak Ridge National Laboratories; however, a limited number of students from other institutions may be accepted if qualified and space is available. The requirements for the degree are:

1. Graduate credit or a proficiency in the following core courses or their equivalents: Biochemistry (511); Biophysical Biochemistry (514); Advanced Protein Chemistry and Cellular Biology (512); the following courses: Genetics (515); Survey of Statistical Methods (530); or Computing for the Life Sciences (523). Additional credits may be obtained (6 to 15 hours) with electives.

2. Thirty hours of approved graduate courses including 6 hours for thesis.

3. For admission to candidacy: Completion of any required prerequisite courses and one semester of graduate coursework with a B average. Admission to candidacy forms must be filed at least one full semester prior to receipt of degree.

4. A master's committee of three approved faculty members upon admission to candidacy.

5. A thesis reporting results of original and significant scientific research.

6. Passing final oral examination.

GRADUATE COURSES

500 Thesis (1-15) P/NP only E

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. S/NC only. E

511 Biochemistry (3) Chemistry of carbohydrates, lipids, proteins, and coenzymes; enzyme kinetics; intermediary metabolism and photosynthesis; biosynthesis of amino acids, lipids, and micromolecules. Coreq: 507.

512 Advanced Protein Chemistry and Cellular Biology (5) Same as Biochemistry and Cellular and Molecular Biology 511.

514 Biochemical and Biophysical Chemistry (3) Biochemistry and biophysical chemistry of purines, pyrimidines and nucleic acids; biosynthesis of RNA, DNA, and proteins. Energy levels and excited states of large molecules; optical instrumentation; adaptation to system perturbations; properties of macromolecules in solutions; molecular solution; molecular conformations; inter- and intramolecular forces; principles of microscopy. Prereq: 511.

515 Genetics (3) Mendelian genetics, mitosis and meiosis; transmission genetics; mapping and linkage; genetics of phage, bacteria and eucaryotes; mapping, linkage, mutagenesis; cytoplasmic inheritance. Mechanisms of recombination, chromosome structure and replication.

525 Computing for the Life Sciences (3) Interactive computing. Mini- and micro-computing environments. Basic Fortran, and/or Pascal languages, application of statistics, graphics, text manipulation, and computer communications.

530 Survey of Statistical Methods I (3) Same as Statistics 531.

531-32-33 Biomedical Sciences Laboratory (3,3,3) Approaches and technologies in various areas of modern biology. Students spend a semester in each of three laboratories conducting research in different areas of biomedical science. Required of all first-year students.

543-46-49 Graduate Research Participation (3,6,9) Special advanced research project not related to dissertation research. Topics chosen with consent of instructor. May be repeated.

551-52-53 Special Topics in Biomedical Sciences (3,3,3) Either tutorials or formal lectures. Potential topics: X-ray diffraction and crystallography; photochemical biophysics; physical chemistry of macromolecules; pathology; mammalian genetics; etc.

600 Doctoral Research and Dissertation (3-15) P/NP only. E

651-52 Advanced Topics in Biomedical Sciences (3,3) Current and future research developments; protein synthesis, protein chemistry and enzyme mechanisms; cytochemistry, and special topics. Either as tutorial or literature survey requiring substantial student preparation. May be repeated.

650 Mammalian Genetics (3) Known genetic variants affecting each organism in the system of experimental mammals, especially laboratory mice. Inheritance of phenotypical and biochemical traits in rodents and other laboratory animals. Prereq: 515.

Mullin, B. C., Ph.D. North Carolina State
Petersen, R. H. (Distinguished Professor), Ph.D. Columbia
Schilling, E. E. (Lissieux), Ph.D. Indiana
Schwarz, O. J., Ph.D. North Carolina State
Sharp, A. J. (Emeritus, Distinguished Professor), Ph.D. Ohio State
Walne, P. L. (Bemwood Distinguished Professor), Ph.D. Texas

Associate Professors:
Amundsen, C. C., Ph.D. Colorado
Heilman, A. S., Ph.D. Ohio State
Smith, D. K., Ph.D. Tennessee
Wofford, B. E. (Curator), Ph.D. Tennessee

Assistant Professors:
Pigliucci, M., Ph.D. Connecticut
von Arnim, A. G., Ph.D. East Anglia (UK)

Lecturer:
McFarland, K. D., Ph.D. Tennessee

The Department of Botany offers the Master of Science and Doctor of Philosophy degrees with concentrations in anatomy, histology, cell biology, genetics, biochemistry, organic chemistry, geology, microbiology, ecology, mycology, botany, physiology, toxicology, and taxonomy.

Educational services are required of each graduate student for the Master of Science degree and such service will include teaching and/or ancillary services performed in the department related to the instruction of courses.

For further information, contact the Department Head or the Graduate Coordinator.

ADMISSION REQUIREMENTS

The Botany Department requires scores from the general portion of the Graduate Record Examination, at least three letters of recommendation or standard recommendation forms from academic or professional persons, a short statement describing reasons for interest in graduate education in botany, and the following academic requirements:

1. Bachelor's degree of B.A. or B.S. from an accredited college or university and a cumulative grade-point average of 2.5 or better (on a 4.0 scale), with evidence of ability to do work of graduate quality.
2. General botany or general biology: 8 semester hours.
3. Advanced botany or closely allied biological sciences: 12 semester hours.
4. Physical sciences: general inorganic chemistry: 8 semester hours; organic chemistry. Physics highly recommended.
5. College mathematics: 6 semester hours including 1 term of calculus.

Evidence of a broad undergraduate background, an ability to do work of graduate quality, and an interest in the study of plant science are considered to be much more important than the particular courses taken as an undergraduate. Accordingly, students lacking specific prerequisite courses but otherwise qualified may be admitted to graduate studies in botany. In such cases, the deficiencies should be removed as soon as possible, typically during the first year of the student's graduate program. The determination of deficiencies and the manner in which they will be removed will be decided upon by the student's pro-temp committee during the first meeting with the student.

THE MASTER'S PROGRAM

The program for the Master of Science is patterned to fit the needs of students who desire a less extensive course of study than the Ph.D. program. However, the applicant must be equally well prepared and display an attitude and ability for advanced study. The M.S. includes thesis and non-thesis options.

Thesis Option

The thesis program is the usual route taken by botany students for the M.S. It is important that the entering student promptly identify a major professor and a suitable research project. The requirements for the thesis option consist of the following:

1. Satisfactory presentation of a written formulation and an oral defense to the student's committee of a research proposal suitable for a thesis. This must be completed before enrollment in Botany 500.
2. Successful completion of 30 hours of graduate credit, at least two-thirds of which must be at the 500 level or higher.
3. Satisfactory completion of two hours at the 600 level.
5. Presentation of a 30 minute departmental seminar.
6. Educational service in the form of teaching and/or ancillary services; consult major professor and department head.

Non-Thesis Option

1. Satisfactory completion of 34 semester hours of approved graduate courses of which 30 semester hours must be in botany including Botany 503. At least two-thirds of the hours must be at the 500 level or higher.
2. Satisfactory completion of two hours at the 600 level.
3. Educational service in the form of teaching and/or ancillary services; consult major professor and department head.
4. Satisfactory performance on a final written examination on all work offered for the degree. The student's committee may also require that an oral examination follow the written examination.

THE DOCTORAL PROGRAM

The Doctor of Philosophy program is patterned to provide training that involves extensive independent research within the student's area of concentration. Although there is no formal program of coursework, the student's committee may require specific courses for the completion of the degree. Most students spend from three to five years working on their Ph.D.

Requirements for successful completion of the Ph.D. are as follows:

1. Satisfactory presentation of a research problem by means of a written proposal and an oral defense to the student's committee. This must be completed before enrollment in Botany 600.
2. Satisfactory performance on a written comprehensive examination.
3. Examination of not more than 60 hours of graduate credit with at least a B average.
4. Satisfactory performance on an examination in one modern foreign language (see Graduate Coordinator) or an A or B in French 302 or German 332.
5. Satisfactory completion of 6 hours at the 600 level (excluding dissertation).
7. Presentation of a departmental seminar near the end of the doctoral program.

Note: The listed requirements for the M.S. and Ph.D. degrees should be interpreted as minimal requirements. Specific stipulations or requirements such as additional foreign languages or an additional oral comprehensive examination may be required by the student’s faculty committee.

MINOR IN ENVIRONMENTAL POLICY

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

GRADUATE COURSES

401-02 Field Studies in Botany (1-3,1-3) Field experience and taxonomy of special plant groups. Topics vary: bryology, lichenology, pteridology, angiosperm phylogeny, algal taxonomy, woody plants, and botanical photography. May be repeated under different topic. Minimum 9 hrs.

403 Plant Evolution (3) Evolutionary biology from plant perspective. Speciation, hybridization, polyploidy, evolution of mating systems; phenotypic plasticity; companion of character sets; animal and plant systems. Lectures; paper discussions on primary literature; current research in evolutionary ecology and genetics. Prereq: General Botany or Biodiversity; Organization and Function of the Cell. (Same as Evolutionary Biology 403.)

404 Plant Molecular Biology (4) Current research in plant molecular biology: techniques and procedures. Genome structure, gene expression and regulation, transformation, transposable elements, plant development. Labs: isolation of DNA and RNA, molecular hybridization, isolation and preparation of plasmids, PCR amplification of specific sequences, DNA sequencing and transformation. Prereq: Biodiversity; Organization and Function of the Cell and Genetics with grade of B or better and consent of instructor. 2 hrs and 4 labs. F.A

412 Plant Anatomy (3) Cells, tissues and organs; development in vegetative and reproductive structures of vascular plants—seed plants. Prereq: General Botany or Biodiversity; Organization and Function of the Cell or equivalent.

451 Plant Tissue Culture (3) Methods for culture of cells, tissues, and organs; media preparation and maintenance of cultures. Prereq: General Botany or Biodiversity; Organization and Function of the Cell or equivalent and General Chemistry or equivalent. Recommended prereq: Botany 412; Plants: Evolutionary Survey; Introduction to Plant Physiology; Introduction to Microbiology and Lab; Plant Propagation; and Field and Forage Crops.

500 Thesis (1-15) P/NP only. E

501 Mycology (4) Intensive survey of fungi, all major classes. Lecture, laboratory and field information. Occasional field trips. Prereq. 310. 3 hrs and 1 lab. Su/A

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester on campus for use of University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

503 Non-Thesis Research (2) Library, field, or laboratory research under direction of faculty. Not for thesis candidates. May be repeated. Maximum 4 hrs. E

506 Physiology (4) Comparative study of major algal phyla, both freshwater and marine; morphological, developmental, ecological, taxonomic and phylogenetic aspects. Field and laboratory studies, identification, clas-
Business Administration

(College of Business Administration)

MAJOR DEGREES

Business Administration ........ MBA, J.D.-MBA, Ph.D.

The College of Business Administration offers two college-wide programs, the MBA and the Ph.D., with a major in Business Administration. Two tracks are available for the MBA: the regular, full-time program and the executive program. A dual degree program is also available with the College of Law leading to the J.D.-M.B.A.

To obtain application materials, write or call: Office of Graduate Business Programs, Suite 527, Stokely Management Center, College of Business Administration, The University of Tennessee, Knoxville, TN 37996-0552, Telephone: (423) 974-5033. For the executive program, telephone (423) 974-1690.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state basis. The Ph.D. in Business Administration is available to residents of Alabama, Florida, or Kentucky (concentration in logistics and transportation only), or West Virginia; the MBA is available to residents of Louisiana (concentration in forest industries management, or logistics and transportation), Alabama, Florida or Texas (concentration in logistics and transportation only), Kentucky (concentration in new venture analysis and entrepreneurship or environmental management), Virginia (concentration in environmental management or logistics and transportation), or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

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.

THE MBA PROGRAM

The MBA program is designed for students with undergraduate degrees in the social and natural sciences, the humanities, and professional fields such as engineering, business, agriculture, and architecture. The MBA program is a two-year program with students beginning in the fall of each year and graduating in the spring, two years hence. During the summer between the first and second year, 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 first-year core and a wide selection of second-year concentration/elective courses. The first-year core develops a general management foundation upon which specialization is developed in the second year electives. The objective of the program is to develop leaders able to enhance the success of their organizations.

The program consists of two 15-credit-hour MBA core courses in the first year and 24 credit hours of concentration/elective courses in the second.

Admission Requirements

Applications are accepted for fall semester only. The application deadline for fall semester is March 1. Applications by U.S. 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 Graduate School Application, 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 Graduate School one month before the MBA application deadline to allow for processing. Additional information is required by The Graduate School for international students.

For admission to the MBA program, consideration is given to (1) the 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 which 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

College-level mathematics through at least one course in college-level calculus, taken within the past 5 years, with a grade of B or better, is the only prerequisite requirement for entry into the program. Students whose undergraduate training does not include calculus should arrange to take it at UT Knoxville or at another accredited institution prior to the fall semester of entry into the program. Those electing the management science or statistics concentration must have completed two years of college-level calculus.

MBA Core

The MBA core consists of two 15-hour courses, one taken each semester. The courses are taught by the MBA core faculty in an integrated fashion and through a year-long simulation requiring students to learn the functional fundamentals (accounting, finance, management, marketing) when they need to apply them to solving a specific business problem. The topics introduced within this course follow three major themes: the functional fundamentals (learned within a cross-functional framework); the role of the firm in society (with attention to stakeholder value, economics, and the ethical/global legal environment of the firm); and personal and team development. Students will be exposed to the assessment and delivery of customer value, statistical process control, continuous systems improvement, and the role of quality in competitive organizations.

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 must be made after completion of the first year. Requests for changes in concentration area must be submitted for approval to the Office of Graduate Business Programs.

Among the 24 credit hours in the concentration/electives block, at least 9 but not more than 12 must be in one of the following concentration areas. For specific courses required in concentration areas, see the appropriate field of instruction.

- Economics
- Environmental Management
- Finance
- Forest Industries Management
- Global Business
- Logistics and Transportation
- Management Science
- Marketing
- New Venture Analysis and Entrepreneurship
- Statistics

The remaining elective courses must be in fields outside the concentration area, normally selected from MBA courses offered in other departments of the college. Courses outside the College of Business Administration as well as courses listed in the Graduate Catalog numbered below 500 may be included in this block only with written prior permission via formal petition to the Office of Graduate Business Programs.

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/electives: 3 hours (provided at least 6 hours of work at this institution are included in the concentration area).
- Elective Area: 3 hours.

Because of the fully integrated nature of the first-year curriculum, no credit hours are transferred into this core curriculum. The maximum number of hours that may be transferred to elective and concentration areas is 6 semester hours. Transfer credit will be considered upon formal petition to the Director of Graduate Business Programs.
Other Requirements
The Application for Admission to Candidacy must be approved by two faculty members and the department head in the student's area of concentration and the Associate Dean in the College of Business Administration. It should be submitted to the Graduate Office at least one full semester prior to the date the degree is conferred. (Admission to candidacy in the fall semester permits graduation in the following spring 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. Each student must write a satisfactory paper in the concentration and in a comprehensive case administered at the end of the first year.

BUSINESS ADMINISTRATION CONCENTRATIONS

For complete listing of MBA program requirements, see above.


In recognition of the growing globalization of business activity and the importance of the international environment to successful management of every firm, the MBA program offers a concentration in global business. The concentration comprises at least two courses taken from Economics 424, Logistics 507, Management 571, and departmental special topics courses with international content; and at least one but not more than two additional courses from the previous list, or from a list of electives as approved by the Director of Graduate Business Programs. Students pursuing a concentration in global business are strongly encouraged to pursue it as a second concentration in addition to one of the traditional departmental concentrations. Students pursuing this concentration are also strongly encouraged to pursue an international or internationally related internship for the summer between their first and second years in the MBA program. Students are expected to participate in a foreign exchange or field experience if at all possible, especially for those with no previous foreign experience. Language training is advised but not required, and beginning language courses are not typically available for graduate credit.

The concentration in new venture analysis and entrepreneurship is comprised of three specifically designed courses which are interdisciplinary in nature. This concentration strives to build a strong academic foundation for both entrepreneurial and intrapreneurial activities. The new venture analysis and entrepreneurship concentration is offered in recognition of the growing trend in American business today towards new product/venture development. The new venture analysis/entrepreneurship concentration courses may be combined with two elective courses in another area (management or marketing) to achieve a dual concentration.

Minimum course requirements are Finance 551, Management 551, and Marketing 550. These course descriptions are listed under their fields of instruction.

PRE-MBA PROGRAM

The College offers a joint BA/MBA program with the College of Arts and Sciences. Students in this program take their first three years of coursework in Arts and Sciences, and their last two years in the College of Business Administration. Within their first three years, students fulfill all general education requirements for the BA degree, both upper and lower division along with a minor offered by one of the Arts and Sciences departments. They may use one Economics course only to fulfill distribution requirements, and they are required to take a year of calculus as the only prerequisite to the MBA.

Admission requirements are higher than those normally expected of MBA applicants. Desired qualifications include a minimum 3.4 GPA and a GMAT score of 600 or higher.

Students interested in the program are counseled initially in the Arts and Sciences Advising Center regarding admission standards and Arts and Sciences requirements. At the end of their second year, they have a conference with the Director of Graduate Business Programs and are advised of their prospects for formal admission. Students who are likely candidates are advised to take the Graduate Management Admission Test in October of the third year, and to submit an application to the MBA program. The admission decision is made by January of the third year.

Upon admission, students begin MBA coursework in the fourth year and are awarded a BA degree at the end of that year. Upon successful completion of the fifth year (minimum of 30 semester hours of graduate credit), the student receives the MBA degree.

DUAL J.D.-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 is designed to accommodate the needs 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 law specialty involving business-related law practice and want to acquire the skills and perspective of the business-oriented manager.

Admission Requirements

Applicants for the J.D.-MBA program must make separate application to, and be competitively and independently accepted by, the College of Law for the J.D., the Graduate School 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 be started prior to entry into the last 28 semester hours of J.D. coursework and prior to entry into the second year of the MBA program. Students interested in entering the dual degree program should submit a letter of application to the Dual Program Committee, the College of Law, and the College of Business Administration. 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.

Curriculum

A dual program candidate must satisfy the graduation requirements of each college. Students withdrawing from the dual program before completion of both degrees will not receive credit toward graduation from either college for courses in the other college, except as such courses qualify for credit without regard to the dual program.

The college of Law will award up to 9 semester hours of credit toward the J.D. for acceptable performance in approved graduate-level courses offered by the College of Business Administration. The College of Business Administration will award up to 9 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 Dual Program Committee and the student’s assigned advisor.

Students may begin their studies in either the J.D. 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 J.D. coursework while completing the first year of the business curriculum. During the first year in the J.D. program, students register through the College of Law. For any term in which students take MBA courses, even though they are also taking law courses, they must register through the Graduate School. The Graduate School registration form must be approved by the Director of Graduate Business Programs.

Awarding of Grades

Grades for graduate business courses accepted by the College of Law are converted to either Satisfactory or No Credit and will not be included in the computation of the student’s grade average or class standing in the college in which such grades are so converted. The College of Law will award a grade of Satisfactory for a graduate business course in which the student has earned a B grade or higher and a No Credit for any lower grade. The College of Business Administration will award a grade of Satisfactory for a law course in which the student has earned a 2.3 grade or higher and a No Credit for any lower grade. Grades earned in courses of either college may be used on a regular graded basis for any appropriate purpose in the course offering the course. The official academic record of the student maintained by the Registrar of the University shall show the actual grade assigned by the instructor without conversion.

Approved Dual Credit

MBA courses to be counted toward the J.D. program must include 9 semester hours approved by the College of Law. Law courses to be counted toward the MBA must be selected...
from those approved by the Director of Graduate Business Programs.

EXECUTIVE MBA PROGRAM

The executive MBA is designed for professionals holding middle and upper level positions in organizations that wish to support their attainment of an MBA degree. The objective of the program is to provide advanced management skills to individuals who play key roles in leading their organizations.

The executive track of the MBA is a three consecutive terms completed in one year. Each term requires two residence periods on campus alternating with a continuous program of reading, study and on-the-job application off campus. The off-campus work requires substantial and regular contact with program faculty and other participants and includes scheduled assignments to be carried out.

The program consists of three 12-hour core courses and a 9-hour sequence which is a project of diagnosis and analysis of a significant strategic issue in the sponsoring organization.

Admission Requirements

All participants begin and complete the program together—each month period. Sessions begin in January of each year. Final deadline for applications is October 10 of the preceding calendar year. For applicants who wish to make plans early in the preceding year, there is an advance reservation deadline of August 1. International students and students whose native language is not English must meet special requirements for admission to The Graduate School of UT Knoxville, and they are advised to make inquiries well in advance of the program application deadline.

To be considered for admission, the applicant must have a bachelor's degree and 10 or more years of work experience. Applicants must submit a complete application file including the Graduate School Application, official transcripts of prior college work, the executive MBA program application with evaluations from his/her company, and the Graduate Management Admissions Test (GMAT) score report. Transcripts from other institutions often take four to six weeks to arrive, so applicants should request these far in advance of the deadline.

For admission to this program, primary consideration is given to the applicant's work history and the recommendation from the sponsoring organization and the GMAT. There is no cut-off for either grade-point averages or GMAT scores, however, admission to the program is competitive, and applicants will be evaluated on their ability to operate on a par with other high achieving participants.

Curriculum

The program is taught by a core faculty of 10 professors assisted by other faculty on an ancillary basis. The core faculty develop the entire curriculum and teach it in an integrated, interdisciplinary manner.

The MBA program for executives is completed in three terms and requires registration for 15 hours in each term. The first term is comprised of Executive Core I and Management Project I; it includes two residence sessions. The second term is comprised of Executive Core II and Management Project II; it includes two residence sessions the first of which will be in some international venue. The third term is comprised of Executive Core III and Manage-ment Project III. It includes two residence sessions.

The core courses are a full-term curriculum with reading and study, case work and problem solving, as well as analysis and applications within the sponsoring organization during the off-campus periods. The sequence of material has been changed within these courses follow five major themes: the functional fundamentals (learned within a cross-functional framework); continuous improvement from a systems-thinking perspective, the role of the firm in the global environment; organizational culture and change management; and personal and team development.

The management project is carried out as an independent project with faculty advisor. It involves the diagnosis and analysis of some significant aspect of the sponsoring organization and is based on applying major themes in the core courses. The written project and presentation to senior management and faculty serves as the comprehensive examination.

The off-campus work requires substantial and regular contact with faculty.

Transfer Credits

Because of the integrated nature of the curriculum, no credit hours for courses already taken may be substituted for those in the executive program of the MBA.

Executive MBA in Taiwan

The executive MBA taught in Taipei, Taiwan is designed for professionals residing in Taiwan and other nearby countries. Its target audience and objectives are the same as those on the Knoxville campus, except that the sequence of material has been changed to accommodate the schedules of faculty teams traveling to Taiwan. The executive track of the MBA in Taiwan results in the same Master of Business Administration degree as the full-time MBA and executive MBA on the Knoxville campus.

The Taiwan executive MBA is three semesters of 15 credit hours each, including the same core and project courses described for the Knoxville program. Between each semester, there is a term when students are not enrolled. The program begins in the Summer term, continues in Spring semester of the following calendar year and is completed in the Fall semester of that same year. All participants begin and complete the program together.

Each term begins with one intensive residential period of concentrated class work with subsequent interactive sessions between faculty and students using distance learning technologies. In addition, a fourth and final period at the end of the summer term will conclude the educational experience.

Admission Requirements for the Executive MBA for Physicians

To be considered for admission, the applicant must have an M.D. degree and 5 or more years of work experience. Applicants must submit a complete application file including the Graduate School Application, official transcripts of prior college work, and the executive MBA program application with recommendation from senior management at Columbia/HCA. Admission to the program is competitive. Primary consideration is given to the applicant's work situation and the recommendation from senior management at Columbia/HCA. Applicants will be evaluated on their ability to operate on a par with other high achieving participants and on their future management potential.

THE DOCTORAL PROGRAM

The primary objective of the Ph.D. 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 Requirements

Students seeking a Ph.D. degree must be recommended for acceptance by the College of Business Administration to The Graduate School. Actual admission is based on the applicant’s overall standing compared with other applicants and the number of vacancies in each department. The Graduate School requires the Graduate School Application, transcripts from all previous college work, and additional information from international students. The college requires the Ph.D. 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 Ph.D. 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.

Program of Study

The Ph.D. normally requires at least three 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 year usually focuses on completion of the dissertation research and writing. It is emphasized that the Ph.D. 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 Ph.D.

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. Typically, the College of Business Administration offers financial support for doctoral students during their tenure in the program.

The Ph.D. 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 six concentrations offered in the Ph.D. program:
- Accounting
- Finance
- Logistics and Transportation
- Management (Operations Management and Strategic Management)
- Marketing
- Statistics

More detailed information concerning these specific areas is available by writing directly to each department chairperson and by referring to the appropriate fields of instruction.

Degree 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. Following are specific degree requirements:

1. Students must complete at least three years of full-time coursework beyond the baccalaureate degree, with two years of residence on the Knoxville campus.
2. Students are required to have a sound and broad base on which to build their Ph.D. 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 Director of Graduate Business Programs. Specific concentrations may have prerequisites.
3. Research Tools: A minimum of 9 semester hours of graduate research methods must be completed. At least 6 semester hours in statistics courses beyond Statistics 531 are required. The remaining 3 semester hours may be completed in additional statistics courses (not to include Statistics 531) or in other areas such as research methodology, management science, computer science, econometrics, and psychometrics.
4. Concentrations: The concentration is the focal point of the Ph.D. program. Students are required to master the literature and research techniques in the concentration area and to develop quality research as evidenced by the preparation of an acceptable dissertation. A minimum of 12 semester hours of coursework is required, including at least 9 hours of doctoral seminars.
5. Comprehensive Examinations: Comprehensive written examinations over the concentration area are required of each person seeking candidacy for the Ph.D. degree. This examination is administered in two sessions of approximately four hours each.
6. Students must complete the concentration 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 12 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 School 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. Doctoral research is conducted by the doctoral committee. 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 Ph.D. 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 discipline 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 Graduate School.

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.

GRADUATE COURSES

504 Core I (15) Development of roles and responsibilities of business manager. Functional fundamentals (accounting, finance, marketing, operations, human resource management) through year-long course in which knowledge is applied to solution of simulated real-world enterprise. Continuous systems improvement and delivery of customer value: role of firm in society (with attention to stakeholder value, economics, and the ethical and legal environment of firm). Personal leadership skills: teambuilding, written and oral communication, and assessment of students’ leadership abilities. Prereq: Admission to MBA program or consent of Director of Graduate Business Programs.

505 Core II (15) Continuation of 504. Functional fundamentals through year-long case. Case-study work on organizational reality, global competition, managing technology, ethics and social responsibility, and strategic planning. Capstone integrated business simulation. Prereq: 504 or consent of Director of Graduate Business Programs.

506 Information Engineering and Management (3) Design and management of information necessary to accomplish organizational objectives using activity blueprints, entity-relationship diagrams, data base design principles, view diagrams and DCASE (Computer-aided Software Engineering) tools.

510 Management of Responsive Service Organizations (3) Management of organizations which respond...
Chemical Engineering

DEGREES

1. A total of at least 33 hours in graduate coursework in chemical engineering and related areas. The minimum requirements are 15 hours in chemical process engineering, 3 hours in other engineering, scientific, or business areas (as approved by the departmental faculty); and 9 hours chosen from either of these two categories.


3. Active participation in graduate seminars in the department. Resident students must register for ChE 501 every semester it is offered.

4. A final oral examination covering the thesis, 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:

1. A total of at least 33 hours in graduate courses in chemical engineering and related areas. The minimum requirements are 18 hours in chemical engineering; 6 hours in other engineering, scientific, or business areas (as approved by the departmental faculty); and 9 hours chosen from either of these two categories.

2. Completion of a critical review of the literature and other sources in an area related to chemical engineering.

3. A written comprehensive examination covering the major field and an oral examination covering the review paper and related areas.

THE DOCTORAL PROGRAM

Students applying for entrance into the doctoral program must submit evidence of ability to perform and report independent research to the satisfaction of the department. The master's thesis may be offered as such evidence.

Department requirements consist of the satisfactory completion of:

1. Graduate courses in chemical engineering, amounting to approximately 24 semester hours, at least 9 of which must be in 500 series courses.

2. Supporting courses in related scientific and engineering fields amounting to approximately 24 semester hours, subject to approval by the student's faculty committee. These related fields will normally include chemistry, mathematics, physics, and engineering.

3. The comprehensive examination, consisting of a written part and an oral part. The written part covers thermodynamics, reactor kinetics, and design of chemical processes. The oral part covers the fundamentals of chemical engineering and the fundamentals of chemical process design.

4. Active participation in graduate seminars conducted by the department. Resident students must register for ChE 501 every semester offered.

GRADUATE COURSES

403 Introduction to Optimization (3) Principles and applications of optimization techniques to chemical process design: unconstrained and equality constrained optimization, linear and nonlinear programming, and geometric programming. Prereq: Mathematics 241.


447 Honors: Transport Phenomena (3) Momentum, heat and mass transfer processes, analogous, differential and macroscopic balances, applications involving molecular diffusion, simultaneous mass transfer and chemical reaction. Prereq: Mass Transfer and Separation Processes and consent of instructor.


486 Hydrocarbon Processing (3) Chemical and physical properties of selected hydrocarbons and their processes utilized in conversion of raw material into liquid fuels and hydrocarbons. Prereq: Mass Transfer and Separation Processes, Organic Chemistry.

500 Thesis (1-15) P/NP only.
501 Graduate Seminar (1) Prereq: Admission to graduate program. May be repeated. S/NC only. F,Sp

502 Registration for Use of Facilities (3-15) Required for the student but 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. S/NC only. E

505 Engineering Analysis (3) Formulation and solution of problems in chemical engineering and materials science, 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.)


511 Advanced Chemical Engineering Thermodynamics (3) Phase equilibrium in ideal and nonideal solutions; composition relationship between phases, solution behavior and application to multicomponent systems.


541 Fluid Mechanics and Polymer Processing (3) (Same as 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 operations, emphasizing nonthermal and multicomponent systems.

551 Chemical Reactor Analysis (3) Rate models for heterogeneous reactions, properties of porous catalyst, catalyst deactivation, fluid-fluid and fluid-solid reactors.

561 Process Modeling and Simulation (3) Theories and structures of models and art of simulation. Model development from basic principles. Model development from plant data. Use of models in operation, optimization and control. Prereq: Familiarity with industrial systems and control. May be repeated. F,Sp

575 Applied Microbiology and Bioengineering (3) Crossdisciplinary course combining basic concepts in microbiology, biochemistry, reaction kinetics, and biochemical and environmental engineering. Commercial processes, biogasification/wastewater treatment, analysis of biomass reactor systems, bioreactors, and immobilization methods. Fundamental laboratory techniques during the entire period. (Same as Environmental Engineering 575, Agricultural Engineering 575 and Microbiology 575.)

580 Technical Review and Assessment (3) Preparation of critical review of literature in areas related to chemical engineering. Limited to candidates in nonthesis option. Prereq: Consent of advisor.

581 Industrial Pollution Prevention (3) Principles and practical aspects of industrial waste minimization. Regulatory environment, waste minimization strategies, economic analysis, and feasibility case study; analysis of alternative waste minimization/management technologies. Prereq: Graduate standing in engineering or consent of instructor. (Same as Environmental Engineering 581 and Engineering Science and Mechanics 585.)

585 Process System Reliability and Safety (3) (Same as Nuclear Engineering 585.)

590 Special Topics in Chemical Engineering (3) May be repeated. Maximum 6 hrs.

600 Doctoral Research and Dissertation (3-15) F,Sp

631 Advanced Topics in Statistical Thermodynamics and Molecular Dynamics (3) Statistical thermodynamics, molecular based computer simulations, Monte Carlo and molecular dynamic calculations; applications to supramolecular and nanoscale systems. Prereq: 531.


642 Advanced Topics in Polymer Processing (3) (Same as Materials Science and Engineering 642.)


661 Advanced Topics in Process Dynamics and Control (3) May be repeated. Maximum 6 hrs.

675 Microbial Systems Analysis (3) Identification and analysis of complex microbial systems using perturbation-response methods. Structuring of important mechanical processes, interactions, and regulation at several levels (reactor or macro, ecological, cellular, physiological and molecular). Experimental methods for data gathering, signal resolution and processing, mathematical 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 hrs.

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**Chemistry** (College of Arts and Sciences)

**MAJOR**

**DEGREES**

Chemistry M.S., Ph.D.

**Professors:**

Michael Sepaniak, Head

Adcock, J. L., Ph.D. .......................................... Texas
Alexandratos, S. D. (Hoechst-Celanese Prof. of Polymer Science), Ph.D ...... California
Baker, D. C., Ph.D. ................................................ Ohio State
Bartmess, J. E., Ph.D. ........................................ Northwestern
Bloor, J. E., Ph.D. ............................................... Manchester
Cook, K. D., Ph.D. ................................................. Wisconsin
Dean, J. A. (Emeritus), Ph.D. ......................... Michigan
Eastham, J. F. (Emeritus), Ph.D. ..................... Illinois
Fletcher, W. H. (Emeritus), Ph.D. .................... California
Fricke, R. G., Ph.D. ........................................... Minnesota
Gailey, J. A., Ph.D. .............................................. Cornell
Guiochon, G. (Distinguished Scientist), Ph.D. .......... Ecole Polytechnique and Paris VI
Hinde, Robert J., Ph.D. ........................................ Chicago
Kovac, J. D., Ph.D. .............................................. Yale
Kowal, J. D., Ph.D. .............................................. Illinois
Lee, J. H., Ph.D. .................................................. Illinois
Luetke, M. H. (Emeritus), Ph.D. ......................... Wisconsin
Magid, L. J., Ph.D. ............................................. Tennessee
Magid, R. M., Ph.D. .............................................. Yale
Pagni, R. M., Ph.D. .............................................. Wisconsin
Peterson, J. R., Ph.D. ............................................ California
Schell, F. M., Ph.D. ............................................. Illinois
Sepaniak, M. J., Ph.D. .......................................... Iowa State
Smith, W. T. (Liaison), Ph.D. .............................. Ohio State
Van Horne, W. A. (Paul and Willma Ziegler Prof.), Ph.D. ............... Purdue
Wheeny, K. E., Ph.D. ........................................... California
Williams, T. F. (Distinguished Prof.), Ph.D. ................. London
Woods, C., Ph.D. .............................................. Colorado
Wunderlich, B. (Distinguished Scientist), Ph.D. ............... Northwestern

**Associate Professors:**

Barrett, C. W., Ph.D. .......................................... Stanford
Feigl, C. S. (Liaison), Ph.D. ................................. Colorado
Schell, F., Ph.D. ............................................... Indiana

**Assistant Professor:**

Lawrence, G. S., Ph.D. ........................................... Massachusetts
Richards, J. D., Ph.D. .......................................... Chicago
Xue, Z. B., Ph.D. .............................................. California

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Students majoring in Chemistry for the master's or doctoral degree are required to present as a prerequisite one year each of general, analytical, organic, and physical chemistry with a satisfactory record. At least one year of inorganic chemistry is also recommended. Students lacking any of these prerequisites may be admitted with appropriate deficiencies that must be removed without graduate credit. Applicants are required to take the general Graduate Record Examination. Students majoring in Chemistry are required to present as a prerequisite two years of chemistry including quantitative analysis.

**THE MASTER'S PROGRAM**

The department offers concentrations in six areas for the M.S.: analytical chemistry, environmental chemistry, inorganic chemistry, organic chemistry, polymer chemistry, and physical chemistry.

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**THE DOCTORAL PROGRAM**

The department offers concentrations in eight areas for the Ph.D.: analytical chemistry, chemical physics (in cooperation with the Department of Physics), environmental chemistry, inorganic chemistry, organic chemistry, physical chemistry, polymer chemistry, and theoretical chemistry.

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including the presentation of at least one seminar.
3. Prescribed remedial courses based on performance on entrance examinations.
4. Completion of the comprehensive examination and defense of an original research proposal to give 2 hours of credit in Chemistry 601.
5. Eighteen additional hours in courses at the 500 level or above including at least one course above 601 and one of the following sequences: 
6. A final oral examination.

The Ph.D. program with 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 6 additional hours in physics at the 500 level or above. Three of the additional physics hours can be used to satisfy the 18 hours requirement in item 5.

GRADUATE COURSES
430 Advanced Inorganic Chemistry (3) Atomic and molecular structure, bonding theories, descriptive chemistry of elements, kinetics and mechanism of inorganic reactions, applications of molecular spectroscopy; introduction to molecular characterization, coordination and organometallic chemistry. Prereq: 230. Prereq or coreq: 380 or 381. Sp
431 Radioactivity and Its Application (2) Radioactive materials in tracer and therapeutic applications. Radioactivity-decay, detection apparatus and techniques, tracer procedures, safety precautions in agriculture, biology, medicine. Not for credit by chemistry or physics majors or minors. Prereq: Mathematics 122 or equivalent and 1 yr of physics. Sp
471-81 Biophysical Chemistry (3.3) (Same as Biochemistry and Cellular and Molecular Biology 471-81.)
473-83 Physical Chemistry (3.3) Students may not receive credit for both 473 and 471 nor for both 481 and 483. 470-200, 473-200. Properties of gases, first, second, and third laws of thermodynamics. Chemical equilibria, simple phase equilibria; properties of solutions, introduction to statistical thermodynamics. Prereq: 360-11. F
520 Chemical Instrumentation (3) Principles of analog and digital systems in chemical instrumentation: practice in design and construction of chemical instruments. Prereq: Consent of instructor.
530 Chemical Bonding (3) Wave mechanical atom, group theory, quantum approach to molecular orbital theory, covalent, ionic, and metallic bonding, lattice field theories, solid state. Prereq: 1 yr of physical chemistry.
550 Chemical Instrumentation (3) Principles of analog and digital systems in chemical instrumentation: practice in design and construction of chemical instruments. Prereq: Consent of instructor.
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; Prereq: 1 yr of physical chemistry.
571 Advanced Quantum Chemistry and Spectroscopy (3) Prereq: 570 or consent of instructor. Sp
590 Polymer Physics (3) Fundamentals of polymer synthesis and characterization through application of organic and physical chemical principles. Prereq: 1 yr each of organic and physical chemistry.
591 Analytical Separations (3) Principles and practice of chemical separations based on extraction, chromatographic, and electrophoretic phenomena. Prereq: 1 yr of physical chemistry.
592 Electroanalytical Chemistry (3) Fundamentals of electrode processes; principles and practice of electroanalytical techniques in quantitative chemical analyses and applied to study of chemical systems. Prereq: 1 yr of physical chemistry.
593 Physical Chemistry of Polymers (3) Conformation of macromolecules, solution and bulk properties, rubber elasticity, kinetics of polymerization, polymer thermodynamics. Prereq: 550 or equivalent. Sp
600 Doctoral Research and Dissertation (3-15) P/NP only. E
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. S/NC only. F
610 Selected Topics in Physical Chemistry (3) Topics of current significance. Prereq: 570-72 or 73 or consent of instructor. May be repeated. Maximum 12 hrs.
620 Selected Topics in Inorganic Chemistry (3) Topics of current significance. Prereq: 530-31-32 or consent of instructor. May be repeated. Maximum 12 hrs.
630 Selected Topics in Organic Chemistry (3) Topics of current significance. Prereq: Two of 550-51-52 or consent of instructor. May be repeated. Maximum 12 hrs.
640 Selected Topics in Polymer Chemistry (3) Topics of current significance. Prereq: 550-51-52 or consent of instructor. May be repeated. Maximum 12 hrs.

GRADUATE COURSES
510 Analytical Chemistry (3) Atomic and molecular structure, bonding theories, descriptive chemistry of elements, kinetics and mechanism of inorganic reactions, applications of molecular spectroscopy; introduction to molecular characterization, coordination and organometallic chemistry. Prereq: 230. Prereq or coreq: 380 or 381. Sp
520 Chemical Instrumentation (3) Principles of analog and digital systems in chemical instrumentation: practice in design and construction of chemical instruments. Prereq: Consent of instructor.
530 Chemical Bonding (3) Wave mechanical atom, group theory, quantum approach to molecular orbital theory, covalent, ionic, and metallic bonding, lattice field theories, solid state. Prereq: 1 yr of physical chemistry.
550 Chemical Instrumentation (3) Principles of analog and digital systems in chemical instrumentation: practice in design and construction of chemical instruments. Prereq: Consent of instructor.
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; Prereq: 1 yr of physical chemistry.
571 Advanced Quantum Chemistry and Spectroscopy (3) Prereq: 570 or consent of instructor. Sp
590 Polymer Physics (3) Fundamentals of polymer synthesis and characterization through application of organic and physical chemical principles. Prereq: 1 yr each of organic and physical chemistry.
591 Analytical Separations (3) Principles and practice of chemical separations based on extraction, chromatographic, and electrophoretic phenomena. Prereq: 1 yr of physical chemistry.
592 Electroanalytical Chemistry (3) Fundamentals of electrode processes; principles and practice of electroanalytical techniques in quantitative chemical analyses and applied to study of chemical systems. Prereq: 1 yr of physical chemistry.
593 Physical Chemistry of Polymers (3) Conformation of macromolecules, solution and bulk properties, rubber elasticity, kinetics of polymerization, polymer thermodynamics. Prereq: 550 or equivalent. Sp
600 Doctoral Research and Dissertation (3-15) P/NP only. E
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. S/NC only. F
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630 Selected Topics in Organic Chemistry (3) Topics of current significance. Prereq: 550-51-52 or consent of instructor. May be repeated. Maximum 12 hrs.
640 Selected Topics in Polymer Chemistry (3) Topics of current significance. Prereq: 550-51-52 or consent of instructor. May be repeated. Maximum 12 hrs.

Child and Family Studies
(College of Human Ecology)

MAJORS

DEGREES

Connie Steele, Head

Professors:
Blanton, Priscilla, Ed.D....................... Tennessee
Buehler, Cheryl, Ph.D........................ Michigan State
Cunningham, Jo Lynn, Ph.D................... Michigan
Fox, Greer L., Ph.D............................ Michigan State
Marian, James D., Ph.D...................... Oklahoma State
Nordquist, V. Mick, Ph.D.................... Tennessee
Steele, Connie, Ed.D........................ Texas Tech
Twardosz, Sandra (Liaison), Ph.D............. Kansas

Associate Professors:
Allen, Jan, Ph.D............................... Purdue
Serp, Deborah, Ph.D.......................... Oklahoma State
Tegano, Deborah, Ph.D....................... Virginia Tech

Assistant Professors:
Groves, Melissa, Ph.D........................ Virginia Tech
Mali, Julia, Ph.D.............................. Iowa State
Morris, Lane, Ph.D............................. Tennessee

The Department of Child and Family Studies encompasses two primary concentrations: child development and family studies. Integration of these areas creates a unique perspective for the study of individuals and families. Each graduate student's program of study is carefully planned in conjunction with a faculty committee to establish a program consistent with individual goals. All programs are characterized by a broad array of coursework, varied research
experiences, and opportunities for experiences in applied settings.
Because the doctoral degree is a research degree, students at this level receive substantial preparation in research methods and research methodology. Interested students should contact the department head.

ADMISSION REQUIREMENTS
A completed file for review includes a departmental application, Graduate Record Examination (GRE) scores for the general section, and completion of three Graduate School Rating Forms by individuals who can attest to the potential for graduate education. Forms may be obtained from the department or Dean's Office, College of Human Ecology. Admission to the program is contingent upon faculty evaluation of GRE scores, undergraduate/graduate GPA, rating forms, and work experience. Prerequisites for admission to the master's or doctoral program are 9 semester hours of either upper division undergraduate or graduate social science.

THE MASTER'S PROGRAM
An individual program of study may be designed by the student in collaboration with his or her major professor and committee. The program provides for a concentration in either child development or family studies. The M.S. with a concentration in child development offers two tracks. Track 1 is designed to meet the needs of professionals who work in programs encompassing a variety of early childhood programs. Specializations in Track 1 consist of early childhood education, early childhood special education, early childhood administration and child development. Thesis and non-thesis options are available for Track 1. Track 2 is designed for students seeking initial teacher licensure in early childhood education (pre-K through grade 3). This program offers an undergraduate degree in child development or equivalent coursework. A non-thesis option only is available in Track 2.

Track 1 - All students in the child development concentration must enroll in CFS 510, 540, and 571. At least 6 hours in a cognate area outside the department must be completed. Thesis students are required to take: 3 hours of 500-level research methods; 3 hours of 500-level statistics; 6 hours of CFS courses in an area of concentration; 6 hours of thesis credit; and an oral comprehensive examination. Non-thesis students are required to take: 3 hours of 500-level research methods, statistical methods, or interpretation of methods and statistics; CFS 564, 565; 9 hours of CFS courses in the area of concentration; and a written comprehensive examination.

Students seeking the M.S. with a major in Child and Family Studies are required to file a plan of study with the department head after 15 hours of graduate credit have been completed.

THE PH.D. CONCENTRATION

The doctoral program in Human Ecology prepares scholars in the concentration areas of child development and of family studies. The strength of the doctoral program is based on three major components: the integration of child development and family studies within the context of human ecology and related areas, concentration in child development or family studies, and an emphasis on becoming proficient producers and consumers of research. 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 those questions.

Requirements include:
1. Minimum 10-13 credits in child and family studies required foundation courses: 510, 550, 570, 571 and 630 (child development area) or 634 (family studies area).
2. Minimum of 12 credits in 500- and 600-level courses in child development or family studies, with at least 3 credits in 600-level courses (in addition to the required courses described in #1);
3. Minimum 6 credits in a cognate area;
4. Minimum 9 credits in graduate-level statistics, with at least 3 of these credits in a more specialized area than a sequence of survey courses;
5. Minimum 3 credits of special area research methods;
6. Pre-doctoral research project approved by student's committee;
7. College Professional Seminar, Human Ecology 610;
8. Minimum 8 credits of electives;

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of any state to enroll in certain programs at UT Knoxville on an in-state basis. The M.S. in Child and Family Studies (concentration in family studies only) is available to residents of Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

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. May be used an on a credit-see time before degree is completed. May not be used toward degree requirements. May be repeated: 'S/N' only.
505 Development of Interpersonal and Supervision Skills (2) Refined development of interpersonal skills needed to work with families and other professionals. Supervisory training in, interventions skills, active listening, self-disclosure, relationship building, and negotiation.
510 Survey of Theory and Research in Child Development (3) Theoretical models and research literature in child development (conception through adolescence); application to research intervention and education. Prereq: 9 hrs of either upper division undergraduate or graduate social science or consent of instructor.
512 Survey of Research in Early Childhood Education (3) Current literature and issues in early childhood education. Prereq: 610 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.
521 Organizational Management in Early Childhood Education (3) Designing, implementing, and evaluating physical and human resources in educational environments for children. Development of skills in environmental organization, interpersonal leadership, and supervision of staff. Prereq: 512 or equivalent or consent of instructor.
522 Naturalistic Interventions for Parents and Teachers of Young Children (3) Common problems faced by parents of teachers; methods available to modify problem behavior. Prereq: 510 or equivalent or consent of instructor.
525 Seminar on Play (3) Comparison and contrast of theoretical framework and research methodologies on play, developmental perspective on play.
530 Families of Handicapped Children (3) Developmental, emotional, social, and educational experiences in caring for handicapped children, especially during infancy and early childhood. Prereq: 510 or consent of instructor.
540 Parent-Child Relations (3) Influence of parents on children, influence of children on parents, reciprocal interaction between parents and children, applications of systems models, child abuse, and impact of divorce on children. Prereq: 550 or equivalent or consent of instructor.
550 Survey of Theory and Research in Family Studies (3) Use of family conceptual frameworks and application of theoretical models in research and family life programs.
552 Family in Contemporary Social Thought (3) Alternative conceptualizations of family in current social thought. Variations of family construction by race, gender, and class. Prereq: 550. F.A.
555 Children, Divorce and Remarriage (3) Children's and adolescents' adjustment to transitions involved in parental divorce, single-parenthood, and remarriage. F.A.
560 Marital Dyad (3) Communication, power, sexuality, marital stability, and marital satisfaction. Prereq: 550 or equivalent or consent of instructor.
563 Family Life Education Programs (3) Planning, implementing and evaluating programs in marital, parent-child, and family relationships, and preparation edu
584 Practicum in Human Development or Family Studies (3) School and community programs concerned with human development and family living. Prereq: Consent of instructor. S/NC only. E

585 Practicum in Human Development or Family Studies II (3) School and community programs concerned with human development and family living. Committee approved and supervised written project. Prereq: 584 and consent of instructor. S/NC only. E

586 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: 585. (Same as Counseling Education and Counseling Psychology 566.)

587 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. F, A


571 Research Seminar (1) Presentation and critique of research projects. Prereq: Departmental major or consent of instructor. May be repeated. S/NC only. E

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. Prereq: 6 graduate hrs in major, or consent of instructor. May be repeated with different topics. Maximum 9 hrs. E

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 hrs or consent of instructor. May be repeated with different topics. Maximum 6 hrs. E

582 Assessment of Family Behavior (3) Analysis of their families in relation to marriage and parenting. Prereq: 9 hrs of graduate family studies coursework. F, A

653 Women and Families (3) Contemporary American women: primary psychological processes in sociological context. Reciprocal influence of society, women, and their families in relation to marriage and parenting. Prereq: 9 hrs of graduate family studies coursework. Sp, A

691 Assessment of Family Behavior (3) Analysis of methods and measures used in family science research. Prereq: 550, 571, 3 hrs graduate statistics, or consent of instructor.

Civil and Environmental Engineering

(College of Engineering)

MAJORS

Civil Engineering .................. M.S., Ph.D.
Environmental Engineering .......... M.S. (Ph.D. through Civil Engineering)

Professors:
Bennett, R. M., Ph.D., P.E. ........ Illinois
Burdette, E. G. (Fred N. Peebles Prof.), Ph.D., P.E. .......... Illinois
Chatterjee, A., Ph.D., P.E. .......... NC State
Davis, W. T., Ph.D., P.E. .......... Tennessee
Deatherage, J. H., Ph.D., P.E. .......... Tennessee
Drumm, E. C., Ph.D. .......... Arizona
Ghosh, M. (Goodrich Chair of Excellence), Ph.D. .......... Illinois
Goodpasture, D. W., Ph.D. .......... Illinois
Grecco, W. L. (Emeritus), Ph.D. .......... Michigan State
Heathington, K. W. (Emeritus), Ph.D. .......... Northwestern
Hughempiers, J. B. (Emeritus), Ph.D. .......... Texas A&M
Johnson, H. L. (Emeritus), Ph.D., P.E. .......... Tennessee
Miller, W. A. (Granger Prof.), Ph.D., P.E. .......... Tennessee
Miller, W. A. (Granger Prof.), Ph.D., P.E. .......... Tennessee
Robinson, R. B. (Fishor Prof.), Ph.D., P.E. .......... VPI
Smoot, J. L., Ph.D., P.E. .......... VPI
Tschertz, B. A. (Condra Prof.), Sc.D., P.E. .......... New Mexico State
Walker, C. R. (Emeritus), M.S., Ph.D. .......... MIT
Wegman, J. M., Ph.D. .......... Northwestern

Associate Professors:
Choi, K. G., Ph.D. .......... Northwestern
Cox, C. D., Ph.D. .......... Penn State
Hansen, J. H. (UTSI), Ph.D. .......... Missouri
Miller, T. L., Ph.D., P.E. .......... Tennessee
Richards, S. H., Ph.D., P.E. .......... Tennessee
Robinson, K. G., Ph.D. .......... VPI

Assistant Professors:
Han, L. D., Ph.D. .......... California
Jackson, N. M., Ph.D., P.E. .......... Oregon State
Mauldin, M., Ph.D. .......... California

The Department of Civil & 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’S PROGRAM

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.

Civil Engineering

The Department of Civil and Environmental Engineering offers two options for the Master of Science with a major in Civil Engineering.

Thesis Option: A minimum of 30 semester hours, including 6 hours of thesis, is required.

Non-Thesis Option: A minimum of 33 semester hours, including a 3-hour special problem is required. The special problem will culminate in a written report which must be approved by the student's major professor.

Environmental Engineering

For a Master of Science in Civil 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: Basic Engineering or Computer Science 101; Basic Engineering 121, 131; Engineering Science and Mechanics 231; Statistics 251; Civil Engineering 390, 395, 396; 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 work toward the Master of Science degree in Environmental Engineering.

Thesis Option: The student must present a minimum of 30 semester hours of approved graduate courses. The major shall include 6 semester hours of thesis and a minimum of 12 semester hours of approved environmental engineering coursework. A minor may be selected but is not necessarily required.

Non-Thesis Option: The student must present a minimum of 33 semester hours of approved graduate courses. The major shall include a minimum of 18 semester hours of approved environmental engineering coursework. A minor may be selected but is not necessarily required.

Either option must be approved by the student's major professor. A student's program must include a minimum of 9 semester hours of advanced environmental engineering design courses selected from a list provided by the student's committee.

Normally, the graduate program of study will culminate in a written report which must be approved by the student's major professor.
THE DOCTORAL PROGRAM

A graduate program leading to the Doctor of Philosophy is offered in Civil Engineering. Specific departmental requirements for the Ph.D. degree include the following:
1. A minimum of 72 semester hours beyond the Bachelor's degree, exclusive of credit for the M.S. thesis. Of this number, a minimum of 24 semester hours in 600 Doctoral Research and Dissertation will be required.
2. A minimum of 24 semester hours of graduate courses in civil engineering, exclusive of thesis or dissertation credit, at least 6 hours of which must be 600-level courses.
3. Supporting courses in related scientific and engineering fields, amounting to approximately 24 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 9 semester hours of mathematics will be required beyond the civil engineering undergraduate requirements.
4. 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.
5. Upon completion of at least one-half of all coursework, each student must pass a comprehensive examination.
6. After completion of the dissertation, prior to graduation, each student must pass a comprehensive examination administered by a faculty committee.

MINOR IN ENVIRONMENTAL POLICY

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

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of 13 southern states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. program in Environmental Engineering (concentration in air quality or waste management) is available to residents of the state of Alabama. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

Civil Engineering

GRADUATE COURSES

421 Portland Cement and Asphalitic Concrete (3) Aggregate properties and tests, tests of portland cement concrete, mix design methods for concrete and asphalt, concrete admixtures, tests of asphalt and asphalt mixes, and nondestructive testing. Prereq: 321. 2 hrs and 1 lab.

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: 210, 251, 352.

452 Traffic Engineering (3) Characteristics of driver, vehicle, and roadway and their interrelationships; traffic studies; basic considerations of traffic circulation and control, lighting, capacity analysis, roadway safety analysis and design. Prereq: 210, 251, 352.


461 Analysis of Framed Structures (3) Maximum stress due to moving loads; use of influence lines; lateral forces due to wind and snow; earthquake analysis. Prereq: Structural Analysis II.

471 Steel Design (3) Design of plate girders and composite beams and columns; combination of loads and members stability. Prereq: Steel Design.

471 Reinforced Concrete Design (3) Reinforced concrete continuous slabs and floors; columns with combined axial and bending; footings and retaining walls. Prereq: 471.

485 Principles of Hydrogeology (3) Same as Geologi- cal Sciences 485.

490 Water Resources Project Design (3) Coherent development of multipurpose reservoir and dam project, data acquisition, spillway and outlet works design, river and gravity dam stability analyses, and foundation studies. Prereq: 300, 355.

492 Urban Drainage Engineering (3) Design and management of structural and nonstructural stormwater control structures. Application of hydrologic and hydraulic principles to design of drainage systems for urban, strip mining, and highway development; design of interceptor and laterals; consideration of flow through basins; estimation of commonly-used computer runoff models; evaluation of land-use on streamflow quality and quantity. Prereq: 300, 355.

495 Water Resources Development and Management (3) Principles of water resources project development planning and management. Institutional framework: water law, evaluation procedures for competing water resources development alternatives, multi-objective planning, principles of engineering economics, benefit-cost analysis, and water allocation methods; environmental impact assessment procedures; decision making in water-resource-related cases; study of expert systems. Prereq: 471. 350.

500 Thesis (1-15) P/NP only. E

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only.

510 Urban Systems: Engineering and Management (3) Various urban systems usually under the responsibility of city manager and/or city engineer: streets, sewers, signalized intersections, parks, transit, refuse collection. Personnel management and management of heavy and building construction projects. Prereq: Construction Management and Methods and Equipment.

511 Traffic Engineering-Characteristics (3) Traffic engineering-characteristics of vehicles, pedestrians, and cyclists; basic traffic characteristics; traffic flow properties; traffic safety and flow analysis; traffic flow analysis; traffic signal operation; traffic control. Prereq: Construction Management and Methods and Equipment.


513 Traffic Accident Reconstruction (3) Data collection and analysis as basis for investigation and cost; accident reconstruction; causes of accidents; accident prevention; investigation of accidents; data collection and analysis. Prereq: Traffic Engineering-Characteristics.

514 Traffic Accident Reconstruction (3) Traffic accident reconstruction; causes of accidents; accident prevention; investigation of accidents; data collection and analysis. Prereq: Traffic Engineering-Characteristics.

515 Traffic Engineering-Characteristics (3) Traffic engineering-characteristics of vehicles, pedestrians, and cyclists; basic traffic characteristics; traffic flow properties; traffic safety and flow analysis; traffic flow analysis; traffic signal operation; traffic control. Prereq: Construction Management and Methods and Equipment.


517 Traffic Accident Reconstruction (3) Data collection and analysis as basis for investigation and cost; accident reconstruction; causes of accidents; accident prevention; investigation of accidents; data collection and analysis. Prereq: Traffic Engineering-Characteristics.

518 Traffic Accident Reconstruction (3) Traffic accident reconstruction; causes of accidents; accident prevention; investigation of accidents; data collection and analysis. Prereq: Traffic Engineering-Characteristics.

519 Traffic Engineering-Characteristics (3) Traffic engineering-characteristics of vehicles, pedestrians, and cyclists; basic traffic characteristics; traffic flow properties; traffic safety and flow analysis; traffic flow analysis; traffic signal operation; traffic control. Prereq: Construction Management and Methods and Equipment.


523 Soil Stabilization (3) Mechanical stabilization of soils by compaction, drainage, and blending; chemical stabilization of soils with admixtures, waterproofing and modifying soils and additives. Reinforced earth and stabilization of cut and fill geosynthetics. Prereq: Introduction to Soil Behavior.

524 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: Introduction to Soil Behavior or consent of instructor.


531 Soil Stabilization (3) Mechanical stabilization of soils by compaction, drainage, and blending; chemical stabilization of soils with admixtures, waterproofing and modifying soils and additives. Reinforced earth and stabilization of cut and fill geosynthetics. Prereq: Introduction to Soil Behavior.

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: Introduction to Soil Behavior or consent of instructor.


537 Issues in Geotechnical Engineering (1-3) Special readings, problems, discussions, and presentations in geotechnical engineering. Prereq: Graduate standing or consent of instructor. May be repeated.

538 Finite Element Applications in Geotechnical Engineering (3) Applications of finite element method to typical problems in geotechnical engineering. Confining analysis of flow through fine grained media, stresses and strains in elastic halfspace; representation of nonlinear soil behavior with elastic and plastic-plastic models; soil structure interaction effects. Prereq: Introduction to Soil Behavior and One-way reversible flow: system operations; identification and correction of high-occurrence accidents; and system deficiencies. Prereq: 551 or 542.

539 Geotechnological Seminar (1) Seminar topics in geotechnical and geological engineering. Research contributions and cases studies by graduate students and engineers and scientists from surrounding community. Prereq: Graduate standing or consent of instructor. May not apply toward degree. May be repeated. S/NC only.


541 Construction Management II (3) Management of heavy and building construction projects. Prereq: Construction Management and Equipment.

542 Construction Estimating (3) Project costs, estimating and takeoff techniques, market cost conditions, and feasibility of design to cost. Prereq: Construction Management and Equipment.

543 Traffic Engineering-Characteristics (3) Traffic engineering-characteristics of vehicles, pedestrians, and cyclists; basic traffic characteristics; traffic flow properties; traffic safety and flow analysis; traffic flow modeling; elements of transportation planning and management. Prereq: Traffic Engineering-Characteristics.

544 Urban Transportation Planning (3) Urban transportation planning; identification of existing and future problems; traffic surveys and demand models; evaluation of alternative systems; transportation planning and management. Prereq: 551 or consent of instructor.

545 Urban Transportation Planning (3) Urban transportation planning; identification of existing and future problems; traffic surveys and demand models; evaluation of alternative systems; transportation planning and management. Prereq: 551 or consent of instructor.

546 Traffic Engineering-Characteristics (3) Traffic engineering-characteristics of vehicles, pedestrians, and cyclists; basic traffic characteristics; traffic flow properties; traffic safety and flow analysis; traffic flow modeling; elements of transportation planning and management. Prereq: Traffic Engineering-Characteristics.

547 Traffic Engineering-Characteristics (3) Traffic engineering-characteristics of vehicles, pedestrians, and cyclists; basic traffic characteristics; traffic flow properties; traffic safety and flow analysis; traffic flow modeling; elements of transportation planning and management. Prereq: Traffic Engineering-Characteristics.

548 Planning and Transportation (3) The development of transportation as elements of comprehensive development plans. Analysis of relationship between various transportation modes and systems and other community facilities. Use of planning process to establish existing travel patterns, modeling of demand, proposing alternatives and evaluation. Prereq: Graduate standing. (Same as Planning 537.)

653 Pollutant Fate Modeling and Risk Assessment (3) Application of scientific principles concerning movement and fate of chemicals at interfaces of air, water, and earth solid phases in an 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.

Classics

(College of Arts and Sciences)

Susan D. Martin, Head

Professors:

t John C. Gries, G. C., Ph.D. .................. North Carolina
Stewart, H. C. (Emeritus), Ph.D. .......... Ohio State

Associate Professors:

Craig, C. P., Ph.D. .................. North Carolina
Martin, S. D., Ph.D. .................. Michigan
Sibree, J. E., Ph.D. .................. Vanderbilt
Tandy, D. W., Ph.D. .................. Yale

Assistant Professor:
Sutherland, E. H., Ph.D. .................. UC Berkeley

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

GRADUATE COURSES


405-06 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 hrs.

414 Cicero and Techniques of Latin Prose Composition (3) For advanced students in Latin, prose in prose composition, writings of Cicero the model. Prereq: 351-352 or consent of instructor.

431-32 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 hrs.

435 Medieval Latin (3) Selected readings from Latin prose and poetry of medieval Europe. Prereq: Consent of instructor.

441 Special Topics in Classical Civilization (1-3) Art, literature, and society of Greece and Rome. May be repeated with consent of department. Maximum 9 hrs.

461 Studies in Classical Archaeology (3) Variable content course offering subject matter not taught in an existing course, or concentrating on one aspect of existing survey. Prereq: According to topic. May be repeated. Maximum 9 hrs.

482 Roman Law (3) Development of Roman law through examination of cases from writing of Roman jurists, world's first legal professionals. Understanding legal institutions in relationship to Roman society. Roman property and contract law.

531 Special Topics in Latin Literature (3) Advanced study of classical or medieval Latin literature, authors selected by students and instructor. May be repeated. Maximum 9 hrs.

561 Special Topics in Classical Civilization (1-3) Advanced tutorial work in Greek and Roman authors in English translation; problems in cultures of Greece and Rome. May be repeated. Maximum 9 hrs. Letter grade or S/NC.

Communications

(College of Communications)

MAJOR DEGREES

Communications ................................ M.S., Ph.D.

The College of Communications offers the Master of Science and the Doctor of Philosophy degrees with a major in Communications. In addition to the full-time program, the M.S. degree program is offered on an evening basis in Knoxville, and via distance education, at the University of Tennessee at Chattanooga campus.

For application forms and other information about the M.S. and Ph.D. programs in Communications, write to: Associate Dean for Graduate Studies, College of Communications, 426 Communications Building, The University of Tennessee, Knoxville, TN 37996-0347.

ADMISSION REQUIREMENTS

Applicants must meet admission requirements of The Graduate School. In addition, they must complete the Graduate Record Examination, rating forms, and application forms as required by the College of Communications. Minimum requirements for admission to full potential graduate status include a 3.0 grade-point average in undergraduate study and scores at or above the fiftieth percentile in verbal and quantitative aptitude on the Graduate Record Examination. All application materials are screened by an admissions committee. The Master of Science degree is available to those who do not have academic prerequisites, and an internship may be required for those who do not have professional experience in the field they wish to study. The course in communications law is a prerequisite.

Students interested in subsequent entry into a doctoral program are advised to pursue the thesis option and to take additional courses in communications theory and research, subject to advisor's approval.

THE DOCTORAL PROGRAM

The Ph.D. with a major in Communications is intended to prepare scholars for teaching, research, administration, and service in the field of mass communications. The program is interdisciplinary, consisting of a required core curriculum and recommended coursework 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.

The master's degree is required for entry into the doctoral program. Students lacking academic or professional experience in communications may 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.

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

1. A 3.0 (4.0 system) grade-point average in undergraduate studies, or 3.5 for graduate work in a master's degree;
2. at or above the fiftieth percentile in verbal and quantitative aptitude on the Graduate Record Examination;
3. endorsement by at least three former teachers or professional colleagues; and
4. a statement of the applicant's goals and reasons for pursuing the doctorate. Personal interviews with members of the Ph.D. Admissions Committee are recommended and may be required.

Professional experience in some field of communications is a highly desirable criterion for admission.

A minimum of 88 hours of approved graduate work is required for the Ph.D.:
1. Twenty-eight hours of core courses--Communications 610, 612, 620, 640, 641; 651, 652.
2. Fifteen hours in a primary concentration (advertising, broadcasting, information sciences, journalism, public relations, or speech communication) supplementing the core. Courses may be taken in one or more of the Departments of Advertising, Broadcasting, Speech Communication, and/or the Schools of Information Sciences and Journalism.
3. Twelve hours in a secondary concentration (outside the College of Communications).
5. Twenty-four 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 Doctoral Committee of the College of Communications. 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.

Candidates without prior teaching experience must register for Communications 521, Tutorial in Communications Teaching.

Planned course offerings in the College of Communications for a full calendar year are available the preceding November. This information is available from the Graduate Studies Office, 426 Communications Building, 977-6651. Students interested in Advertising, Broadcasting, Information Sciences, Journalism, and Speech Communication.

**ACADEMIC COMMON MARKET**

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. program in Communications is available to residents of Arkansas, Kentucky, or Louisiana (concentration in advertising only). The Ph.D. program is available to residents of the states of Alabama, Arkansas, Louisiana, Maryland, Virginia, or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

**ACADEMIC STANDARDS**

A student in the College of Communications 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 hours of graduate coursework attempted that is specified in the student's degree program. Exceptions to this policy may be made only with the approval of the Associate Dean for Graduate Studies of the College of Communications on the recommendation of the student's faculty committee.

**GRADUATE COURSES**

*Mass Communications Law and Ethics (3)* Legal issues directly affecting the mass media: libel, privacy, free press, fair trial, judicial controls, governmental regulations. Ethical standards and practices of mass media in America. Prereq: Writing for Mass Communication or consent of instructor. E

*500 Thesis (1-15)* P/NP only. E

*502 Registration for Use of Facilities (3-15)* Required for the student not otherwise registered during any semester when students use University facilities and/or faculty-time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

*510 Orientation to Master's Studies (1)* Degree and thesis requirements. Committee formation and program planning. Overview of research methods and informational sources. Prereq: Consent of instructor or admission to program. S/NC only. F

*512 Fundamentals of Media Research (3)* Applications of research techniques for management, gathering data for assessing media audiences and message impacts. Prereq: Consent of instructor or admission to program. F

*521 Tutorial in Communications Teaching (1)* Experience as teacher under guidance of faculty member. Prereq: Consent of instructor. S/NC only. E

*540 Theory for Media Management (3)* Selected research hypotheses and theories in literature of mass communications, managerial decision-making. Prereq: Consent of instructor or admission to program. Sp

*550 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. Sp

*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 or admission to program. Sp

*552 Seminar in Health Communications (3)* Methods, problems, and issues of communication in health field. Media's reporting of health issues. Setting of media's "health agenda," strategies of public relations in social marketing efforts; public communication of complex social medical issues. Prereq: Consent of instructor.

*553 Seminar in Risk Communications (3)* Interaction of scientists, journalists, and public on scientific, technological, and medical risks; analysis of methods for enhancing public understanding. Prereq: Consent of instructor.

*560 Seminar in Communications Management (3)* Organizational structure and functions of communication corporations; development of objectives, strategies, tactics. Analysis of financial statements and case studies. Computer-intensive.

*570 Project (3)* Capstone project under guidance of faculty. Application of principles from previous coursework. S/NC only.

*593 Seminar in Mass Communications Issues (3)* Contemporary topics in communications. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

*600 Doctoral Research and Dissertation (3-15)* P/NP only. E

*610 Orientation to Doctoral Research (1)* Degree and dissertation requirements. Committee formation and program planning. Overview of research methods and informational sources. Prereq: Consent of instructor or admission to program. S/NC only.

*612 Fundamentals of Communications 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. Sp

*620 Seminar in Mass Communications Education (3)* Role and scope of mass communications teaching unit, historical perspectives of curricular trends. Teaching methods and institutional objectives; classroom testing and measurement; design of professional curriculum, research and extension; program evaluation: grants and contracts in research. Prereq: Consent of instructor or admission to program. Su

*622 Quantitative Research (3)* Techniques for evaluation of research design and measurement. Survey, content analysis, and experimental techniques. Assessment of reliability and validity. Data analysis, hypothesis testing and inference statistics. Prereq: 612. F

*632 Mass Communications History and Historiography (3)* Origins and development of mass media in America. Philosophies of history. Historical sources and their verifications. Synthesis and interpretation of data. Prereq: 612 or consent of instructor. Su

*640 Mass Communications Theory I (3)* Selected research hypotheses, and theories in literature of mass communication theory. Prereq: Consent of instructor or admission to program. F

*641 Mass Communications Theory II (3)* Selected topics in theory. Critical evaluation of extant theory, derivation of hypotheses, and advanced theory construction. Prereq: 640. Sp

*642 Qualitative Research (3)* Theory and application of qualitative research methods in communication 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. Su

*652 Mass Communications Law and Legal Research (3)* Legal restrictions under which mass media operate. Federal, state, and international law, legal approaches. May be repeated. Prereq: 651 or consent of instructor. F

*692 Advanced Topics in Communications Theory and Methodology (3)* Advanced study of communication issues, theories and methods. May use quantitative, qualitative, historical or legal approaches. Prereq: 651 or consent of instructor.
Comparative and Experimental Medicine

Office of the Vice Chancellor for Academic Affairs

MAJOR

Comparative and Experimental Medicine

DEGREES

M.S., Ph.D.

L. N. D. Potgieter, Director

Joint Graduate Coordinating Committee:

Fuhr, J. E., Ph.D., Medical Biology
Lawfer, J. E., Ph.D., Psychology
Lozzio, C., M.D., Medical Biology
Potgieter, L. N. D. (Liaison), B.V.Sc., Ph.D., Veterinary Teaching Hospital
Slauson, D. O., D.V.M., Ph.D., Veterinary Teaching Hospital

The Comparative and Experimental Medicine degree program (M.S. and Ph.D.) is a jointly-administered graduate program intended to prepare students for teaching and/or research careers in the health sciences. This program emphasizes the comparative approach to the study of experimental pathobiology, infectious diseases, pharmacokinetics, epidemiology, clinical medicine, immunopathology, hematology, aberrant metabolism, oncology, and genetic diseases. The Ph.D. program is open to approved graduate students seeking training in this area and is especially useful for individuals with professional degrees. For the student with undergraduate biological science background, the Comparative and Experimental Medicine program provides an unusual opportunity to study disease processes common in humans and animals from a multidisciplinary perspective. The scope of this intercollegiate program, which pools faculty resources from both veterinary and human medicine, is broadened by faculty members representing animal science and numerous areas of the life sciences. The interdisciplinary training environment includes such diverse support as facilities and personnel at the Veterinary Teaching Hospital, UT Medical Center at Knoxville, Oak Ridge National Laboratory, The Knoxville Zoological Park, Hemophilia Clinic, Developmental and Genetic Center, Hematology and Oncology services, and departments of life sciences.

A comprehensive examination is given at the end of the program.

ADOPTION REQUIREMENTS

Admission requirements of The Graduate School of UT Knoxville apply. In addition, all applicants must furnish three letters of recommendation from individuals who are familiar with their scholastic or professional records.

Master of Science Degree Program

Applicants must have a baccalaureate degree with coursework in chemistry through organic, mathematics through calculus, physics, and basic biology. More advanced study in biology such as biochemistry, mammalian anatomy, histology, cell biology, or other appropriate biomedical courses from an accredited university is recommended.

Applicants for admission to the Master of Science degree program whose background include no formal training in the biomedical field beyond the baccalaureate degree will be required to score at least 1,000 on the quantitative and verbal portions of the Graduate Record Examination.

Doctor of Philosophy Degree Program

Applicants generally will be expected to have a master's degree in one of the biological sciences and a Graduate Record Examination score of at least 1000 for the quantitative and verbal sections, or a professional degree in one of the medical sciences, e.g., M.D., D.D.S., D.V.M.

An individual having a baccalaureate degree with a strong background in the physical and biological sciences may be admitted upon presentation evidence of exemplary performance on the Graduate Record Examination.

Exceptional veterinary students at UT 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.

THE MASTER'S PROGRAM

All students must take at least 4 credit hours in 500- or 600-level courses in basic mechanisms of disease and at least 7 credit hours of 500-level biochemistry or cell biology. See listings under Biochemistry and Cellular and Molecular Biology program for information on these courses. 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 College 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.

THE DOCTORAL PROGRAM

All students must take at least 4 credit hours in 500- or 600-level courses in basic mechanisms of disease and at least 7 credit hours of 500-level biochemistry or cell biology. See listings under Biochemistry and Cellular and Molecular Biology program for information on these courses. 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 pharmacology, comparative pathology, immunology, genetics, infectious diseases, or biochemistry of disease. 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 16 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. The director is the fourth member of the doctoral committee. At least one member must be from the College of Veterinary Medicine and at least one member from the College of Medicine.

A comprehensive examination is given at the completion of coursework. A seminar and final oral defense of the dissertation culminate the program.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The Ph.D. program is available to residents of the state of Florida. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

Comparative and Experimental Medicine--Graduate School of Medicine

GRADUATE COURSES

Participating departments include: Anesthesiology, Medicine, Medical Biology, Obstetrics and Gynecology, Pathology, Pediatrics, Radiology, and Surgery.

500 Thesis (1-15) P/NP only. E

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. S/NC only. E

508 Graduate Research Participation (3) Advanced research techniques while conducting individual biomedicall research projects under supervision of faculty. Open to all graduate students. Prereq: Consent of instructor. May be repeated with consent of instructor. Maximum 9 hrs. S/NC only. E

521 Principles of Oncology (3) Lectures, classroom discussion, and case reports summarizing major topics of oncology. Prereq: Biology 220-30 or consent of instructor. E

541 Molecular Basis for Metabolic Disease (4) Disease at the 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 410-418 or equivalent. F/Sp

545 Clinical Genetics (3) Human genetic disorders: new developments in cyogenetics, molecular genetics, clinical diagnoses and prevention. Prereq: Biology and genetics background or consent of instructor.

600 Doctoral Research and Dissertation (3-15) P/NP only. E

610 Medical Biology Seminar (1) Invited speakers. Topics posted in advance. May be repeated. S/NC only. E

611 Advanced Topics in Medical Science (1-3) New developments in biological research applicable to clinical medicine. Primarily for doctoral candidates in Comparative and Experimental Medicine. Prereq: Consent of
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 hrs. E

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 hrs. E

605 Pathobiology Seminar (1) Subjects of current interest in biomedical science. Students present one seminar per term. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. Class meets once monthly. E

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. Sp

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. Prereq: Consent of instructor. Sp

608 Descriptive and Applied Epidemiology (2) 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. F

609 Mechanisms of Disease (4) Advanced topics in pathobiology and mechanisms of disease: pathophysiology, cellular degeneration, immunopathology, heredity. 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. Sp

610 Advanced Topics in Comparative and Experimental Medicine (1-3) Specialized in-depth experience in various disciplines. Current and future research methodology, recent advances in instrumentation in analytical techniques for comparative medicine. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs. E

615 Advanced Topics in Animal Anatomy (1-4) (Same as Animal Science 651). E

652 Disorders of the Endocrine System (2) (Same as Animal Science 652). Sp

Comparative Medicine

See College of Veterinary Medicine and Comparative and Experimental Medicine

Computer Science

(College of Arts and Sciences)

MAJOR

DEGREES

Computer Science ........................................ M.S., Ph.D.

Robert C. Ward, Head

Professors:

Dongarra, Jack, Ph.D. ...................................... New Mexico

Langston, Michael A., Ph.D. ............................ Texas A&M

Poore, J.H., Ph.D. ......................................... Georgia Tech

Sherman, Gordon R. (Emeritus), Ph.D. ............. Purdue

Thomason, Michael G., Ph.D. ........................... Duke

Ward, Robert C., Ph.D. ................................. Virginia

Associate Professors:

MacLennan, Bruce J., Ph.D. ............................ Purdue

Vander Zanden, Bradley, Ph.D. ....................... Cornell

Vose, Michael D., Ph.D. ............................... Texas

Assistant Professors:

Beck, Mich, Ph.D. ......................................... Cornell

Berry, Michael W., Ph.D. ............................... Illinois

Gregor, Jens, Ph.D. ........................................ Aalborg (Denmark)

Jones, Mark T., Ph.D. ...................................... Duke

Plank, James S., Ph.D. .................................... Princeton

Raghavan, Padma, Ph.D. ............................... Penn State

Straight, David W., Ph.D. ............................... Texas

Instructor:

Mayo, J. Wallace (Liaison), M.S. ................. Tennessee

THE MASTER'S PROGRAM

Two semesters of calculus plus two additional semesters of college mathematics (e.g., linear algebra, differential equations, probability) and a course in Discrete Structures and in Systems Programming are required for admission. For the master's degree, 30 semester hours of graduate credit are required, 24 of which must be 500 level or above. Computer Science 530, 560 and 580 are required for the degree. Graduate courses taken outside the department are sometimes allowed but must be approved by the Graduate Committee before enrollment.

Thesis Option

The student must reach agreement on a thesis topic with a faculty advisor and must take 6 hours of 500 Thesis. Six hours of 500 Thesis may count in the 24-hour requirement at the 500 level or above.

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.

Master's Minor in Computer Science

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

THE DOCTORAL PROGRAM

A student seeking admission to the Ph.D. program is expected to meet the following requirements:

1. 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.

2. 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 Graduate School.

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

Original research reported in a dissertation of high quality is emphasized. The minimum hour requirements are 24 hours of course 600 Doctoral Research and Dissertation and 24 hours of graduate courses beyond the equivalent of a master's degree (i.e., beyond 30 graduate credit hours) graded A-F. Computer Science 530, 550, and 580 are required for the degree. At least six hours of 600-level graded courses must be taken in computer science at UTK. 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.

**GRADUATE COURSES**

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 hrs.

430 Advanced Topics in Hardware Systems (3) Architecture, parallel processors, microprogramming, networks and communications. Faculty research. Prereq: Completion of course curriculum or consent of instructor. May be repeated. Maximum 9 hrs.

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 hrs.

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 hrs.

471 Numerical Analysis (3) (Same as Mathematics 471.)

472 Numerical Algebra (3) (Same as 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 hrs.

494 Special Topics in Computer Science (1-3) May be repeated. Maximum 9 hrs.

500 Thesis (1-15) P/NP only. E

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 degrees completed. May not be used toward degree requirements. May be repeated. S/N only. E

521 Advanced Topics in Artificial Intelligence (3) Heuristic search, automatic theorem proving, symbolic methods, semantic information processing, representation theory. Prereq: Discrete Structures and Problem Solving.

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.


532 Boolean Algebra, Logic Design and Microprocessors (3) Boolean algebras. Combinational and sequential logic design. Microprocessors, hardware lab. Prereq: One year of college mathematics beyond algebra and trigonometry.


538 Computer Networks (3) Design and operation of networks. Hardware and software systems; communications subsystems. Prereq: System Programming and 532.


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) Techniques of computer image processing and understanding. Prereq: 551.


571-72 Numerical Mathematics (3) (Same as Mathematics 571-72.)

573 Finite Difference Methods for Partial Differential Equations (3) (Same as Mathematics 573.)

574 Finite Element Methods (3) (Same as Mathematics 574.)

575 Matrix Theory and Techniques in Numerical Analysis (3) (Same as Mathematics 575.)

576 Sparse Matrix Computations (3) Solution of large sparse linear systems: graph models, reordering techniques, symbolic factorizations, data structures, numerical algorithms, complex problems, parallel algorithms. Prereq: Numerical linear algebra.

580 Foundations (3) Finite automata and regular sets. proof of push-down automata and context-free languages. Turing Machines, recursively enumerable sets, undecidability, Cook’s theorem and NP-completeness. Prereq: Discrete Structures.

581 Design and Analysis of 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.

588 Computability and Computational Complexity (3) Computability by abstract devices, recursively enumerables sets, decidability, NP-completeness, polynomial-time hierarchy. Prereq: 580.

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. E

620 Advanced Topics In Intelligent Systems (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

630 Advanced Topics In Computer 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 Numerical Mathematics (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.

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**Counselor Education and Counseling Psychology**

(Formerly Counseling, Psychodrama, and Counselor Education)

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**MAJORS**

Counseling ............... M.S.
Education ................. Ed.S., Ph.D.

M. A. Hector, Leader

Professors:
Davis, Kathleen L., Ed.D. ...... Georgia
DeRidder, Lawrence M. (Emeritus), Ph.D. ...... Michigan
Dietz, Siegfried C. (Emeritus), Ed.D. ...... Arizona State
Hector, M. A. (Liaison), Ph.D. ...... Michigan State
Huck, Schuyler W., Ph.D. ...... Northwestern
McClain, Ed W. (Emeritus), Ph.D. ...... Texas
Peterson, M. P., Ph.D. ...... Ohio State
Poppen, William A., Ph.D. ...... Ohio State
Thompson, C. L., Ph.D. ...... Ohio State

Associate Professor:
Hutchens, Teresa A., Ph.D. ...... Georgia

The Counseling Education and Counseling Psychology unit participates in graduate programs leading to degrees, majors, and concentrations in:

Master of Science,
Counseling
Community counseling
School counseling
Educational Specialist
Education
School counseling
Doctor of Philosophy
Education
Counseling psychology

See Education Under Fields of Instruction for full description of all degree requirements.

The M.S. and Ed. S. degree programs with their respective concentrations are accredited by the Council for Accreditation of Counseling and Related Educational Programs. In addition, the counseling psychology concentration under the college-wide Ph.D. program is accredited by the American Psychological Association, and the specialization in counseling education within the counseling psychology concentration is accredited by the Council for Accreditation of Counseling and Related Educational Programs.

The Counseling Education and Counseling Psychology unit emphasizes research-based practices that address the growth and development of the whole person throughout the lifespan. In its counseling programs, the unit concentrates on maximizing development and adjustment of individuals through prevention and
treatment models in schools, colleges, community agencies, businesses, and private-practice settings.

The application deadline for admission to the doctoral and Ed.S. programs is February 1; November 1 and February 1 for the master’s program.

ADMISSION REQUIREMENTS

Admission requirements include up-to-date scores from the GRE, the unit applications, formal application, and letters of recommendation. For the doctoral programs, a writing sample is also required.

GRADUATE COURSES

410 Sex Role Development: Implications for Education and Counseling (3) Theories and research concerning development of person’s sexual role and its relevance in educational and counseling settings. E,S

431 Personality and Mental Health (3) Various perspectives of mental health with application to education and other social institutions. E

500 Thesis (1-15) P/NP only. E

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. Maximum 15 hrs. S/NC or letter grade. E


504 Special Topics (1-3) Instructor-initiated course offered at convenience of academic unit on topics of current interest. May be repeated. Maximum 15 hrs. S/NC or letter grade. E

518 Educational Specialist Research and Thesis (3) May be repeated. P/NP only. E

520 Statistics and Research Design: Conceptual (3) Consumer-oriented, conceptual treatment of statistics, research design, and quantitative basis of testing. E

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. Prereq: 520 or equivalent. F,Su

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 Introduction to Pupil Personnel Programs (3) History, philosophy, professional standards, counselor role in relation to school staff and mental health professionals, and ethics of profession. F

551 Theory and Practice of Counseling (3) Philosophical bases of helping relationships; development of counselor and client self-awareness; counseling theory/techniques. F,Su

552 Career Development: Vocational Theory, Research and Practice (3) Relationship of vocational theory, career development research and societal factors to life career roles. F,Su

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. E

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 hrs. E

556 Seminar in Community Agency Counseling (1) Orientation to professional organizations, code of ethics, certification requirements, and role identity of community agency counselors. May be repeated. Maximum 2 hrs. S/NC only. F,Sp

559 Internship in School Counseling (1-6) Supervised practicum employment at academic unit approved site. Prereq: 550 and consent of instructor. May be repeated. Maximum 12 hrs. S/NC only. E

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. Sp,Su

566 Approaches to Family Intervention and Counseling (3) (Same as Child and Family Studies 566.) F

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. Sp

571 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: 525 and 560 and admission to counseling program or consent of instructor. S/NC only. Sp,A


593 Independent Study (1-3) May be repeated. S/NC or letter grade. E

600 Doctoral Research and Dissertation (3-15) P/NP only. E

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 hrs. S/NC only. E

604 Special Topics (1-3) Instructor-initiated courses offered at convenience of academic unit on topics of interest. May be repeated. Maximum 15 hrs. S/NC or letter grade. E

625 Advanced Study in Personality (3) Theory, research and conceptual analysis of studies with application to education and counseling. Prereq: 431 or equivalent. F

635 Ethical, Legal, and Professional Issues in Psychology (3) (Same as Psychology 635 and Psychological Studies 635.) Sp

650 Seminar in Counseling Education (1) Professional issues related to role and function of counselor/educator. Prereq: Admission to doctoral program in counselor education. May be repeated. Maximum 2 hrs. S/NC only. F

655 Practicum in Counseling 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 hrs. Sp

659 Internship in Counseling Education (1-6) Supervised employment in academic unit approved internship sites in counselor education. May be repeated. Maximum 12 hrs. S/NC only. E

661 Education Implications of Neuropsychology (3) Theory and assessment. Common syndromes and their behavioral and cognitive manifestations. Prereq: 516; and 541 or equivalent individual assessment course; or consent of instructor. Sp


671 Personality and Vocational Assessment (3) Use and interpretation of personality and vocational measures in assessment of clients. Prereq: 525, 552, or consent of instructor. A

672 Psychological Dysfunction (3) Classification methods, dynamics and treatment of dysfunctional individuals in counseling. Prereq: 625 and course in abnormal psychology, or consent of instructor. A

673 Advanced Theory and Practice in Group Counseling (3) Theories and supervised practice. Prereq: 554, 555, and consent of instructor. F

674 Practicum in Counseling Psychology (3) Supervised practice of individual counseling. Minimum 150 clock hrs required each semester. Prereq: Admission to counseling psychology doctoral program, 555, and consent of instructor. May be repeated. Maximum 6 hrs. E

678 Theory and Practice of Counseling Supervision (3) Theory and practice of supervision in counseling. Prereq: 665, or 674, or consent of instructor. S/NC only. Sp

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 hrs. S/NC only. E

693 Independent Study (1-3) May be repeated. S/NC or letter grade. E

Cultural Studies in Education

(Graduate of College of Education)

MAJORS

DEGREES

Education..................M.S., Ph.D.

Human Performance and Sport Studies...........M.S., Ph.D.

J. Paul, Leader

Professors:

Allison, C. B., Ph.D...........................Ohio State

DeSens, J. T., Ed.D..........................North Carolina (Greensboro)

Howard, Robert (Emeritus), Ph.D. ..............Ohio State

Mead, B. J., Ph.D.............................Purdue

Morgan, W. J., Ph.D...........................Columbia

Paul, Joan (Liaison), Ed.D....................Minnesota

Phillips, Marjorie (Emeritus), Ph.D. ...........Alabama

Winston, Richard, Ed.D........................Wayne State

Wrisberg, C. A., Ph.D...........................Michigan

Assistant Professor:

Wright, Handel K., Ph.D........................Toronto

The Cultural Studies in Education unit participates in graduate programs leading to degrees, majors, and concentrations in:

Master of Science

Education

Social foundations

Human Performance and Sport Studies

Motor behavior/sport psychology

Sociocultural foundations of sport
Doctor of Philosophy

Education

Cultural studies in education

Motor behavior/sport psychology

Social foundations in education

See Education under Fields of Instruction for full description of all degree requirements.

The unit derives its intellectual identity and orientation from disciplines such as anthropology, history, philosophy, psychology, and sociology, and is characterized by more specialized forms of inquiry such as ethnography, semiotics, literary theory, hermeneutics, linguistics, and feminist theory.

As a unit founded upon and devoted to interdisciplinary inquiry, Cultural Studies in Education seeks to bring its disciplines to the service of students and faculty throughout the college as aids to understanding diverse cultural contexts that shape beliefs, values and practices. The main charge of the unit is to examine critically the social practices, institutions, "helping" agencies, and other social sites where disenfranchised and marginalized groups struggle for greater control over their futures.

Graduate Courses

500 Thesis (1-15) P/NP only. E

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 (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. S/NC only. E


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. (Same as Sociology 564.)

526 Philosophy of Education (3) Truth, knowledge, and valuation in relation to work of schools. F, Su

530 Development of Education Thought (3) Historical and philosophic approach to education and writing of influential educators: Plato, Quintilian, Comenius, Rousseau, Pestalozzi, Froebel, Dewey, Prereq: Graduate status and consent of instructor. Sp, Su

533 Psychology of Sport (3) Social psychological factors influencing human behavior in 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.

540 Foundations of Educational Policy (3) Relationship between theory, policy, and practice; educational policies that arise from philosophical and practical considerations relative to human nature, to educational purpose, to content of curriculum and to methods and techniques for conducting educational enterprise. F, Su

541 Special Topics (1-3) Advanced study in selected disciplinary or professional areas of physical education and/or sport. May be repeated.

542 Sociological Aspects of Sport (3) Social and cultural factors influencing sport and physical education. Pertinent issues and research applications. Prereq: Consent of instructor. (Same as Sociology 542.)


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 seniors, juniors, and graduate students. F

546 Topics in History of Education (3) May be repeated. E

547 Topics in Philosophy of Education (3) May be repeated. F, Su

549 Topics in International Education (3) Historical, philosophical, and sociological foundations; selected nations and their cultures. May be repeated. E

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. F, Su

593 Independent Study (1-3) May be repeated. S/NC or letter grade. E

594 Supervised Readings (1-3) May be repeated. S/NC or letter grade.

595 Special Topics (1-3) Advanced study in selected aspects of the humanities. May be repeated. Maximum 9 hrs. S/NC or letter grade.

600 Doctoral Research and Dissertation (3-15) P/NP only. E

604 Seminar in Curriculum and Instruction (1) Required 2 consecutive semesters. S/NC only. E

607 Advanced Seminar in the Social Foundations of Education (4) Interdisciplinary team taught seminar. Readings selected by faculty and participants from classic and contemporary periods of human civilization. Core readings and development of special interests. Prereq: Permission of instructor.

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. E

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. Sp

633 Advanced Motor Behavior (3) In-depth analysis, synthesis, and discussion of contemporary theory and research; development and production; motor control learning, sport psychology, motor development. May be repeated. Maximum 9 hrs.

648 Topics in Sociology of Education (3) May be repeated. Sp

652 Advanced Studies in Educational Anthropology (3) Study of human behavior in contemporary educational settings; applied and formal educational methodology. Analysis of selected research in field. Prereq: 451, 2 courses in cultural anthropology, or consent of instructor. Sp


681 Practicum (1-3) Intern experience in areas of major interest. May be repeated.

683 Independent Study (1-3) May be repeated. S/NC or letter grade. E

694 Supervised Reading (1-3) May be repeated. S/NC or letter grade. E

695 Special Topics (1-3) Study for doctoral students in selected aspects of educational studies. May be repeated. Maximum 9 hrs. S/NC or letter grade.

Ecology and Evolutionary Biology

(Graduate Program in Ecology and Evolutionary Biology)

MAJOR

DEGREES

Ecology ........................................ M.S., Ph.D.
Zoology ........................................ M.S., Ph.D.

A.C. Echternacht, Head
W.O. Smith, Associate Head

Professors:

Bunting, D. L., Ph.D. .......................... Oklahoma State
Burghardt, G. M., Ph.D. ........................ Chicago
Deiourct, P. A., Ph.D. .......................... Minnesota
Echternacht, A. C., Ph.D. .................... Kansas
Etiene, D. A., Ph.D. .............................. Minnesota
Gavrilts, S., Ph.D. ............................... Moscow State
Greenberg, N. B., Ph.D. ...................... Rutgers
Gross, J. L., Ph.D. ............................... Cornell
Hallam, T. G., Ph.D. ............................ Idaho
Harris, W. F., Ph.D. ............................. Tennessee
Kot, M., Ph.D. ................................. Arizona
Maxson, L. R., Ph.D. .......................... California (Berkeley); San Diego State
McCormick, J. F., Ph.D. ...................... Emory
McCracken, G. F., Ph.D. ...................... Cornell
Pan, M. L., Ph.D. ............................... Pennsylvania
Pimm, S. L., Ph.D. ............................... New Mexico State
Riechert, S. E., Ph.D. ......................... Wisconsin
Sayer, G. S., Ph.D. ............................. Idaho
Schultz, T. W., Ph.D. ........................... Tennessee
Simberloff, D. (Gore Hunger Chair of Excellence), Ph.D. ........................ Harvard
Smith, W. O., Ph.D. ............................ Duke
Stacey, G., Ph.D. ............................... Texas
Vaughan, G. L., Ph.D. ......................... Duke

Associate Professors:

Amundson, C. C., Ph.D. ....................... Colorado
Boake, C. R. B., Ph.D. ........................ Cornell
Delcoult, H., Ph.D. .............................. Minnesota
Draik, J. G., Ph.D. ............................... Purdue
Fox, D. J., Ph.D. ............................... Johns Hopkins
Gittleman, J. L., Ph.D. ....................... Sussex (UK)

Assistant Professors:

Cruz, M. B. C., Ph.D. ........................ SUNY (Stony Brook)
Piglucci, M., Ph.D. .............................. Connecticut

Research Assistant Professor:

Grebeamer, J. M., Ph.D. ........................ Alaska

Shared faculty are drawn from other University departments, the Oak Ridge National Laboratory, the National Biological Service, and the Tennessee Valley Authority.

The Department of Ecology and Evolutionary Biology offers the Master of Science and Doctor...
of Philosophy degrees with a major in Ecology or Zoology, concentrations in behavior, ecology, environmental toxicology, and evolutionary biology.

REQUIRED FOR ADMISSION

Applications are accepted once a year. The deadline for receipt of all application materials is 15 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 had 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 1500. Submission of scores on appropriate (e.g., biology, mathematics) advanced GRE examinations are recommended but not required. Applicants are also expected to have an overall grade-point average of at least 3.0, and 2.7 or above for all science and mathematics courses, on a 4.0 scale (successful applicants will usually have grade-point averages exceeding these minimums).

Applications must be completed and submitted to both the Graduate School and the department. The departmental application requires 3 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 Affairs Committee, Department of Ecology and Evolutionary Biology, The University of Tennessee, Knoxville, TN 37996-1610.

THE MASTER'S PROGRAMS

In addition to general requirements of the Graduate School, aspirants for the Master of Science degree 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.

THE DOCTORAL PROGRAMS

In addition to general requirements of The Graduate School, aspirants for the Doctor of Philosophy degree 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 dissertation.
Economics

(College of Business Administration)

MAJORS

Economics ........................................... M.A., Ph.D.
Business Administration .......................... MBA

William F. Fox, Head

Professors:

Bohm, Robert A. (Liaison), Ph.D. ........ Washington (St. Louis)
Bowlby, Roger L. (Emeritus), Ph.D. .......... Texas
Carr, Sidney L., Ph.D. .......................... Harvard
Chang, Hui S., Ph.D. ............................ Vanderbilt
Clark, Don P., Ph.D. ............................. Michigan State
Cole, William E. (Emeritus), Ph.D. .......... Texas
Davidson, Paul (J. Fred Holly Chair of Excellence), Ph.D. ...... Pennsylvania
Fox, William F., Ph.D. ........................... Ohio State
Garrison, Charles B., Ph.D. .................... Kentucky
Herzog, Henry W., Ph.D. ....................... Maryland
Jensen, Hans E. (Emeritus), Ph.D. .......... Texas
Lee, Feng-Yao, Ph.D. ............................. Michigan State
Mayhew, Anne Ph.D. .............................. Texas
Mayo, John W., Ph.D. ......................... Washington (St. Louis)
Moore, John R. (Distinguished Prof.) ....... Emeritus
Neale, Walter C. (Emeritus), Ph.D. ........ London
Russell, Milton, Ph.D. ............................ Oklahoma
Schlottman, Alan M., Ph.D. ................. Washington (St. Louis)
Spiva, George A. (Emeritus), Ph.D. ........ Texas

Associate Professors:

Gauger, Jean A., Ph.D. ........................ Iowa State
Gustafson, Erlod, Ph.D. ....................... Stanford
Kahn, James R., Ph.D. ........................ Maryland
Murray, M. N., Ph.D. .......................... Syracuse

Assistant Professors:

Barse, Peter M., Ph.D. ........................ Virginia
Farmer, Amy L., Ph.D. ......................... Duke
Rubin, Jonathan D., Ph.D. ........................ California (Davis)
Stango, Victor O., Ph.D. ........................ California (Davis)
Stanley, Denise L., Ph.D. ........................ Wisconsin

The Department of Economics offers graduate programs leading to the M.A. and Ph.D. The M.A. may be completed by either a thesis or non-thesis option, while the Ph.D. requires successful completion of a dissertation. Applicants to these programs should contact the Director of Graduate Studies, Department of Economics, for further information. The Department also offers an area of concentration for the MBA degree. Students interested in the MBA program should contact the Director of Graduate Business Programs, College of Business Administration.

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 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 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.

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.

THE MASTER'S PROGRAM

Admission to the M.A. 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. The non-thesis option requires 30 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 18 hours in economics at the 500 level or above, 12 hours must consist of 511, 512 and 513, 514, and the remaining 6 hours must be in one field of economics. Of the 30 hours, a maximum of 9 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. The thesis option requires 30 hours of coursework at the 400 level or above, including at least 24 hours at the 500 level or above, 6 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 6 hours may be in an area other than economics.

THE DOCTORAL PROGRAM

Admission to the Ph.D. 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. 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:

1. Students are required to complete the following core requirements:
   a. Economic Theory: Microeconomic theory and macroeconomic theory by a qualifying exam taken not later than the beginning of the fourth semester of study.
   b. History of Economics: Completion of 515 or 615 with a grade of B or better, or by qualifying examination.
   c. 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.

2. 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.
3. 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.
4. Students are required to complete a doctoral dissertation and to defend it successfully before the faculty.

MINOR IN ENVIRONMENTAL POLICY

The program is designed to give master's and doctoral level graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. While administered through the Economics Department, the program is coordinated by a committee of representatives from the following participating departments and programs:

Agricultural Economics and Rural Sociology; 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.

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:

1. Ecology and Evolutionary Biology 520 or Plant and Soil Science 414 or Geography 433 or an equivalent course approved by the coordinating committee.
2. 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.

BUSINESS ADMINISTRATION CONCENTRATION

For complete listing of MBA program requirements, see Business Administration.

MBA Concentration: Economics

Minimum course requirements are as approved by the area MBA faculty advisor.

GRADUATE COURSES

400 Special Topics (3) Topics vary. Prereq: Determined by department. May be repeated.
413 Macroeconomic Fluctuations (3) Analysis of historical data, methods of analyzing macro-economic fluctuations, theoretical explanations of cycles, and role of monetary and fiscal policies. Benefits and costs of aggregate economy. Major writing requirement. Prereq: Intermediate Macroeconomics or consent of instructor.
415 History of Economics (3) (Same as History 415.)
The College of Education offers the Master of Science, Educational Specialist, Doctor of Education, and Doctor of Philosophy degrees in cooperation with eleven individual units: Counselor Education and Counseling Psychology (CECP), Cultural Studies in Education (CSE), Education in the Sciences, Mathematics, Research and Technology (ESMRT), Exercise Science (ES), Holistic Teaching/Learning (HTL), Inclusive Early Childhood Education (IECE), Language, Communication, and Humanities Education (LCHE), Leadership Studies in Education (LSE), Psychoeducational Studies (PES), Rehabilitation, Deafness, and Human Services (RDHS), Sport and Physical Activity (SPA). The College also offers initial teacher licensure programs at the graduate level. The program features a professional year internship with accompanying coursework which may lead to a master's degree with a major in Education. See Track 2 under Master's Programs, Education, and Teacher Licensure.

For admission, most programs require current scores from the GRE general section, and all require a unit application form and letters of recommendation as indicated on the chart of Majors and Degree Programs. For additional information about the various programs of study and admission, write to the Graduate Center in the College of Education, CA 213, The University of Tennessee, Knoxville, TN, 37996-3400, tel. (423) 974-0906, www.utk.edu/advising/advising.html.

THE MASTER'S PROGRAMS

College Student Personnel

Students who major in College Student Personnel (LSE) are prepared to enter the field of student personnel administration in colleges, universities, and community or junior colleges. The program has both a thesis and non-thesis option. A minimum of 36 hours, which includes 6 hours of practicum experience, is required in either option. Students must complete a minimum of 12 hours in Higher Education courses.

Counseling

The master's degree with a major in Counseling offers concentrations (with abbreviated unit designations) in:
- Community counseling (CECP)
- Rehabilitation counseling (RDHS)
- School counseling (CECP)

The program includes thesis and non-thesis options. The concentration in community counseling requires completion of 80 hours of coursework plus supervised practicum and internship experiences working with clients. The concentration in rehabilitation counseling is fully accredited by the Council on Rehabilitation Education, Inc., and requires 54 semester hours, including internship. A minimum of 12 hours of Supervised Practicum in Education and Human Services courses is required. The concentration in school counseling requires 48 hours of coursework, including supervised practicum and internship experiences working with clients. A final examination is required of all students.

Education

The master's degree with a major in Education has two tracks. Track 1 is intended for students who are licensed to teach English, foreign language, mathematics, natural science, social science, early childhood special education, modified and comprehensive special education, or education of the deaf and hard of hearing. (Non-licensed applicants to Track 1 will be reviewed on a case-by-case basis and must have a strong disciplinary background and professional goals which can be fostered through participation in this non-licensure program.) Track 2 is designed for students seeking initial teacher licensure in one of the above fields. Thesis and non-thesis options are available for both tracks.

Track 1 - Concentrations (with abbreviated unit designations) are available in:
- Art education (LCHE)
- Curriculum (ESMRT)
- Early childhood special education (IECE)
- Education of the deaf and hard of hearing (RDHS)
- Elementary education (HTL and IECE)
- English education (LCHE)
- Foreign language/ESL education (LCHE)
- Instructional media and technology (ESMRT)
- Mathematics education (ESMRT)
- Modified and comprehensive special education (HTL)
- Reading education (HTL)
- Science education (ESMRT)
- Social foundations (CSE)
- Social science education (HTL)

The thesis option requires the completion of 30 hours, including 6 hours of Thesis 500. The non-thesis option requires the completion of 33 hours of coursework (54 hours for special education concentrations). Both options require a minimum of 12 hours in the major discipline (18 hours for special education concentrations).

Track 2 - Concentrations (with abbreviated unit designations) are available in:
- Art education (LCHE)
- Early childhood special education (IECE)
- Education for the deaf and hard of hearing (RDHS)
- Elementary teaching (HTL and IECE)
- Modified and comprehensive special education (HTL)
- Secondary teaching (ESMRT, HTL, and LCHE)

The thesis option requires completion of 36 hours, plus 6 hours of Thesis 500 for a total of 42 hours. The non-thesis option requires 36 hours, including 24 hours of prescribed licensure coursework and 12 hours in the academic discipline as approved by the student's committee.

For both tracks, a comprehensive written examination is required. An oral exam is given over the thesis.

Educational Psychology

The master's degree with a major in Educational Psychology is offered with concentrations (with abbreviated unit designations) in:
- Adult education (PES)
- Individual & collaborative learning (PES)
- Sociocultural foundations of sport (CSE)
- Sport administration (SPA)

Both programs include the completion of 33 hours. The concentration in adult education requires a minimum of 12 hours in Adult Education courses. A final examination is required of all master's degree students.

Human Performance and Sport Studies

The master's degree with a major in Human Performance and Sport Studies offers concentrations (with abbreviated unit designations) in:
- Exercise science (ES)
- Motor behavior/sport psychology (CSE)
- Sociocultural foundations of sport (CSE)
- Sport administration (SPA)

Both options require a minimum of 12 hours of sport studies, exercise science, or sport administration courses.

Leadership Studies in Education

The master's degree program with a major in Leadership Studies in Education offers a concentration in educational administration and supervision (LSE), requiring a minimum of 30 hours, including 6 hours of Thesis 500, for the thesis option, or 33 hours for the non-thesis option.

The concentration in educational administration and supervision consists of a minimum of 18 hours of coursework in Educational Administration and Supervision. A final oral examination is required for the thesis option, with a written exam at the option of the committee. A final written examination is required for the non-thesis option, with an oral exam at the option of the committee. Students entering either of these options must complete the introductory core consisting of Educational Administration and Supervision 513, 515, 516, and 535 or a demonstrated computer proficiency. These courses are prerequisites to other courses in the unit.

THE SPECIALIST IN EDUCATION PROGRAM

The Educational Specialist degree program with a major in Education encompasses concentrations (with abbreviated unit designations) in:
- Curriculum (ESMRT)
- Educational administration & supervision (LSE)
Elementary education (HTL)
English education (LCHE)
Foreign language/ESL education (LCHE)
Instructional media and technology (ESMRT)
Mathematics education (ESMRT)
Reading education (HTL)
School counseling (CECP)
School psychology (PES)
Science education (ESMRT)
Social science education (HTL)
Teaching and learning (HTL)

The instructional and curricular concentrations require completion of a minimum of 30 hours of coursework beyond the master’s degree, including 6 hours in core courses, 18 hours in specialized courses, and 6 hours to be determined by the student’s committee. The educational administration and supervision concentration requires the completion of a minimum of 60 hours beyond the baccalaureate, including a 6-hour cognate within or external to the college, and a highly recommended internship. Both thesis and non-thesis options are available. The school counseling concentration requires a minimum of 22 hours beyond the master’s degree but no fewer than 80 hours beyond the baccalaureate, including practicum and internship experiences. The school psychology concentration requires the completion of a minimum of 66 semester hours beyond the baccalaureate. Refer to Degree Requirements under The Graduate School for complete program requirements.

THE DOCTOR OF EDUCATION PROGRAM


The program requirements are:

Requirements

Research Area 15
Foreign or Computer Language (demonstrate proficiency) 6
General Core Requirements

Option A

—History and philosophy of education, (both areas must be represented) 4
—Learning theory and curriculum (both areas must be represented) 4
—Administrative/Leadership theory 2
—Trans-college seminar: two consecutive semesters 2

Option B

—Philosophy of education 3
—History of education 3
—Administrative theory 3
—Learning theory 3
—Curriculum theory 3
—Trans-college seminar: two consecutive semesters 2

Option C

—Philosophy of science 3
—Trans-college seminar: two consecutive semesters 2
—Seminar(s) in primary concentration 2
—Learning theory/group dynamics or independent study in this area 3

Concentrations

Primary Concentration: A minimum of 15 hours normally selected from one or two specializations within the primary concentration 15
Supporting Concentration: A minimum of 9 hours selected from a concentration other than the primary concentration 9

The concentrations are:

Adult education

Counseling psychology (counseling psychology; counselor education)
Cultural studies in education (cultural studies; sport history; sport philosophy; sport sociology)
Early childhood education
Educational psychology (individual and collaborative learning)
Elementary education
English, foreign language, ESL education
Exercise science
Instructional technology/curriculum
Leadership for teaching and learning
Leadership studies (educational administration and supervision; higher education)
Literacy studies (reading/language arts)
Mathematics, science, and social science education
Motor behavior/sport psychology
Rehabilitation and special education
Research/assessment/evaluation
School psychology
Social foundations in education

Under Counselor Education and Counseling Psychology, the following minimum number of hours is required, according to which field the student chooses: counseling psychology, 98; counselor education, 86. Residence is three consecutive semesters of full-time coursework. The program requires coursework in both a supporting concentration and a cognate area, as well as either foreign language or computer proficiency. Coursework in statistics and research design is required in all specializations. Pre-dissertation research participation is also a requirement. The concentration in counseling psychology requires a year-long practicum sequence and the equivalent of a year’s full-time work as an intern in an appropriate counseling setting. The concentration in educational psychology also requires a supervised practicum experience in classroom teaching.

The guidelines for each program may be consulted for further requirements.

TEACHER LICENSURE

In addition to the above cited degree programs, the College of Education offers graduate level teacher licensure courses. Students completing requirements for initial teacher licensure earn 24 semester hours of graduate credit which may be applied to a 36 semester hour Track 2 master’s degree with a major in Education.

To earn initial teacher licensure, students must complete graduate level courses, gain admission to The Graduate School, and following 24 hours of coursework:

Fall Semester

573 Internship 4 hrs
574 Analysis of Teaching for Professional Development 2 hrs

Summer

574 Analysis of Teaching for Professional Development 2 hrs

Spring Semester

573 Internship 4 hrs
Education in the Sciences, Mathematics, Research, and Technology

MINOR IN GERONTOLOGY

Graduate students in the units of Counselor Education and Counseling Psychology, Exercise Science, or Psychosocial Health Studies, 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. Please refer to Human Ecology for specific requirements.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. program in Counseling is available to residents of Alabama (concentration in counseling in rehabilitation counseling only). The M.S. program in Education is available to residents of the states of Kentucky (concentration in education of the deaf and hard of hearing) or West Virginia (concentration in foreign language/ESL education—Track 1 only), or South Carolina, Virginia, or West Virginia (concentration in education of the deaf and hard of hearing). The M.S. program in Human Performance and Sport Studies is available to residents of Arkansas, or Georgia or South Carolina (concentration in motor behavior/sport psychology only) and Alabama, South Carolina, or Virginia (concentration in sport administration only). The Ph.D. program in Education is available to residents of the state of Arkansas (concentration in counseling psychology, educational administration and supervision/higher education, educational psychology, or school psychology). Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

510 Advanced Educational and Clinical Procedures (3-6) Integration of advanced educational and clinical procedures; skills and knowledge for implementing instruction and for consulting with other persons in treatment of exceptional individuals. May be repeated. Maximum 6 hrs.

517 Seminar (1-3) Curriculum, instructional technology, elementary education, secondary education, or social foundations as related to goals of student programs. May be repeated. Maximum 6 hrs. S/NC or letter grade. E

532 Instructional Research: Analysis and Application (3) Analysis of research on instruction. Translation and application of research findings into instructional performance. Prereq: Consent of instructor. F, Su

540 Topics in Improvement of Instruction (1-3) Special conferences, workshops, and inservice programs. May be repeated. Maximum 6 hrs. S/NC only. E

562 Direction and Supervision of Student Teaching (3) Roles and responsibilities of cooperating teachers and student teachers; objectives and policies of student teaching program; elements of clinical supervision; overview of research. F, Su

568 Teacher-Parent-Community Relations (3) Techniques for effective relations between parents and teachers; examination of roles and expectations; parental involvement; volunteer programs; influences of community on educational process. Prereq: Consent of instructor. F, Su

574 Analysis of Teaching for Professional Development (2) Strategies to develop and analyze effectiveness of teaching and of professional development. Study and application of various approaches. Coreq: 575. F

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 hrs. S/NC only. F, Sp

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 entrance to certification requirements. May not be used toward degree requirements. May be repeated. Maximum 12 hrs. S/NC only. E

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 hrs. S/NC only. E

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.

601 Trans-College Seminar (1) Introduction to Ph.D. program in Education; research requirements, meaning of scholarship in academic and issues/problems in education. Minimum of two consecutive semesters preceded or followed by summer term required of all Ph.D. students. Prereq: Admission to Ph.D. program or consent of Ph.D. program coordinator. May be repeated. Maximum 3 hrs. May not be used to meet 600 requirement. S/NC only.

618 Interpretation and Application Curriculum and Instruction Research (3) Analysis of research in curriculum and instruction, newer methodologies and strategies. Utilization of research to improve curriculum and instruction practices, application of research principles in context of specific professional assignments. Prereq: Consent of instructor. F

635 Teacher Education in America (3) For students preparing to enter teacher education. Brief historical development, program analysis and evaluation, current issues, and future directions. F

Education in the Sciences, Mathematics, Research, and Technology

Major in Engineering

The education in the Sciences, Mathematics, Research, and Technology unit participates in graduate programs leading to degrees, majors, and concentrations in:

- Master of Science
- Doctor of Education
- Doctor of Philosophy

Education

Track 1—Curriculum

- Instructional media and technology
- Mathematics education
- Science education

- Doctor of Philosophy

Education in the Sciences, Mathematics, Research, and Technology

- Instructional technology/cumculus
- Mathematics/science/social science education
- Research/assessment/evaluation

See Education under Fields of Instruction for full description of all degree requirements.

The unit is composed of four areas: science and mathematics education, educational research and statistics, instructional media and technology, and curriculum studies. The mission of all areas focuses on the preparation of teachers and instructors in curriculum and integrative mathematics and sciences and in the preparation of various other professionals who desire to utilize educational research and instructional technology.

GRADUATE COURSES

475 Utilization of Instructional Media (3) Basic concepts of communication and instructional development for improving instruction through use of media. (Same as Information Sciences 475.) E

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 Program. F

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. F

500 Thesis (1-15) P/NP only. E

522 Registration for Use of Facilities (3-15) Required for student not otherwise registered during any semester when student uses University facilities and for tuition/fees before degree is completed. May not be used...
568 Teaching Probability & Statistics (3) Teaching of probability and statistics in schools, elementary through college. Probabilities and statistical experiments, demonstrations, and applications. Prereq: 485 or equivalent.

583 Teaching Mathematics in Senior High Schools and Community Colleges (3) Topics appropriate for high school and community college mathematics curriculum. Special problems related to teaching methods, problem solving, and use of microcomputers. Opportunities for special projects. Prereq: 485 or equivalent.

586 Teaching Probability & Statistics (3) Teaching of probability and statistics in schools, elementary through college. Probabilities and statistical experiments, demonstrations, and applications. Prereq: 485 or equivalent.

588 Instructional Theory and Design (3) Relationship of curriculum to instruction; examination of instructional and related learning theories; instructional models and teaching styles.

593 Independent Study (1-3) May be repeated. S/NC or letter grade.

594 Supervised Reading (1-3) May be repeated. S/NC or letter grade.

595 Special Topics (1-3) May be repeated. S/NC or letter grade.

600 Doctoral Research and Dissertation (3-15) P/NP only. May be repeated. Maximum 6 hrs.


698 Advanced Research in the Teaching of Mathematics (3) Teaching of mathematics in schools, elementary through college. Related teaching methods. Prereq: 485 or equivalent.

699 Advanced Research in the Teaching of Mathematics (3) Teaching of mathematics in schools, elementary through college. Related teaching methods. Prereq: 485 or equivalent.
Associate Professors:
Abidi, M. A., Ph.D. ................. Tennessee
Bomar, Bruce W. (UTSI), Ph.D. ....... Tennessee
Crilly, Paul B., Ph.D. ............... New Mexico State
Joseph, Roy D. (UTSI), Ph.D. ....... Case Western
Koch, Daniel, Ph.D. ................. Missouri (Rolla)
Rochelle, James M., Ph.D. ........... Tennessee
Rosenberg, David, Ph.D. ............ New York
Wallace, J. Wayne, Ph.D. ............ Tennessee

Assistant Professors:
Smith, L. Montgomery (UTSI), Ph.D. ........ Tennessee
Whitaker, Ross T., Ph.D. ............ North Carolina

The Electrical Engineering Department has a graduate committee to administer, promote, and advance the general well-being of the graduate program. The Department of Electrical Engineering and the Department of Nuclear Engineering jointly offer a master's degree program in the field of fusion energy. Students may have the opportunity to do their master's thesis at the Fusion Energy Division of the Oak Ridge National Laboratory or at the Plasma Science laboratory, affiliated with the Electrical Engineering Department. A limited number of Graduate Research Assistantships are available at each location. Further information about this program is available from the department.

THE MASTER'S PROGRAM
Graduate work leading to the Master of Science with a major in Electrical Engineering may be completed during one academic year of full-time study, or the degree may be obtained in two or three years of study in the evening.

Admission Requirements
Students applying for admission to the Master of Science program and who hold a B.S. in Electrical Engineering are considered for admission on an individual basis. The minimum expectation is an undergraduate cumulative grade-point average of 3.0 out of 4.0 and a GPA of 3.0 for the senior year. All applicants whose native language is not English, including those who have earned degrees at U.S. institutions, must score at least 550 on the TOEFL exam to be considered for admission to the program. Students who hold the B.S. or B.A. in a field other than electrical engineering 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. These students should also have a background equivalent to that obtained by earning credit with a minimum 3.0 grade-point average in the Electrical Engineering courses normally taken at the 200 and 300 levels in the Bachelor's program in this department, and two senior Electrical Engineering courses (and any labs associated with them) in the student's area of interest. Students from fields other than electrical engineering who have met the admission standards except for this background will be admitted only as non-degree students until they have completed coursework to provide this background.

Master's Degree Requirements
Specific degree requirements which must be met include:
1. Electrical Engineering 503 and 504.
2. Six semester hours of graduate credit in mathematics consisting of mathematics courses of 400 level or higher which have been approved by the E.E. Graduate Committee.
3. An additional 12 semester hours of 500-level work in electrical engineering courses or 6 semester hours of 500-level work in one area of electrical engineering courses and 6 semester hours of 500-level work in another area approved by the student's master's committee. The 500-level work in electrical engineering courses must include at least 6 hours in the student's major area.
5. A final oral examination covering the thesis and related coursework.

THE DOCTORAL PROGRAM
The Ph.D. with a major in Electrical Engineering may be pursued in the concentration areas of circuit theory, computers, electronics, communication theory, electromagnetic theory, plasma engineering, power systems, solid-state electronics, and control systems. Applicants must submit scores on the General Graduate Record Exam. A TOEFL score of 550 is required for non-native speakers of English, including those who have earned degrees at U.S. institutions. Specific departmental requirements for the Ph.D. include the following:
1. A Master of Science or Master of Engineering degree.
   a. A minimum of 24 semester hours of work in electrical engineering courses at the 500 and 600 levels.
   b. A minimum of 9 semester hours of 600-level coursework. At least 3 semester hours of this work must be in an area other than the student's major area.
   c. A minimum of 12 hours of mathematics courses approved by the Electrical Engineering Graduate Committee. All 12 hours must be 500-level or above, and at least 6 hours must be at 500-level or above.
3. 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.
4. Satisfactory performance on both a qualifying and comprehensive examination. The qualifying examination is prepared by the Electrical Engineering faculty and consists of a 3-hour written examination in each of four areas. Areas (1) mathematics and transform methods, and (2) basic electrical network analysis, are required of all Ph.D. students. Areas (3) and (4) are usually chosen from two of the graduate course divisions in the department and cover material from undergraduate courses and first year graduate courses. A student who fails the qualifying examination must take and pass the examination the next time it is offered to remain in the Ph.D. program. The qualifying examination is normally taken after the completion of 24 hours of graduate coursework or immediately after completion of a master's degree. A minimum of 18 hours of graduate coursework must be completed after the student has taken the qualifying examination the first time.
5. A comprehensive examination is required by the Graduate School. In this department the comprehensive exam 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.
6. A dissertation covering the student's major area.

6. A minimum of 48 semester hours of dissertation work.

Many of the electrical engineering courses are offered in the evening. Engineers working in industry are encouraged to take the department's graduate program. Departmental graduate programs are also available at the Space Institute, Tullahoma.

Departmental actions regarding a graduate student may be appealed in writing, first to the Department Graduate Committee and then to the Department Faculty.

GRADUATE COURSES
Note: Courses required in the Electrical Engineering undergraduate curriculum cannot be used in either the M.S. or Ph.D. programs. No 400-level course may be used toward a graduate degree in Electrical Engineering except when required by the program.

400 Senior Design (5) Major design project focusing attention on professional practice, accumulated background of curricular components, and recent developments in the field. Prerequisite: Completion of required junior EE courses.

411 Digital Signal Processing and Filter Design (3) Discrete-time signals and their properties, sampling, discrete Fourier transforms, analog filter characteristics, nonrecursice and recursive filter design, and CAD tools for filter design. Experiments and projects. Prerequisite: Frequency-Domain Analysis of Signals and Noise, Linear Systems Analysis, Systems and Power Lab.

412 Linear Control System Design (4) Classical and modern techniques for design and compensation of linear feedback control systems: Bode design, root locus design, state variable pole position design. Prerequisites: 411.


ture 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 (3) Laboratory instruction in operation of plasma diagnostic instruments in plasma science laboratory with plasma arcs, ion beams, plasma waves, and composite insulated systems. Testing with low-noise instrumentation, pulse height analysis, optics, acoustics, and bridges; associated statistics and distributed parameter effects. Case studies drawn from active research, power systems, electronic circuits and devices, shielding, and stress grading. Prereq: 528, 540, and consent of instructor.

563 Advanced Topics in Electronic Instrumentation (3) Based on particular interests of students. Fundamental physical processes in instrumentation transfer to industrial applications: thermoelectric, magnetoel ectric, electromechanical and quantum-mechanical devices. Prereq: 531-32 and consent of instructor.

562 Laser Modulation and Spectra, steady-state and O-switched operation. Stability of solid-state, gas, and quantum-mechanical devices. Prereq: Graduate standing or consent of instructor.

565 Industrial Plasma Engineering II (3) Continuation of 566 industrial applications: plasma diagnostics, plasma chemistry, plasma devices, and related topics. Prereq: 565 or consent of instructor.

571 Pattern Recognition (3) Decision-theoretic and statistical 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, and coding techniques. Image representation and description. Prereq: 472 or consent of instructor.

573 Vision and Sensing for Robotics and Automation I (3) Acquisition, processing, integration, and interpretation of a wide range of vision and non-visual sensory modalities as applied to autonomous and teleoperated robotic systems. Prereq: Consent of instructor.

574 Vision and Sensing for Robotics and Automation II (3) Aspects of robot programming and motion using various sensing modalities. Image processing. Topics selected from current literature. Prereq: Consent of instructor.


598 Graduate Seminar (1) Topics of interest discussed in weekly seminar. May be repeated. Maximum 6 hrs. S/NC or letter grade.

599 Special Topics (1-3) May be repeated. Maximum 9 hrs.

600 Doctoral Research and Dissertation (3-15) P/NP only.

614 Optimal Control (3) Deterministic and stochastic dynamic programming in continuous and discrete time, minimum principle and matrix minimum principle, computational methods. Prereq: 563 and consent of instructor.

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: 563 and consent of instructor.

618 Special Topics in Systems Theory II (3) Topics of current interest to students and faculty: large scale systems, model order reduction, algebraic and geometric system theories, and advanced design methods. Prereq: 567.

623 Advanced Power Electronics and Drives (3) Phase-controlled, cycloconverters, cycloconverter-fed ac drives, resonant converters, vector and scalar control of synchronous machines, static Krammer drives, static Schensted drives, VSCF generation, modern control theory in ac drives.
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 M.A. as well as a special concentration in writing.

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 must contact the department to receive the proper information and forms with which to apply.

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.

THE MASTER’S PROGRAM

Requirements

Coursework: A minimum of 24 semester hours in English beyond the B.A., to include 6 hours at the 400 level and 6 additional hours at the 500-600 level (Only 3 hours of 593 Independent Study may be applied toward the M.A.); and 6 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 semester 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:
1. Completion of the second year of a language at college level with a grade of C or better.
2. Completion of French 302 or German 332 at UT Knoxville with a grade of B or better.
3. Passing of the related Ph.D. foreign language examination as currently administered at UT 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; 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.

Non-residence Requirement: There is no residence requirement for the M.A., 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 writing, specialize in teaching writing courses at the college level, or work as professional writers in business or industry.

The requirements for the writing concentration are the same as those for the thesis option above with the following exceptions:

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

Writing Projects: One of the following writing projects for six hours of credit:
1. A thesis, usually a major work on some aspect of writing or rhetorical theory.
2. 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.
3. A candidate should be able to present an argument for the candidate’s project, to the candidate’s particular writing emphasis.

Examinations: The reading list may be modified by the M.A. examining committee, meeting as a body with the student, to reflect the candidate’s particular writing emphasis.

THE DOCTORAL PROGRAM

Requirements

A student must successfully complete a program of study, normally 6 full semesters as outlined below, approved by the candidate’s committee or the Director of Graduate Studies in English.

Coursework: At least 51 semester hours beyond the B.A. (of which at least 24 semester hours must be beyond the M.A.) to include at least 21 semester hours at the 600 level; at least 15 semester hours at the 500 level or above (only 3 hours of 593 Independent Study may be applied toward the M.A.); at least 24 semester hours at the 400 level.

Final Examination: The reading list may be modified by the M.A. examining committee, meeting as a body with the student, to reflect the candidate’s particular writing emphasis.

The requirements for the writing concentration are the same as those for the thesis option above with the following exceptions:

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

Writing Projects: One of the following writing projects for six hours of credit:
1. A thesis, usually a major work on some aspect of writing or rhetorical theory.
2. 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.

Examinations: The reading list may be modified by the M.A. examining committee, meeting as a body with the student, to reflect the candidate’s particular writing emphasis.

THE DOCTORAL PROGRAM

Requirements

A student must successfully complete a program of study, normally 6 full semesters as outlined below, approved by the candidate’s committee or the Director of Graduate Studies in English.

Coursework: At least 51 semester hours beyond the B.A. (of which at least 24 semester hours must be beyond the M.A.) to include at least 21 semester hours at the 600 level; at least 15 semester hours at the 500 level or above (only 3 hours of 593 Independent Study may be applied toward the M.A.); at least 24 semester hours at the 400 level.

Final Examination: The reading list may be modified by the M.A. examining committee, meeting as a body with the student, to reflect the candidate’s particular writing emphasis.

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

GRADUATE COURSES

Note: 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 romantic dramas, 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 sixteenth 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 seventeenth century: poetry of Milton, Donne, Marvell; and prose of Browne, Bacon, Walton.

411 Literature of Restoration and Early Eighteenth Century: Dryden to Pope (3) Survey of English literature and culture from 1660 to 1745.

412 Literature of Later Eighteenth Century: Johnson to Burns (3) Survey of English literature and culture from 1745 to 1800.

413 Restoration and Eighteenth-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 Victorian Poetry and Prose I (3) Tennyson, Pre-Raphaelites, Carlyle, New and Mill.

417 Victorian Poetry and Prose II (3) Browning, Arnold, Hopkins, Hardy, Ruskin, Darwin, and Wilde.

420 The Nineteenth-Century British Novel (3) Scott to Hardy.

421 Modern British Novel (3) Lawrence, Joyce, and Woolf.

422 Women Writers in Britain (3) Literary consciousness and works of women writers in Britain. Topics vary: Marie de France, Margaret Kempe, Aemilia Lanyer, Elizabeth Cary, Aphra Behn, Frances Burney, Mary Wollstonecraft, Mary Shelley, George Eliot, Virginia Woolf, and Doris Lessing. May be repeated. Maximum 6 hrs. (Same as Women's Studies 422.)

423 Colonial, Federal, and Early National American Literature (3) From Columbus to Washington Irving.

423 American Romanticism and Transcendentalism (3) Prose and poetry of American Romanticism, from c. 1830 to end of the Civil War: Cooper, Poe, Hawthorne, Melville, Emerson, Thoreau, Stowe, Douglass, Whitman, and Dickinson.

423 American Realism and Naturalism (3) Literature from time of the Civil War to World War I. Twain, Howells, James, Jamett, Freeman, Crane, and Norris.

424 Modern American Literature (3) World War I to present.

425 American Novel before 1900 (3) From earliest sentimental novels through Brown and Cooper, and major figures to 1900: Hawthorne, Melville, Stowe, Clemens, and James.


427 Southern Literature (3) Southern writing from colonial period into twentieth century: frontier humorists, local color writers, and Southern literary renaissance.

428 American Humor (3) Early nineteenth century into twentieth century: Mark Twain.

429 Topics in Black Literature (3) Contents vary: particular authors, or themes 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.

430 Modern British and American Poetry (3) From Yeats and Frost to Auden, Stevens, and more recent poets.

432 American Romanticism and Transcendentalism (3) Same as Women's Studies 422.

433-44 First 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.

451 Modern British and American Poetry (3) Original writing integrated with reading, usually taught by professional author. Topics vary. May be repeated. Maximum 6 hrs.

452 Special Topics in Language (3) May be repeated. Maximum 6 hrs with consent of department. (Same as Linguistics 452.)

453 Continental Drama (3) Selection of plays in (English translation) by major European writers from late Renaissance to present; twentieth-century achievement.

454 Twentieth-Century International Novel (3) Joyce, Camus, Kafka, Nabokov.

455 Persuasive Writing (3) Writing and analyzing persuasive texts in public, private, and academic contexts.

462 Writing for Publication (3) Principles and practices of writing for publication. Dissertation, theses, articles, and reports in science and technology. Prereq: Technical and Professional Writing 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.

465 Special Topics in Rhetoric (3) Topics vary. Prereq: Technical Expository Writing or consent of instructor. May be repeated with consent of department. Maximum 6 hrs.

467 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 and Sociology 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.)

473 Teaching English as a Second Language (3) Major issues surrounding teaching ESL/EFL: political implications; 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 473.)

473 Teaching English as a Second or Foreign Language (3) Issues, principles, and techniques in teaching grammar, pronunciation, reading, and writing in ESL/EFL. Observations and teaching practice in ESL classes and development of ESL materials and tests. Prereq: 474. (Same as Linguistics 474.)

474 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 language instruction. (Same as Linguistics 474.)

475 Literary Criticism (3) Historical survey of major works of literary criticism.

480 British and American Ballad and Folk Tale (3) Popular ballads and folktales of English, Scottish, and North American tradition.

481 Studies in Folklore (3) Topics vary. May be repeated with different content. Maximum 6 hrs.

482 Major Authors (3) Content varies. Concentrated study of at least one of most influential writers in British or American literary history: e.g., Donne, Tennyson, James A. Buffman, Faulkner, Baldwin or Lawrence.

483 Special Topics in Literature (3) Topics vary. May be repeated. Maximum 6 hrs.

484 Special Topics in Writing (3) Original writing integrated with reading, usually taught by professional author. Topics vary. May be repeated. Maximum 6 hrs.

485 Special Topics in Language (3) May be repeated. Maximum 6 hrs 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 hrs.

487 Special Topics in Film (3) Content varies. Particular directors, film genres, national cinemas, or other topics. May be repeated with consent of department. Maximum 6 hrs. (Same as Cinema Studies 487.)

490 Language and Law (3) Language in Anglo-American legal process: focus on differences between spoken and written language; legal and non-legal ambiguity; pragmatics; space; time; analysis; and language rights of linguistic minorities. Prereq: Foundations of the English Language or The Structure of Modern English or consent of instructor. (Same as Linguistics 490.)

491 Introduction to Rhetoric and Composition (3) Historical, theoretical, and empirical modes of inquiry in rhetoric and composition and implications for teaching of composition. Prereq: Advanced Expository Writing or consent of instructor.

493 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: Advanced Expository Writing or consent of instructor.

500 Thesis (1-15) P/NP only. E

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 for which the degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

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.


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.

508 History of the English Language I (3) Phonological, morphological, and syntactic development of the English language with concentration on developments after 1500, especially in American English. Sp.A

509 History of the English Language II (3) Phonological, morphological, and syntactic development of the English language with concentration on developments before 1500, especially in British English. Sp.A

513-14 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.

520-21 Readings and Analysis in Selected Areas of Seventeenth- and Eighteenth-Century Prose, Poetry, and Drama (3,3) Content varies: genre, theme, literary movement, or other coherent emphasis.

530-31 Readings in English Literature of the Restoration and Eighteenth Century (3,3) Topics vary: genre, theme, literary movement, or other coherent emphasis.

530-31 Readings in English Literature of the Restoration and Eighteenth Century (3,3) Topics vary: genre, theme, literary movement, or other coherent emphasis.

550-51 Readings in American Literature from the Colonial Period to the Present (3,3) Content varies: genre, theme, literary movement, or other coherent emphasis.

552 Readings in Black American Literature (3) Content varies: genre, theme, literary movement, or other coherent emphasis.
### Entomology and Plant Pathology

#### College of Agricultural Sciences and Natural Resources

**MAJOR**

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<th>DEGREE</th>
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<tr>
<td>Carroll J. Southards, Head</td>
<td><strong>Professors:</strong></td>
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<td></td>
<td>Bernard, Ernest C., Ph.D.</td>
<td>Georgia Gerhardt, Reid R. (Liaison), Ph.D.</td>
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<td>Grant, Jerome F., Ph.D.</td>
<td>Lambein, Louis E., Ph.D.</td>
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<td>Gwin, Kimberly D., Ph.D.</td>
<td>Lambdin, Paris, Ph.D.</td>
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<td>Gratt, Mark T., Ph.D.</td>
<td>Pless, Charles D., Ph.D.</td>
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<td>Windham, Mark T., Ph.D.</td>
<td>Johnson, Leander F. (Emeritus), Ph.D.</td>
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**Assistent Professor:**

- Owsley, Bonnie H., Ph.D. NC State

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

**THE MASTER'S PROGRAM**

**Admission Requirements**

For admission to the M.S. degree program, a student must meet all requirements of The University of Tennessee Graduate School and must have completed (1) general botany or biology, 8 hours; (2) advanced biological sciences, 8 hours; (3) general inorganic chemistry, 6-8 hours; (4) organic chemistry, 3 hours. In addition, three completed rating forms and a written statement of career goals and interest in entomology or plant pathology are required.

**Degree 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 1 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 6 hours and no 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.

### GRADUATE COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>510</td>
<td>Plant Disease Fungi</td>
<td>Morphology, taxonomy, biology, and genetics of plant pathogenic fungi.</td>
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<tr>
<td>511</td>
<td>Plant Disease Fun gi</td>
<td>Morphology, taxonomy, biology, and genetics of plant pathogenic fungi.</td>
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<tr>
<td>512</td>
<td>Soilborne Plant Pathogens</td>
<td>Pathogenicity of soil-borne pathogens.</td>
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<tr>
<td>514</td>
<td>Bacterial Plant Diseases</td>
<td>Morphology, taxonomy, biology, and genetics of bacterial plant pathogens.</td>
</tr>
<tr>
<td>515</td>
<td>Physiological Plant Disease</td>
<td>Biochemical and physiological events in host-pathogen interactions.</td>
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<tr>
<td>520</td>
<td>Plant Parasitic Nematodes</td>
<td>Morphology, physiology, and biology of plant parasites.</td>
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<tr>
<td>521</td>
<td>Plant Virology</td>
<td>Symptomatology, epidemiology, and management of virus infection.</td>
</tr>
<tr>
<td>523</td>
<td>Field Crop and Vegetable Insects</td>
<td>Identification, biology, and management of insects affecting commercial vegetable and home garden crops.</td>
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</tbody>
</table>
Environmental Engineering

See Civil Engineering

Exercise Science

( College of Education)

MAJORS

DEGREES

Education .................................................. Ph.D.
Human Performance and Sport Studies ..... M.S.

W. Liemohn, Leader

Professors:

Capen, Edward K. (Emeritus), Ph.D. ....... Iowa
Howley, Edward T., Ph.D. ................. Wisconsin
Kozar, Andrew J. (University Prof.), Ph.D. .......... Michigan
Liemohn, W. P., Ph.D. ......................... Iowa
Namey, T. C., M.D. .............. Washington (St. Louis)
Rokett, Ian R. H., Ph.D. ................. Brown
Welch, Hugh (Emeritus), Ph.D. ........ Florida

Associate Professor:

Bassett, David R., Jr., Ph.D. .......... Wisconsin

Assistant Professors:

Thompson, Dixie, Ph.D. ............ Virginia
Zhang, Songning, Ph.D. ............ Oregon

The Exercise Science unit participates in graduate programs leading to degrees, majors, and concentrations:

Master of Science
Human Performance and Sport Studies
Exercise science
Doctor of Philosophy
Education
Exercise science

See Education under Fields of Instruction for full description of all degree requirements.

The unit promotes and integrates scientific research, education, and practical applications of exercise science to maintain and enhance health, fitness, performance, and quality of life. The unit offers an undergraduate major in Exercise Science that will prepare students for careers in fitness and provide the science-based background needed for application to graduate programs in exercise science, physical therapy, athletic training, public health, exercise psychology, athletic training, or public school teaching. Graduate students and faculty focus on research dealing with theoretical and applied aspects of exercise and sport.

ADMISSION REQUIREMENTS

Applicants are required to complete the unit application which will be sent to all persons upon their initial inquiry about the program. This is in addition to The Graduate School application.

The following retention policy applies to all graduate students seeking a degree in the Exercise Science unit:

1. Graduate students are required to maintain an overall 3.0 GPA.
2. Any student who falls below the standard set will be advised in writing by the unit leader of the need to discuss the matter with his/her advisor.
3. If a student's overall GPA remains below 3.0 for a second semester, the student will have his/her degree status revoked.

GRADUATE ASSISTANTSHIPS

A limited number of graduate assistantships are available for qualified women and men 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, Exercise Science Unit, The University of Tennessee, Knoxville, TN 37996-2700.

GRADUATE COURSES

480 Physiology of Exercise (3) Functions of body in muscular work: physiological aspects of fatigue, training and adaptation to environment. Prereq: Human Physiology or general physiology. 2 hrs and 1 lab. (Same as Biochemistry and Cellular and Molecular Biology 480.)

500 Thesis (1-15) P/NP only. E

501 Special Project (3) Culminating experience for non-thesis major. Research study suitable for publication, or practicum requiring special written work.

502 Registration for Use of Facilities (3-15) Required when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/N only. E


508 Research in Exercise Science (3) Research for writing of thesis and/or research paper; 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) (Same as Public Health 509, Nutrition 509, Nursing 509 and Social Work 509.)


513 Biomechanics of Orthopaedic Rehabilitation (3) Effect of physical activity on bone and soft tissue development, anatomical and mechanical implications of exercise, theoretical bases for rehabilitative programs.

516 Therapeutic Exercise (3) Therapeutic exercise programs designed for specific conditions: McKenzie, neutral spine; based on specific biomechanical considerations: eccentrics, closed kinetic chain; and more general in nature: Feldenkrais, myofascial release.

521 Analytic Epidemiology (3) Epidemiologic strategies for evaluating research questions concerning causes, prevention and treatment of morbidity and mortality. Presentations by experts working with large population-based datasets. Research process: grant writing and protocol preparation. 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 prevention or controlling occurrence of injury and violence in both general population and high risk subpopulations.

541 Special Topics (1-3) Advanced study in selected areas of exercise science. May be repeated.

563 Laboratory Techniques in Exercise Physiology (3) Laboratory course in experimental methodology and instrumentation: respiratory and metabolic measurements, blood chemistry, and gas analysis. Prereq: 480.

565 Advanced Physiological Methods of Exercise (3) Quantitative approaches to current and classical questions in exercise physiology. Prereq: 480 and 563.


568 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 and 414 or equivalents. (Same as Public Health 568.)

569 Fitness Testing, Programming, and Leadership for Diverse Populations (2) Clinical experience in selecting, administering, and evaluating exercise tolerance tests on cycle ergometer and treadmill. Individual fitness programs for diverse populations. Practice in leading variety of activities aimed at improved fitness. Prereq: 480 and 414. (Same as Public Health 569.)

570 Cardiac Rehabilitation Practicum (1-3) Supervised experience in hospital-based exercise programs for participants with cardiovascular and pulmonary disorders. Use of telemetry monitoring, leading safe exercise regimens for patients with cardiac conditions. Prereq: 480 and 567. Coreq: 569. May be repeated. Maximum 6 hrs.


593 Independent Study (1-3) May be repeated. S/N or letter grade. E

600 Doctoral Research and Dissertation (3-15) P/NP only. E

601 Research Seminar in Exercise Science (1) Research seminars in different aspects of exercise science. May be repeated. S/N only.

622 Directed Independent Research (3-6) Prereq: Doctoral student or consent of instructor. May be repeated. S/N or letter grade.

661 Seminar in Exercise and Applied Physiology (1) Selected topics in exercise and environmental physiology. Prereq: 563 and 565. May be repeated with consent of instructor.

664 Research Participation in Applied Physiology (1-6) Participation in research with faculty member whose interests coincide with those of student. S/N only.
Finance
(College of Business Administration)

MAJOR DEGREES

Business Administration ........ MBA, Ph.D.
James W. Wansley, Head

Professors:
Black, Harold A. (James F. Smith, Jr., Prof.), Ph.D. .......... Ohio State
Boehm, T. P., Ph.D. ........ Washington (St. Louis)
Dotterweich, William W. (Emeritus), Ph.D. ........ Pennsylvania
Ehrhardt, M. C., Ph.D. ........ Georgia Tech
Philippatos, G. C. (Distinguished Prof.), Ph.D. .......... New York
Shrieves, Ronald E. (Wm. Voigt School), Ph.D. ......... Illinois
Wachowicz, J. M., Jr., CPA, Ph.D. ............. Illinois
Wansley, James W. (Clayton Chair of Excellence) (Liaison), CFA, Ph.D. .... South Carolina

Associate Professors:
Auxier, A. L., Ph.D. ............... Iowa
Collins, M. Cary, Ph.D. ............ Georgia
Daves, Phillip R., Ph.D. ........... North Carolina
DeGennaro, R. P., Ph.D. .......... Ohio State
Gunthorpe, Deborah L., Ph.D. ..... Florida

BUSINESS ADMINISTRATION CONCENTRATIONS

For complete listing of MBA and Ph.D. program requirements, see Business Administration.

MBA Concentration: Finance.
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: Finance 510 (6 hours), plus two from the following: 512, 522, 532, 551, and 581.

Ph.D. Concentration: Finance.
Minimum course requirements are finance seminars 641, 642, 651, 652.

GRADUATE COURSES

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. S/NC only. E

510 Contemporary Concepts and Methods in Finance (8) Strategic issues and broad-based valuation concepts in finance; integrated approach in investments, corporate finance and institutions areas. Prereq: Business Administration 504 and 505 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 504 and 505 or consent of instructor.

522 Portfolio Analysis and Management (3) Portfolio theory and evidence of behavior of security returns with view to determining rational investment policy. Statistical analysis of risk and return of portfolios, portfolio evaluation and revision, capital market theory, and extensions of portfolio analysis. Prereq: Business Administration 504 and 505 or consent of instructor.

532 Financial Institutions (3) Analysis of management policies of financial institutions: asset, liability and capital management, legal, economic and regulatory environment and implications for management. Financial institution structure and competition and changing trends in U.S. financial system. Prereq: Business Administration 504 and 505 or consent of instructor.

581 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: Business Administration 504 and 505 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. Effects 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 504 and 505 or consent of instructor.

599 Special Topics in Finance (1-3) Topics vary. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

600 Doctoral Research and Dissertation (3-15) P/NP only. E


642 Seminar in Finance II: Theory of the Firm (3) Financial theory of firm and financial decision making under conditions of uncertainty, equilibrium models of firm. Option pricing, agency theory, capital structure, economics of information, and dividend policy.

651 Advanced Seminar in Finance I (3) Recent theoretical and empirical developments in micro-finance literature. Topics vary. May be repeated. Maximum 6 hrs.

652 Advanced Seminar in Finance II (3) Recent theoretical and empirical developments in macro-finance literature. Topics vary. May be repeated. Maximum 6 hrs.

CONCENTRATIONS

510 Corporate Finance Laboratory and Case Studies (3) Laboratory and case studies to develop an understanding of the theoretical and practical aspects of corporate finance. May be repeated. Maximum 6 hrs.

512 Problems in Financial Management Laboratory and Case Studies (3) Laboratory and case studies for students to develop an understanding of the theoretical and practical aspects of corporate finance. May be repeated. Maximum 6 hrs.

581 Financial Management of a New Enterprise Laboratory and Case Studies (3) Laboratory and case studies to develop an understanding of the theoretical and practical aspects of financial management of a new enterprise. May be repeated. Maximum 6 hrs.

581 Real Estate Investment and Finance Laboratory and Case Studies (3) Laboratory and case studies for students to develop an understanding of the theoretical and practical aspects of real estate investment and finance. May be repeated. Maximum 6 hrs.

599 Special Topics in Finance Laboratory and Case Studies (1-3) Topics vary. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

600 Doctoral Research and Dissertation Laboratory and Case Studies (3-15) P/NP only. E

641 Seminar in Finance I: Capital Markets Laboratory and Case Studies (3) Laboratory and case studies for students to develop an understanding of the theoretical and practical aspects of capital markets. May be repeated. Maximum 6 hrs.

642 Seminar in Finance II: Theory of the Firm Laboratory and Case Studies (3) Laboratory and case studies for students to develop an understanding of the theoretical and practical aspects of financial theory of firm and financial decision making. May be repeated. Maximum 6 hrs.

651 Advanced Seminar in Finance I Laboratory and Case Studies (3) Laboratory and case studies for students to develop an understanding of the theoretical and empirical developments in micro-finance literature. Topics vary. May be repeated. Maximum 6 hrs.

652 Advanced Seminar in Finance II Laboratory and Case Studies (3) Laboratory and case studies for students to develop an understanding of the theoretical and empirical developments in macro-finance literature. Topics vary. May be repeated. Maximum 6 hrs.

THEMASTER'S PROGRAM

Applicants must have a B.S. in food technology, food science or a related scientific field.

Thesis Option
1. Prior to research for the thesis, the student must develop a detailed written research plan. Registration for 6 hours of 500 Thesis is required.
2. In addition to the thesis requirement, a minimum of 24 semester hours of graduate coursework is required. This work must be approved by the student's committee and a minimum of 12 hours must be courses numbered above 500. The committee may require additional coursework if the student's progress or background indicates such need.
3. All students are required to take 2 hours of 501 Seminar in their program and are expected to attend this course and participate in discussions during their master's program. Completion of 510 or equivalent is also required.
4. An oral, final examination covering the thesis and coursework is required.

Non-Thesis Option
1. In lieu of a thesis, students are required to complete a problem in cooperation with their employer (company or governmental agency) and their faculty committee. Students working on a problem must register for 6 hours of 503.
2. In addition to the requirement for 6 hours of 503, a minimum of 24 semester 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.
3. All students are required to take 2 hours of 501 Seminar in their program and are expected to attend this course and participate in discussions during their master's program. Completion of 510 or equivalent is also required.

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

Graduate School rating forms or letters of recommendation from at least three people are required. Respondents should be familiar with the applicant's scholastic ability and professional potential.

Food Science and Technology
(College of Agricultural Sciences and Natural Resources)

MAJOR DEGREES

Food Science and Technology .......... M.S., Ph.D.
Clark J. Brekke, Head

Professors:
Brekke, C. J., Ph.D. ................. Wisconsin
Collins, J. L., Ph.D. ................. Maryland
Draughon, F. A., Ph.D. .......... Georgia
Jaynes, H. O. (Emeritus), Ph.D. .... Illinois
Melton, S. L., Ph.D. ................ Tennessee
Miles, J. T. (Emeritus), Ph.D. ..... Wisconsin
Overcast, W. W. (Emeritus), Ph.D. .......... Iowa State
Penfield, M. P. (Liaison), Ph.D. ..... Tennessee

Associate Professors:
Christen, G. E., Ph.D. .......... Missouri
Loveday, H. D., Ph.D. .......... Kansas State
Mount, J. R., Ph.D. .......... Ohio State

Assistant Professor:
Boatlie, S. E., Ph.D. ............... Oregon State
Golden, D. A., Ph.D. .......... Georgia
Hulbert, G., Ph.D. .......... Illinois
van Laack, R. L., Ph.D. ............. Utrecht

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

Graduate School rating forms or letters of recommendation from at least three people are required. Respondents should be familiar with the applicant's scholastic ability and professional potential.

THEMASTER'S PROGRAM

Applicants must have a B.S. in food technology, food science or a related scientific field.

Thesis Option
1. Prior to research for the thesis, the student must develop a detailed written research plan. Registration for 6 hours of 500 Thesis is required.
2. In addition to the thesis requirement, a minimum of 24 semester 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.
3. All students are required to take 2 hours of 501 Seminar in their program and are expected to attend this course and participate in discussions during their master's program. Completion of 510 or equivalent is also required.
4. An oral, final examination covering the thesis and coursework is required.

Non-Thesis Option
1. In lieu of a thesis, students are required to complete a problem in cooperation with their employer (company or governmental agency) and their faculty committee. Students working on a problem must register for 6 hours of 503.
2. In addition to the requirement for 6 hours of 503, a minimum of 24 semester 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.
3. All students are required to take 2 hours of 501 Seminar in their program and are expected to attend this course and participate in discussions during their master's program. Completion of 510 or equivalent is also required.
4. 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.

THE DOCTORAL PROGRAM

1. Completion of a master's degree in the field, or a closely related field, or passing a special qualifying examination is required for admission. Scores on the GRE aptitude test are also required.


3. A minimum of 72 hours beyond the Bachelor's degree, excluding credit for the master's thesis, is required. Of this, 24 semester hours must be 600 Doctoral Research and Dissertation.

4. At least 24 hours of coursework numbered above 500 are required exclusive of doctoral research and dissertation. At least 6 of the 24 hours must be courses numbered above 600.

5. A minimum of 6 hours of courses for graduate credit must be taken outside the Department of Food Science and Technology.

6. All candidates must complete 601 (2 hrs.) and are expected to attend 601 during their Ph.D. program.

7. 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.

GRADUATE COURSES

430 Sensory Evaluation of Food (3) Principles and methods of sensory evaluation of foods. Prereq: Basic statistics. 2 hrs. and 1 lab. F

452 Science of Dairy Foods (3) Science and technology of processing of milk and its products. Prereq: Food Laws and Regulations, Food Chemistry, Food Microbiology and Lab. 3 hrs. Food Preservation or consent of instructor; 2 hrs and 1 lab. F

460 Meat Science (3) Carcass characteristics of meat animals, muscle structure and composition, cut identification, curing, freezing and cooking. Prereq: Food Industry or consent of instructor. F

469 Meat Science Lab (1) Slaughter and processing methods for beef, pork, lamb and poultry. Coreq: 466. Sp

470 Food Crop Products (3) Food products from plants, types, manufacturing systems, quality attributes and utility. Prereq: Food Preservation and 3 hrs. biological science or consent of instructor. Sp

480 Cereal Science and Bakery Products (3) Chemistry and technology of processing cereal grains, interaction of ingredients during production and storage of baked products. Prereq: Food Laws and Regulations, Food Chemistry, and Food Preservation or consent of instructor. 2 hrs. and 1 lab. Sp

485 Food Processing System Analysis and Evaluation (3) Design and evaluation of food processing operation to produce safe and acceptable quality food product. Prereq: Food Chemistry, Food Microbiology, Food Preservation or consent of instructor. Sp

500 Thesis (1-15) P/NP only. E

501 Seminar (1) Individual reports and discussion on topics from current literature. May be repeated. Maximum 3 hrs. F, Sp

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. S/NC only. E

503 Problems in Lieu of Thesis (2-3) May be repeated. S/NC only. E

510 Instrumental Analysis of Food (3) Modern instrumental methods for control of food manufacturing processes. Prereq: Food Chemistry. 2 hrs and 1 lab. F

511 Color of Foods (2) Chemical basis, measurements, and reactions involved in color changes in foods. Manufacture and application of food colors in foods. Prereq: Food Chemistry or equivalent. 1 hr and 1 lab. F, A

512 Flavor of Foods (2) Chemical basis, measurements, and reactions involved in flavor changes in foods. Manufacture and application of flavorings in foods. Prereq: Food Chemistry or equivalent. 1 hr and 1 lab. F, A

515 Food Carbohydrates, Proteins and Lipids (4) Advanced study of chemical and physical attributes of carbohydrate, protein, and lipid components of foods; effects of components on production of safe and consistent quality food products; and changes during processing and/or distribution of food products. Prereq: Food Chemistry or equivalent. 3 hrs and 1 lab. Sp

520 Food and Industrial Fermentations (3) Microbiology, biochemistry and technology of food-related fermentations involving dairy products, meat, cereals, fruits and vegetables. Production of food ingredients and by-product utilization. Prereq: Food Microbiology and Lab, Food Protection, Biochemistry and Cellular and Molecular Biology 410 or equivalent. 2 hrs and 1 lab. Sp

521 Advanced Food Microbiology (3) Extraneous 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: Food Microbiology and Lab or equivalent. 2 hrs and 1 lab. Sp

540 Food Product Development (3) Art, science and technology of developing and marketing new food products. Prereq: Food Preservation. 2 hrs and 1 lab. Sp

560 Advanced Meat Science (3) Physical and chemical changes that occur in conversion of muscle to meat; effect of postmortem treatments on meat quality, compositional and palatability, packaging, preservation and quality control. Prereq: 450. 2 hrs and 1 lab. Sp

580 Food Oils and Fats (2) Chemistry and technology of food fats, fats processing and use. Credit from courses in oils. Prereq: Food Chemistry or equivalent. 1 hr and 1 lab. Sp

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 hrs. F, Sp

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 hrs. E

600 Doctoral Research and Dissertation (3-15) P/NP only. E

601 Seminar (1) Reports and directed discussion on research topics from current literature. May be repeated. Maximum 3 hrs. F, Sp

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. Sp

650 Thesis (1-15) P/NP only. E
department also has an application that must be submitted at the time of application to the Graduate School.

Thesis Option
1. Prior to research for the thesis, the student is required to develop a detailed written research proposal. Registration for 6 hours of Thesis (Forestry 500 or Wildlife and Fisheries 500) is required.
2. A graduate committee of no fewer than 3 faculty members will 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.
3. 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.
4. An oral examination covering the thesis and coursework is required.

Non-Thesis Option (Forestry only)
1. Thirty-five hours of graduate coursework of which 23 must be at the 500 level or above is required.
2. A graduate committee of no fewer than 3 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.
3. Three hours of Forestry 511 are required.
4. Nine hours of coursework in the department must be at the 500 level or above, exclusive of Forestry 511.
5. Final comprehensive written and oral examinations shall be taken upon completion of no fewer than 28 hours of approved study.

MINOR IN ENVIRONMENTAL POLICY
The department participates in a program designed to give graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. See Economics for program description.

ACADEMIC COMMON MARKET
An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. program in Forestry is available to residents of the state of Maryland. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

Forestry

GRADUATE COURSES
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: Forest Resource Analysis or consent of instructor. F
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. F
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. Prereq: Wildland Recreation or consent of instructor. 2hrs and 1 lab. Sp
430 Wood Adhesives and Glued Wood Products (2) Theory of adhesives of 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 field testing of strength and glued-wood product performance; day field trips. Prereq: Wood Properties and Uses and Wood Identification, or consent of instructor. 1 hr and 2 labs. Sp
434 Wood Processing and Machining (2) Primary log breakdown and secondary processing into major products. Fundamentals of machining technology for major types of cutting operations: sawing, boring, planing, turning, cutting, and laser machining; day field trips. Prereq: Wood Properties and Uses and Wood Identification, or consent of instructor. F
435 Wood Drying and Preserving (2) Discussion of wood moisture relationships. Introduction to commercial wood drying equipment and practices. Proper use, specification, and disposal of preservative treated wood. Day field trips. Prereq: Wood Properties and Uses and Wood Identification, or consent of instructor. F
500 Thesis (1-15) P/NP only. E
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. S/NC only. E
511 Problem Analysis in Forest Resources (3) Problem identification, analysis and solution in forest resources management. Identify, analyze and prepare written report of problems. Topic and report must have approval of graduate committee. Available only to students in non-thesis option for M.S. in Forestry. E
512 Seminar (1) Current developments in forestry. Required of all graduate students in residence fall semester. May be repeated. Maximum 2 hrs. S/NC only. F
520 Advanced Forest Tree Biology (3) Growth, reproduction, and physiology of forest trees; developmental biology; taxonomy and anatomy of forest trees. Prereq: Graduate standing in forestry or biological science, or consent of instructor. F,A
530 Advanced Forest Resource Management (3) Analysis of forest management problems and their solutions exemplified in public agencies and private firms. Forest organization and computerized regulation systems; financial and operational planning tools, as applied to forested land management. Prereq: Senior-level forest management or consent of instructor. Sp,A
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. Prereq: Silvicultural methods and Biology 220 or consent of instructor. Sp,A
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 examples. Overhead. Prereq: Senior level in forest recreation or consent of instructor. F,A
570 Management & Policy of Forest Resource Organization (3) Theory and application of management as applied to natural resource organizations; institutional direction and culture, and strategic management. Development of policy as planning tool and as results from conflict resolution. Linkage between policy development and execution, and structure and management of organizations. Prereq: Forest administration and policy or consent of instructor. F,A
550 Advanced Silviculture (3) Silvicultural practices and systems applied to commercially important hardwoods and softwoods. In-depth analyses of silvicultural principles involved and tools used, prescribed fire, pesticides, in regeneration and management; computer modeling of stand dynamics, structure, growth, yield. Prereq: Undergraduate silviculture course or consent of instructor. 2hrs and 1 lab. Sp,A
555 Advanced Forest Biometry (3) Application of sampling techniques to forest inventory; fixed and variable plot sampling; list sampling; Poisson sampling; regression estimation methods. Growth and yield predictors for even-aged and uneven-aged forests. Prereq: Land Measurement Techniques and Forest Resource Inventory or consent of instructor. F,A
560 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 hrs. E
593 Independent Study in Forestry (1-4) May be repeated. Maximum 6 hrs. E

Forestry, Wildlife & Fisheries

GRADUATE COURSES
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. Prereq: Principles of Wildlife and Fisheries Management or consent of instructor. Applicable to majors in Forestry and in Wildlife and Fisheries Science. 2 hrs and 1 lab. F
416 Planning and Management of Forest, Wildlife and Fisheries Resources (3) Integrated forest and wildlife 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. Prereq: Senior standing 1 hr and 2 labs. Sp
512 Management of Forest, Wildlife and Fisheries Resources (3) Ecological aspects of wildlife and fisheries management. Prereq: Senior-level natural resources science or equivalent or consent of instructor. Applicable to majors in Forestry and in Wildlife and Fisheries Science. Sp
535 Environmental Impacts to Natural Ecosystems (2) Current technologies and management strategies concerning wise use of forested, wildlife, and fisheries resources necessary for decision making and implementation. Prereq: 6 hrs of natural sciences or consent of instructor. Not available to students in forestry or wildlife and fisheries science. 4 hrs and 1 lab for six weeks. Sp
540 Seminar on Integrated Resources Management in Biosphere Reserves (2) MAB program, UNESCO sponsored global conservation initiative. Analysis of integrated resources management practices that demonstrate concept of sustainable development. Environ mental issues and application of systems management practice. Applicable to majors in Forestry and in Wildlife and Fisheries Science. Sp
440 Wildlife Techniques (2) Methods of wildlife damage control, forest, farmland, and wildlife habitat management; identification of wildlife field sign, wildlife capturing techniques and management plan preparation.
Fish Culture (3) Principles, concepts and techniques of culturing economically important fish, shellfish, and humanized to rigorously analytic and GIS-based.

Population and Habitat Analysis (2) Details techniques of culturing economically important fish and shellfish species. Prereq: 443 or consent of instructor. 2 hrs. and 1 lab. Sp, A

French
See Romance Languages

Geography
(College of Arts and Sciences)

MAJOR

DEGREES

Geography........................................ M.S., Ph.D.

Carol Harden, Head

Professors:

Associate Professors:
Brinkman, Leonard W., Jr., Ph.D. ..... Wisconsin Harden, Carol P., Ph.D. ............... Colorado Horn, Sally F., Ph.D. ............... California Rehder, John B., Ph.D. ............... Louisiana State

Assistant Professor:
Orvis, Kenneth H., Ph.D. ............... California

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 opportunitiy to gain substantial depth in a concentration or a major technique. An emphasis in geographic information systems is available for students who have appropriate background 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.

The DOCTORAL PROGRAM

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. Course requirements for the degree shall be determined by the student's faculty committee in accordance with specific interests and needs. The program must include 504, 515, 599, 9 hours of 600-level seminars, and (at each offering during residency) 501. A minimum of 9 hours must be earned in related fields outside the department. Competence in cartography and quantitative techniques 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; written examinations on two special fields; and an oral examination on the student's program, the special fields, and the dissertation proposal. Also required is a final oral examination on the dissertation and on other aspects of the program as determined by the student's doctoral committee.

MINOR IN ENVIRONMENTAL POLICY

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

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The Ph.D. program in Geography is available to residents of the states of Alabama, Arkansas, Mississippi, Virginia, or West Virginia. The master's program is also available to residents of Texas. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

411 Computer Mapping and Geographic Information Systems (3) Concepts, management, and presentation of digital data for spatial analysis, cartographic data structures. Prereq: 310 and knowledge of computer language or consent of instructor. 2 hrs and 1-2 lab.

412 Cartography (3) Cartographic techniques applied to design, compilation, and reproduction of maps and other graphics. Prereq: 310 or consent of instructor. 2 hrs and 1-2 lab.

413 Remote Sensing: Types and Applications (3) Principles and uses of remote sensing imagery, digital data, and spectral data: geographic interpretation and
THE DOCTORAL PROGRAM

The prerequisite for the Ph.D. program, in addition to that for the M.S. program, is either a master's degree in Geology, or a Bachelor's degree plus completion of 9 hours of coursework from the list in #3, above, including one course from each group. These courses may be taken while completing other course requirements.

Graduation requires passing a comprehensive examination, taken no later than the end of the second year, completion of all course requirements, 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 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 study of 9 hours of 600-level geology courses, 9 hours of 500-level or higher geology courses, and 6 hours of additional graduate courses. Extra-departmental coursework is encouraged.

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

GRADUATE COURSES

401 Quantitative Methods in Geology (3) Applications of calculus and differential equations to problems in sciences. Examples of diffusion equation in hydrogeology; wave equation in geophysics; mechanical modeling and boundary conditions in structural geology and tectonics. Prereq: The Dynamic Earth or Earth, Life, and Time, 2 semesters of Calculus.
410 Advanced Mineralogy (3) Crystal chemistry of rock-forming minerals. Interaction of electromagnetic radiation and crystals of minerals. Optical properties of minerals, visible and infrared spectroscopy, and x-ray diffraction. Laboratory exercises emphasize thin section and x-ray diffraction methods of mineralogy. Prereq: 310; 2 hrs and 1 lab.
420 Paleocology (4) Principles of ecological analysis as applied to fossils and fossil assemblages: data collection and interpretation. Laboratory designed around preparation of scientific reports based on field and laboratory analysis. Writing emphasis course. 3 hrs and 1 lab.
421 Invertebrate Paleontology (4) Survey of invertebrates: animal phylogeny, skeletal structure and preservation, functional morphology, stratigraphy and stratigraphic distribution. Prereq: Paleobiology or consent of instructor. 2 hrs and 2 lab hrs.
440 Field Geology (6) Summer field course for advanced undergraduate geology majors and first-year graduate students with major 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 geologic problems. Prereq: Completion of major core courses and consent of instructor.
455 Basic Environmental Geology (3) Applications of geologic processes toward understanding of environmental and human activities on earth's environments. Prereq: 12 hrs of geology courses, 2 hrs and 1-3 hr lab or field period.
460 Principles of Geochemistry (3) Application of chemical principles to geologic problems. Prereq: General chemistry and general physics. 2 lab hours.
470 Applied Geophysics (3) Basic principles of geophysical exploration: application to environmental problems. Prereq: 310, 330, and 568 or equivalent. 2 lab hours.
471 Fieldwork in Geophysics (2) Geophysical investigations applied to solution of problems in tectonics, hydrogeology, or environment. Summer field course off-campus. Requires full time for 2 or more weeks. Prereq: 470 or consent of instructor.
475 Physical and Chemical Systems of the Earth (3) Development of physical earth from solar nebula to present. Formation of Earth; evolution of atmosphere, hydrosphere, crust, mantle, and core. Interdependence of plate tectonics, volcanism, plate tectonics, geodynamics, chemistry and physical processes of interior, and Earth's temperature. Historical perspective on major controversies of past, and problems unresolved today. Prereq: 16 hrs of geology courses numbered 300 and above. 2 hrs and 1 discussion.
480 Principles of Economic Geology (4) Ore-forming processes, classification of mineral deposits, survey of different types of mineral deposits with examples, and mineralogies. Prereq: 310 and 330 or equivalent. Recommended prereq: 460. 1 hr and 1 lab.
485 Principles of Hydrogeology (3) Physical principles of flow, flow equations, geologic controls, aquifer analysis, water well design, sailing, introduction to transport processes. Prereq: The Dynamic Earth; Calculus; Fundamentals of Physics or equivalent, or consent of instructor. (Same as Civil Engineering 465).
500 Thesis (1-15) P/NP only. E
502 Registration for Use of Facilities (3-15) Required for the student: not otherwise registered during any term when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/N only: E
505 Structure of the Southern and Central Appalachians (3) Structure and tectonics of Southern and Central Appalachians from extensional Late Proterozoic to early Paleozoic rift-slip-platform margin through processes related to compressional events producing accretionary tectonics. Laboratory experiences included. Prereq: 310 and 566 or equivalent. 2 hrs and 1 lab.
510 Clay Mineralogy (3) Origin, chemistry, structures, and properties of clay minerals; application of mineralogical techniques in clay mineral studies. Prereq: 310 and 566 or equivalent. 2 hrs and 1 lab.
521 Data Analysis in Geology and Environmental Science (3) Application of statistical and other quantitative techniques using computers to analyze geological data: environmental problems. 2 hrs and 1 lab.
525 Biostratigraphy (3) Examination of principles of stratigraphy and biostratigraphy through selected case histories. 1 hr and 2 hr seminar.
530 Petrogenesis of Crystalline Rocks (4) Origin and properties of igneous and metamorphic rocks, magmatic and metamorphic processes, and applications to conditions. Laboratory involves petrographic study of crystalline rocks in thin section. Prereq: 410, 3 hrs and 1 lab.
535 Ground Water Hydrology (3) Same as Environmental Engineering 535.
540 Seminar in Locality (1) Introduction of geology of Southern Appalachians. 1 hr plus field trips.
545 Sandstone Petrology/Sedimentary Petrology (4) Field and petrographic analysis of conglomeratic and lutite rocks; petrographic analysis of tectonic and geologic processes. Prereq: 640. 2 lab hours.
550 Regional Geomorphology (3) Integrative approach to study of natural geomorphological regions stressing links and similarities across boundaries, unique characteristics of major divides, provinces, sections, and districts. May be repeated with consent of instructor. Maximum 6 hrs. (Same as Geography 550.)
556 Quaternary Geology of North America (3) Interpretation of geologic, stratigraphic, and sedimentologic evidence in order to reconstruct Quaternary landform evolution, periglacial, and nonglaciated regions of North America; correlation of major episodes of North American glacial with paleo-oceanographic changes in Atlantic and Pacific Oceans. Prereq: 101 or consent of instructor.
557 Quaternary Paleocology (3) Perfusion, process, and pattern within Quaternary ecosystems; climatic change and vegetation responses during last 2.5 million years. Prereq: Consent of instructor.
563 Stable Isotope Geochemistry (3) Theoretical aspects of stable isotope fractionation, isotope exchange, and isotope geologic systems. Isotope exchange, variations in natural waters, diagenetic, hydrothermal and metamorphic systems. Prereq: General Chemistry or equivalent.
566 Geochemical Analysis (3) Collection and treatment of geochemical data using electron microprobe, x-ray fluorescence, and atomic absorption spectrophotometry techniques. Prereq: 310 or consent of instructor. 2 hrs and 1 lab.
570 Advanced Structural Geology (4) Current topics in structural geology and tectonics of mountain belts; re-
Germanic and Slavic Languages

(College of Arts and Sciences)

MAJORS

German ........................................ M.A.
Modern Foreign Languages ................ Ph.D.

David E. Lee, Head

Professors:
Fallon, James E. (Emeritus), Ph.D. Pennsylvania
Fiere, Donald M. (Emeritus), Ph.D. .......... Indiana
Hodges, Carolyn R., Ph.D. .................... Chicago
Kratz, Henry (Emeritus), Ph.D. ............. Ohio State
Osborne, J. C. (Emeritus), Ph.D. .......... Northwestern
Ritenhoven, Ursula C. (Emeritus), Ph.D. ... Connecticut

Associate Professors:
Lauckner, Nancy A. (Liaison), Ph.D. ... Wisconsin
Lee, David E., Ph.D. ....................... Stanford
Mellor, C. J., Ph.D. ............................. Chicago
Pervukhina, Natalia K., Ph.D. ............. Bryn Mawr

Assistant Professors:
Blackwell, Stephen H., Ph.D. ............... Indiana
Hoeung, Peter, Ph.D. ........................... Wisconsin
Livers, Keith A., Ph.D. ........................... Michigan
Moser, Beverly, Ph.D. ........................... Georgetown
Ohnese, Stefanie, Ph.D. ........................... McGill

The Department of Germanic and Slavic Languages offers two advanced degrees: the Master of Arts in German and the Doctor of Philosophy in Modern Foreign Languages. Inquiries should be addressed to the head of the department.

THE MASTER'S PROGRAM

The department requires a minimum of 30 semester hours including 15 hours of coursework numbered 500 and above and 6 hours of Thesis 600.

THE DOCTORAL PROGRAM

The Ph.D. in Modern Foreign Languages is offered jointly by the Department of Germanic and Slavic Languages and the Department of Romance and Asian Languages and requires advanced training in a major language and either a second language or applied linguistics. Students whose language of first concentration is French or Spanish should consult the section on Romance and Asian Languages.

Admission Requirements

Applicants must have completed a B.A. 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.

Degree Requirements

Candidates with German as a first concentration must complete a minimum of 63 semester hours of coursework beyond the bachelor's degree in addition to 24 hours of doctoral research and dissertation.

The coursework must be distributed as follows:

1. First Concentration: German. A minimum of 39 hours of German courses beyond the bachelor's degree, distributed as follows:
   - 400 level: A maximum of 6 hours of 400-level classes taken for the M.A. 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.

2. Second Concentration. A minimum of 18 hours beyond the bachelor's degree, taken in the field of applied linguistics or in a second language, either French, Italian, Russian, or Spanish. Twelve of these hours must be at the 500 level or above.

Students choosing applied linguistics as a second concentration are strongly urged to take their cognate work in a second language.

4. 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).

If a student has not chosen a third language as his or her cognate area, basic competence (determined by a reading examination with translation into English administered by the department concerned) in a third language is required. If the student's first and second languages are Romance languages, the third language should be chosen from another language family.

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 offering the language.

A comprehensive examination on 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.
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 hrs of upper-division German excluding courses in translation and graduate reading courses.

500 Thesis (1-15) P/NP only. E

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. S/NC only. E

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 M.A. and Ph.D. students holding GTAs, except those whose previous training or experience warrants excuse by department.

519 Bibliographical Methods (1) Bibliographical methods, major reference works and bibliographical problems in language and literature.

520 Seminar (2) Advanced training in use of bibliographical and reference tools; illustrative problems; paper preparation.

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 hrs.

552 German Enlightenment, Rococo, and Sturm und Drang (3) Content varies. May be repeated. Maximum 6 hrs.

553 German Classicism and Romanticism (3) Content varies. May be repeated. Maximum 6 hrs.

554 German Realism and Naturalism (3) Content varies. May be repeated. Maximum 6 hrs.

555 Modern German Literature 1890-1945 (3) Content varies. May be repeated. Maximum 6 hrs.

556 Modern German Literature 1945-Present (3) Content varies. May be repeated. Maximum 6 hrs.

560 German Literary Theory and Criticism (3)

561-62 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.

593 Independent Study (1-15) See College of Arts and Sciences.

Health, Leisure, and Safety Sciences

(College of Human Ecology)

MAJORS

DEGREES

Human Ecology ........................................ Ph.D.
Public Health ............................................. M.P.H.
Recreation, Tourism and Hospitality Management ........................................ M.S.
Safety Education and Service ........................................ M.S.

Charles B. Hamilton, Head

Professors:

Gorski, June, Dr.P.H. .................................. UCLA

Hayes, Gene A. (Liaison) .................................. Oklahoma

Kirk, Robert H., H.S.D. .................................. Indiana

Wallace, Bill C. (Liaison) .................................. North Carolina

Assistant Professors:

Blanton, Mary Dale, Re.D. ....................... Tennessee

Pursley, P. Jack, Ph.D. ............................... Iowa

Zemel, Paula, Ph.D. ................................. Wayne State

Associate Professors:

Ellison, Jack S. (Liaison), Ed.D. ................ Tennessee

Fitzhugh, Eugene C., Ph.D. ..................... Alabama

Hendrick, Francis T. (Liaison), Ph.D. .... Oregon

Smith, Susan M., Ed.D. .............................. Tennessee

The Health, Leisure, and Safety Sciences Department offers graduate programs leading to the Master of Science with majors in Health Promotion and Health Education; Recreation,
Tourism and Hospitality Management; and Safety Education and Service; and to the Master of Public Health degree in Public Health. The department provides doctoral preparation through a concentration in Human Ecology. Inquiries should be directed to the department head. Application packets are available by request to department.

The department fosters a natural uniting of disciplines that contribute to a holistic approach to healthy living and the enjoyment of life for all citizens. The academic disciplines focus on assisting students, clients, and faculty to (1) develop a healthful and safe lifestyle that considers the dimensions of disease and injury prevention, and the role of leisure as it contributes to mental, social, and physical health; and (2) prepare persons for competent practice of their respective disciplines, including scholarly, creative scholars with an intent towards research. The department is committed to the educational value of community-based experiential learning.

Health

A graduate program is available leading to the Master of Science in Tourism and Hospitality Management; and the Master of Science with a major in Health, Leisure, and Safety Sciences. A graduate program is also available leading to the Doctor of Philosophy with a major in Public Health.

THE PH.D. 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 professionals with an interest in improving the health of the nation.

Requirements include:
1. Minimum 21 hours of foundation courses: 610, 620, 6 (hours of statistics, 3 hours of specialized research methods; and 6 hours of natural or behavioral sciences)
2. Minimum 21 hours in primary specialization: 530, 540, 610, 660, and 6 hours of electives
3. Minimum 12 hours in supporting specialization in a focused area: public health, safety, gerontology, or a program approved by doctoral committee.
4. Minimum 6 hours in a cognate area.

GRADUATE COURSES

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) Sp

405 Alcoholism and Alcohol Education (3) Problems of alcoholism. Factors which make alcoholism serious and safety perspectives. Various types of instruction: educational and intervention programs. F

406 Death, Dying and Bereavement (3) Aspects of dying, death and handling of trauma. Medical, financial, physical, legal and social implications of death. F, Sp

420 Sex Education As It Relates to Human Sexuality (3) Exploration of the human sexuality. Trends, issues, and content of instruction. E

425 Women's Health (3) Factors influencing women's health and women consumers in nation's health delivery systems. Health problems/concerns of women

430 Suicide and Crisis Intervention (3) Factors which make suicide serious health problem. Assessment, intervention, and prevention techniques. Sp

435 Substance Use and Abuse (3) Drug and alcohol abuse problems and urban causes; pharmacology of drugs and effects on society; strategies for intervention and education. Sp

455 Aging and Health (3) Aging process in health perspective as related to health promotion and wellness of aged. F, Sp

500 Thesis (1-15) P/NP only. E

502 Registration for Use of Facilities (3-15) Required for the student not otherwise required during any semester when student uses University facilities. 2-4 hours. F, Sp

520 Sex Education and Human Sexuality (3) Advanced in-depth discussion of educational and health counseling theory, techniques, materials used in schools, community, or health care facility. Sp

530 Health Promotion and Health Education Programs Development (3) Fundamental theories and principles of health promotion program development; methodology, marketing, public relations. Health education as vehicle for health promotion. Sp

540 Evaluation in Health Promotion and Health Education (3) The evaluation process, including methodologies as related to health promotion products, processes, and programs. Construction of instruments for use in assessing health education outcomes. Sp

570 Special Topics (1-3) For graduate students, discussion of the current body of knowledge in the area of specialization. May be repeated. Maximum 12 hrs. E

600 Doctoral Research and Dissertation (3-15) F, E

601 Internship/Research in Safety and Health (3-6) (Same as Safety 601) F

610 Critical Analysis of Writing and Research (3) Analysis of writing and research in health related areas. F

620 Advanced Research Techniques in Health (3) Advanced theory and techniques of research design and methodologies in health discipline. Prereq: 590, 610. Sp

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) Su

655 Seminar in Nation's Health (3) Comprehensive study of definition, determinants, resources and health status of nation. (Same as Public Health 655) F

660 International Health (3) Study of quality of health, health promotion and health services in countries throughout world. (Same as Public Health 660) Sp


Public Health

Graduate study with a major in Public Health leads to the Master of Public Health (M.P.H.). Two professional preparation concentrations are available: community health education and health planning/administration. The M.P.H. program is accredited by the Council on Education for Public Health. A minor in statistics is available to interested M.P.H. students due to public health affiliation with the Intercollegiate Graduate Statistics Programs.

ADMISSION REQUIREMENTS

A statement of the applicant's educational and career goals and three rating forms are required. Request application packet from the department. Preference 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 and 1 April for Fall semester.

THE MASTER'S PROGRAM

The M.P.H. is a non-thesis program requiring completion of 38 semester hours of coursework inclusive of fieldwork and field practice. Field practice 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. 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.

DUAL MS-MPH PROGRAM

The College of Human Ecology offers a coordinated dual program leading to the conferment 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: 1) plan a career in Public Health Nutrition and want to acquire the knowledge and skills of the nutritionist and public health professional; 2) plan a career in nutrition and want to acquire the knowledge and skills and the perspective of the public health professional; or 3) plan a career in public health and want to acquire the knowledge, skills and perspective of the nutritionist.

Admission Requirements

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, Leisure and Safety 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 after acceptance by either department, matriculation in either or both departments. Such approval will be granted, provided that dual program studies be started prior to entry into the fourth quarter of the MS and MPH programs.

Curriculum

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 Health and Society (PH 555), two credits of Seminar in Public Health (PH 509), and a minimum of 60 credits. The Department of Nutrition will award a maximum of 9 semester hours of credit toward the MS degree for successful completion of approved graduate level courses offered in the Department of Health, Leisure and Safety Sciences. The Department of Health, Leisure and Safety Sciences will award a maximum of 11 semester hours of credit toward the MPH degree 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 degree 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 (NTR 515) and 1 semester hour of Graduate Seminar in Public Health (NTR 509). MS courses counted toward the MS can be counted toward the degree. All required courses must be approved by the Public Health Academic Program Committee and the student's academic advisor.

GRADUATE COURSES

400 Consumer Health (3) (Same as Health 400.)

410 Health in the Work Environment (3) Fundamental activities in field of health at work and at reducing health problems for employees. Workplace design, health hazards and problems of concern to nurses, medical staff, managers and others in industrial health and safety fields. Prerequisite: Consent of instructor. May not be taken for credit by occupational health concentration majors. F

493 Directed Independent Study (1-3) Individual in-depth study of selected issue. Prerequisite: Consent of instructor. May be repeated. Maximum 6 hrs. E

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered according to any standards in the University. May not be used toward degree requirements. May be repeated. S/NC only. E

509 Graduate Seminar in Public Health (1) In-depth discussion of timely topics reflecting scope of public health, and its interrelation with many other academic and professional disciplines. Open to both internal and external. May be repeated. Maximum 4 hrs. (Same as Nutrition 509, Nursing 509, Exercise Science 509, and Social Work 509.) S/NC only. F,Sp

510 Environmental and Occupational Health (2) Emphasis on interdepartmental and environmental health and occupational hygiene. Techniques and instrumentation for solution of workplace hazards. Prerequisite: 2 yrs. of chemistry and biology and consent of department. F

512 Industrial Hygiene Controll (4) Activities in comprehensive practice of industrial hygiene control procedures. Application of industrial hygiene techniques and instrumentation to solution of workplace hazards. Prerequisite: 511.

513 Industrial Hygiene Instrumentation and Sampling (3) Methods and instruments for evaluating industrial environment for exposure to airborne and physical stressors affecting worker's health. Lecture, laboratory, and course. Prerequisite: Consent of instructor. F,Sp

514 Industrial Toxicology and Occupational Exposures (3) Principles of industrial toxicology, basic mechanisms, portals of entry, physiologic and biochemical responses. Occupational exposure assessment, pharmacokinetics and environmentally influenced exposure characterization, statistical aspects of sampling, and transport of contaminants into general environment. Prerequisites: General chemistry and 1 semester of human biology. F

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 management concepts/techniques/process. F,Sp

521 Organization Theory and Health Care Delivery (3) Administrative and organization theory related to health facilities; organizational and management of community hospital. Case discussions and problem-solving exercises; managerial functions and skills. F

523 Management in Extended Care Settings (3) Managerial concepts and theoretical foundations essential to supervision and administration of domiciliary health service programs. Management and operation of health service programs for patients and clients in institutional 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 health programs. Prerequisite: 521 or consent of instructor. Sp

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 analysis. Opportunities for independent research. Prerequisites: 520 or consent of instructor. Sp

530 Biostatistics (3) Application of descriptive and inferential statistical methods to health-related problems and programs. Microcomputer applications, use and interpretation of statistical data pertaining to group and control studies. Laboratory research methodology preparatory for first course in epidemiology. Prerequisite: Introductory statistics or consent of instructor. F,Sp

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. Prerequisite: Consent of instructor. Sp

542 Advanced Epidemiologic Methods (3) Nature, construction, analysis and interpretation of statistical data pertaining to cohort and case-control studies. Surveillance and analytic methods: multiple logistic and discriminant analysis. Prerequisites: Consent of instructor. Prerequisite: Consent of instructor. Sp

550 Principles and Practices of Community Health Education (3) Theoretical foundations for community health education: opportunities for skill development in health education; introduction to community health analysis. F

552 Community Health Problem Solving (4) Dynamics of community organization, community needs assessment, educational interventions, and application of problem planning and evaluation techniques. Opportunity to practice skills in realistic setting. Prerequisite: Consent of instructor. Sp


560 Theories and Techniques in Health Planning (4) Overview of health planning concepts and methodologies: systems, problem-oriented planning process. Major elements of a problem: formulation and conceptualization of problem, plan design, evaluation and implementation. Health planning: institutions, communities and selected population groups, appropriate diagnoses, and programs for addressing needs. Sp

568 Physical Activity and Positive Health (3) (Same as Exercise Science 568.)

569 Fitness Testing, Programming, and Leadership for Diverse Populations (2) (Same as Exercise Science 568.)

580 Special Topics (3) Prerequisite: Consent of instructor. May be repeated for different topics. Maximum 6 hrs.

585 Seminar in Gerontology (1) (Same as Human Ecology 585, Counseling Education and Counseling Psychology 585, Exercise Science 585, Nursing 585, Psychology 585, Educational Studies 585, Social Work 585, and Sociology 585.)

587-88-89 Internship (3,3,3) Internship (community health education or health planning/administration) in either approved organization or research setting under supervision of designated preceptor. Prerequisites: MPH major, one semester advance notice and consent of major advisor. 587: available only for approved extended placements. S/NC only. E

590 Research Methods in Health (3) (Same as Health 590.)
Recreation and Tourism Management

Graduate study leads to a Master of Science degree with a major in Recreation, Tourism and Hospitality Management. Four concentrations are available: therapeutic recreation, recreation administration, tourism, and hospitality management. The thesis option requires 33-36 hours and non-thesis option requires 36-39 hours depending upon the specific concentration. For all thesis concentrations, individuals not possessing an undergraduate degree in the discipline or having appropriate full-time work experience will be required to take 590 (graduate internship).

Requirements for each concentration are:

Hospitality Management

All students (28 hours): Hotel and Restaurant Administration 532, 537, 542; Nutrition 541; Hotel and Restaurant Administration/Nutrition electives (12 hours); related area (6 hours); statistics (3 hours);

Thesis Option (6 hours): 500;
Non-Thesis Option (6 hours): 535; Hotel and Restaurant Administration/Nutrition elective (3 hours); elective (3 hours).

For a description of courses in the hospitality management concentration, see Nutrition.

Recreation Administration

All students (24 hours): 415 or 440, 510, 515, 540, 541; Safety Education 443; Sport Management 512; statistics (3 hours); research methods (3 hours);

Thesis Option (6 hours): 500;
Non-Thesis Option (9 hours): 590 (6 hours); elective (3 hours);

Therapeutic Recreation

All students (24 hours): 420 or 425, 510, 515, 520, 521, 522; statistics (3 hours); research methods (3 hours);

Thesis Option (9 hours): 500; elective (3 hours);
Non-Thesis Option (12 hours): electives (6 hours);

Tourism

All students (30 hours): 470, 510, 515; Hotel and Restaurant Administration 532, 542, Marketing 510; Hotel and Restaurant Administration/Planning 540; Planning 548 or 550; statistics (3 hours); research methods (3 hours);

Thesis Option (6 hours): RTM or HRA 500;
Non-Thesis Option (9 hours): 590 (3-6 hours); elective (3-6 hours).

GRADUATE COURSES

415 Development and Maintenance of Leisure, Sport, Tourism Services (3) Principles of planning, designing, outfitting and operating leisure/sport related facilities such as aquatic centers, tennis complexes, activity centers. Prereq: leisure program development and evaluation, or consent of instructor. (Same as Sport Management 415). F

430 Organization and Administration of Leisure and Tourism 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: consent of instructor. F


450 Specialized Study in Leisure Education (1-6) Special interest leisure activities; developing positive attitudes toward leisure. Demonstrates how leisure contributes to one's mental and physical health. May be repeated. Maximum 6 hrs. E

470 Tourism and Leisure Industries (3) Symbolic relationship between tourism and various sectors of leisure industry. Use of resources, natural and developed, and economic impacts of ventures. Socio-cultural impacts on venue as well as venues impact on local population. Sp

500 Thesis (1-15) S/NC only. E

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. S/NC only. E

510 Perspectives and Trends in Leisure Services (3) Basic role of leisure delivery systems in today's society, scope of leisure services, determinants of leisure behavior, developmental features of leisure and recreation, current trends, problems, laws, and issues affected by and/or affecting delivery of leisure services. Sp

515 Philosophical and Conceptual Foundations of Leisure (3) Philosophy of leisure and recreation; nature of philosophy, constitutive nature of leisure, recreation, play work and other factors, history of field, and relationship of ideas to contemporary society and to professional practice. F

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 wellness delivery systems. Prereq: Consent of instructor. F

521 Facilitation Techniques in Therapeutic Recreation (3) Role of therapeutic recreation in clinical and non-clinical settings: application of life-style planning, safety awareness, risk evaluation and prevention in training in therapeutic recreation, relationship of leisure education to therapeutic recreation. Prereq: 520 or consent of instructor. Su

522 Clinical Aspects in Therapeutic Recreation (3) Concepts and techniques utilized by experienced and advanced therapeutic recreation specialist: clinical issues, comprehensive program concerns, administrative funding and trends in practice of therapeutic recreation services. Prereq: 520. Sp

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. Sp

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 as a maintenance of recreation and sport related facilities. Prereq: Consent of instructor. Su

590 Graduate Internship (3-6) Required of all graduate students. Minimum 50 clock hours for each credit hour. Work experience, evaluation by agency and university and written paper required. E

591 Directed Study in Leisure & Recreation (1-6) Detailed study of theme, issue, or concern. Designed to meet needs of individual students. May be repeated. Maximum 6 hrs. E

592 Special Topics in Recreation & Leisure Studies (1-6) May be repeated. Maximum 6 hrs. E

Safety

Graduate study with a major in Safety Education and Service (thesis and non-thesis options) leads to the Master of Science degree. The M.S. requires completion of 30 semester hours. Students may elect an internship experience with private industry or nonprofit organizations. Curricular experiences will assist graduate in preparation for certified safety professional examination.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. program in Safety Education and Service is available to residents of the states of Alabama, Arkansas, or Florida. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

443 Sports & Recreational Safety (3) Accident prevention and injury control in sports activities; philosophy of sports safety; human environmental factors and interrelationships in sports injury and control; risk-taking and decision solution strategies; and contributions of sports medicine to safety. 3 hrs and 2 labs.

452 General Safety (3) Principles, practices, and procedures in general safety. Safety problems in school, traffic, recreation, industry, home and other public areas. F, Su

500 Thesis (1-15) S/NC only. E

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. S/NC only. E

532 Behavioral Problems in Safety Education & 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. F

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. F

534 Organization, Administration and Supervision of Safety Programs (3) National, state and local level programs; administrative, supervisory aspects. Implementation of relevant programs. Sp

535 Emergency Management (3) Civil and defense problems: tornadoes, floods, fires, mass civil disorders, and nuclear and personnel attack by alien countries. Sp

572 Graduate Workshop in Safety (3) Special safety education problems. For advanced graduate students, teachers, supervisors, and administrators. May be repeated. Maximum 12 hrs.

590 Special Topics (1-3) Advanced study in selected disciplinary or professional area of safety education management. May be repeated. Maximum 12 hrs.

601 Internship/Research in Safety and Health (3-6) Field experience. Significant problem identified, re-
History

(College of Arts and Sciences)

MAJOR DEGREES

History ........................................... M.A., Ph.D.

Russell Buhite, Head

Professors:
Bergeron, Paul H., Ph.D................. Vanderbilt
Buhite, Russell D., Ph.D.............. Michigan State
Chmielewski, Edward V., Ph.D............ Harvard
Culler, Everette W., Ph.D.............. Texas
Farris, W. Wayne, Ph.D................. Harvard
Finger, John R., Ph.D................. Washington
Haas, Arthur G., Ph.D....................... Kentuck
Hao, Yan-Ping (Lindsay Young Prof.), Ph.D...... Chicago
Haskins, Ralph W. (Emeritus)............ Harvard
Klein, Milton M. (Emeritus) (Distinguished Prof.), Ph.D........ Columbia
Moser, Harold, Ph.D................. Wisconsin
Ratner, Lorman A., Ph.D.............. Cornell
Uhley, Jonathan G. (Emeritus)............ Illinois
Wheeler, W. Bruce, Ph.D.................... Virginia

Associate Professors:
Becker, Susan D., Ph.D................. Case Western
Bing, J. Daniel, Ph.D...................... Indiana
Bohlstedt, John, Ph.D................. Harvard
Brummet, Palma R. (Liaison), Ph.D.... Chicago
Diacom, Todd A., Ph.D................. Wisconsin
Johnson, Charles W., Ph.D............ Michigan
Moldovan, John, Ph.D..................... Yale
Pinkey, Paul J., Ph.D....................... Vanderbilt

Assistant Professors:
Ash, Stephen V., Ph.D..................... Tennessee
Bast, Robert J., Ph.D...................... Arizona
Bradley, Owen P., Ph.D............... Cornell
Burman, Thomas E., Ph.D.............. Toronto
Glover, Lorri, Ph.D...................... Kentucky
Haaken, Elizabeth, Ph.D.............. California (Berkeley)
Higgs, Catherine A., Ph.D............. Yale
Luleviculcs, Vejas G., Ph.D............ Pennsylvania

The Department of History offers graduate study leading to the Master of Arts and Doctor of Philosophy degrees. The M.A. 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. Details of the program may be obtained from the Director of Graduate Studies in History who also advises all incoming students.

THE MASTER'S PROGRAM

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

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 M.A. examination. As many as 9 related hours may be taken outside the department. As many as 9 graduate credits taken elsewhere may be applied toward the M.A. 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
Twenty-four hours of coursework and 6 hours of Thesis 500 for a total of 30 hours are required. Thesis students are required to select one M.A. field and write a thesis. At the end of the program the thesis student will stand for a two-hour oral examination on both the thesis and the field.

Non-Thesis Option
A total of 30 hours of coursework is required. At least 6 hours must be completed in each of two M.A. fields. The primary field is examined by a two-hour written taken 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.

M.A. 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. M.A. students must take the M.A. examination no later than the semester following the completion of 30 hours. A student who fails the M.A. examination must repeat the examination no later than the following semester. A student who fails the examination a second time or does not take the examination when required will be dropped from the graduate program.

THE DOCTORAL PROGRAM

Admission Requirements
1. Successful completion of the M.A. degree from an accredited institution.
2. Acceptable scores on the Graduate Record Examination (general).

Residence and Coursework
Before being admitted to doctoral candidacy, a student must:
1. Complete History 510 at UT Knoxville.
2. Complete a minimum 6 related hours outside the department.
3. Spend two consecutive semesters in residence.
4. Complete 9 hours in each of two Group I doctoral fields. (Courses in the non-examined field must be graded A-F. There is no minimum hours requirement for a Group II field. Courses taken to fulfill M.A. requirements may be counted toward this requirement.)
5. Fulfill the foreign language requirement.
6. Complete two 600-level research seminars. (One must be completed at UT Knoxville.) Students who have completed a master's thesis need complete only one research seminar (must be taken at UT Knoxville), and History 621.
7. Maintain a 3.0 overall grade-point average in graduate work attempted.
8. Complete 21 hours of graduate coursework graded A-F at UT Knoxville beyond that required for the M.A.
9. 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.

Comprehensive Examination
The comprehensive examination is to be taken no later than the semester following the term in which the student has completed the residence, coursework, and language requirements. A student stands examination in one field selected from Group I and one field selected from Group II below. Both parts are 4-hours, written, and taken during the same semester. A general oral exam will be taken following the successful completion of the two written portions. The two written and one oral exams are separate examinations, and Group I must be passed before taking Group II, and the latter passed prior to taking the oral portion. A student who fails any one of the three parts (Group I or Group II or the Oral) which constitute the Comprehensive Exam must repeat the failed exam within the same semester, excluding summer. A second failure on any one of the three parts (regardless of which one) will cause the student to be dropped from the History graduate program. Likewise, a student who does not repeat a failed exam within the allotted time (two semesters) will be dropped from the program. Upon successful completion of the residence, coursework, and language requirements and passing the comprehensive examination, 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
Dissertation and Defense

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

GRADUATE COURSES

415 Western Economic Thought Since the 18th Century (3) Methods of study of doctrinal history. Origins and evolution of major doctrines: classical and neoclassical economics, economics of Keynes and his followers, principal developments of second half of 20th century. Major writing requirement. May not be used toward graduate degree in History. Prereq: Introductory Economics or consent of instructor. (Same as Economics 415.)

500 Thesis (1-15) P/NP only. E

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. S/NC only. E

510 Foundations of Graduate Study in History (3) Assumptions and methods of historians. Required of all candidates for advanced degrees. F


531 Topics in Premodern Europe (3) Reading seminar: secondary sources on premodern European movements and trends. Focus varies. May be repeated. Maximum 15 hrs.

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 hrs.

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 hrs.

541 Topics in Early American History (3) Reading seminar: secondary sources on early North American history. Focus varies. May be repeated. Maximum 15 hrs.

542 Topics in 19th-Century United States (3) Reading seminar: secondary sources on 19th-century United States. Focus varies. May be repeated. Maximum 15 hrs.

543 Topics in 20th-Century United States (3) Reading seminar: secondary sources on 20th-century U.S. Focus varies. May be repeated. Maximum 15 hrs.

551 Topics in the History of Foreign Relations (3) Reading seminar: secondary sources on foreign relations. Focus varies. May be repeated. Maximum 15 hrs.

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 hrs.


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 hrs.

557 Topics in Cultural and Intellectual History (3) Reading seminar: secondary sources on cultural and intellectual history. Focus varies. May be repeated. Maximum 15 hrs.

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 hrs.

561 Topics in Latin American History (3) Reading seminar: secondary sources in Latin America. Focus varies. May be repeated. Maximum 15 hrs.

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 hrs.

571 Historical Editing (3) Seminar to develop practical skills applicable to historical editing.

580 Topics in History (3) Reading seminar: secondary sources for new topics. Focus varies. May be repeated. Maximum 15 hrs.

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 hrs.

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. E

621 Directed Readings (3) Directed readings to prepare candidate for doctoral comprehensive examination. May be repeated. Maximum 1 per doctoral field. S/NC only.

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 hrs.

641 Seminar in Early American History (3) Research seminar in primary sources culminating in scholarly paper in American history. Focus varies. May be repeated. Maximum 15 hrs.


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 hrs.


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 hrs.

Holistic Teaching/Learning

(College of Education)

MAJORS

DEGREES

Education .................. M.S., Ed.S., Ed.D., Ph.D.

L. Knight, Leader

Professors:

Alexander, J. Estill (Emeritus), Ed.D. ............... Kentucky
Davis, A. E., Ph.D. .................................. Ohio State
Hargis, Charles H. (Liaison), Ed.D. .................... Colorado State

Harris, G. A., Jr., Ph.D. ......................... Michigan
Huff, P., Ph.D. ................................ Ohio State
Jost, Karl J., Ed.D. .................................. Oklahoma
Knight, Lester N., Ph.D. ......................... Texas
Rowell, C. Glennon, Ed.D. ......................... George Peabody
Schindler, W. Jean, Ph.D. ......................... Kent State
Turner, T. N., Ed.D. .............................. Penn State

Associate Professors:

Chance, Charles A., Ph.D. ........................ Ohio State
Hannum, Michael C., Ed.D. ....................... Northern Colorado

Assistant Professors:

Gilrane, Colleen P., Ph.D. ........................ Illinois
Hendricks, D. A., Ph.D. ........................... Alabama

Instructor:

Butterworth, Jennifer R., Ph.D. .................... Vanderbilt

The Holistic Teaching/Learning unit participates in graduate programs leading to degrees, majors, and concentrations in:

Master of Science

Education

Track 1-elementary education
Track 1-modified and comprehensive special education
Track 1-reading education
Track 1-social science education
Track 2-elementary teaching
Track 2-modified and comprehensive special education
Track 2-secondary teaching

Education Specialist

Elementary education
Reading education
Social science education
Teaching and learning

Doctor of Education

Education

Elementary education
Reading education
Social science education

Doctor of Philosophy

Education

Elementary education
Literacy studies: reading and language arts

The unit also houses programs for students seeking licensure in early childhood, primary, and middle school education (grades K-8 and 1-8), reading endorsement, special education licensure, and secondary social studies. See Education under Fields of Instruction for full description of all degree requirements.

The unit's central emphasis is on holistic, integrative, and interdisciplinary teaching/learning as opposed to teaching disciplinary subject content (e.g., science, mathematics, language arts) as separate entities. The focus on integration is similar to how children learn and how language is central to the teaching/learning process. The faculty believe that students should be prepared as teachers who can facilitate learning rather than merely dispense content. Central to the philosophy of holistic teaching and learning is knowing each individual child's learning style, abilities, and interests.

GRADUATE COURSES

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: Special Education Principles and Special Education Strategies, Admission to Teacher Education Program. Coreq: 420, F.

420Field Experience in Modified Programs (3) Practicum in teaching in modified programs: planning, developing, implementing, and evaluating instruction. Prereq: Special Education Principles and Special Education Strategies, Admission to Teacher Education and Curriculum and Instruction 422. Coreq: 420. S/NC only. F.

421Elementary and Middle School Science and Social Studies Instruction (3) Methods and materials for teaching science and social studies. Development of functional relationships and abilities of the teacher. Not open to students with recent course or background in teaching science and/or social studies. Prereq: Admission to teacher education. F,Sp.

422Elementary and Middle School Teaching Methods I (6) Methods and materials (knowledge base) for teaching reading, writing, language, social studies, and science and social studies. Unit planning, daily planning, evaluation, etc., and language and concept development.

429Language Arts/Reading Instruction in Elementary and Middle Grades (3) Language and language development as applied to teaching of reading (listening, speaking) and aspects of literacy (reading process/readiness and writing). Not open to students with recent course in reading methods. Prereq: Admission to teacher education. F,Sp.


431Field Experience in Comprehensive Programs (3) Prereq: Special Education Principles and Special Education Strategies, Admission to Teacher Education and Curriculum and Instruction 422. Coreq: 430. S/NC only.

432Psychology and Education of Students with Moderate/Severe Disabilities (6) Nature and characteristics of persons with moderate/severe disabilities and educational strategies appropriate for those persons. Prereq: Special Education Principles and Special Education Strategies, Admission to Teacher Education and Curriculum and Instruction 422.

434Topics in Reading Education (1-5) Prereq: Admission to teacher education. For students enrolled in reading education. May be repeated. Maximum 6 hrs. E.

454Teaching Strategies and Issues in Social Studies Education (3) Goals, objectives, techniques, materials, and evaluation; directed observation in public schools, preparation of teaching plans and materials; simulated teaching experiences. Prereq: Admission to Teacher Education Program.

456Speech 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.

470Psychology of the Exceptional Child (3) Variables of exceptional children; general characteristics and educational needs. Implications of developmental variations for functioning as adults. Opportunity to expand study upon particular exceptionalities. Enrollment limited to non-special education majors.

500Thesis (1-15) P/NP only. E

502Registration 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. S/NC only. E.

503Problems in Lieu of Thesis (2-3) May be repeated. Maximum 9 hrs. S/NC only. E.

504Studies and Theory in Language Development (3) Studies and theory of language development in children. Prereq: 1 elementary school language arts course or consent of instructor. F.

505Elementary and Middle School Teaching Methods I (6) Content area teaching and development of educational strategies for each content area. Prereq: 575.

506Internships in Teaching in Special Education and Rehabilitation (3-15) Placement in professional settings in public schools or agencies under supervision of qualified practitioners. Enrollment limited to those in fifth-year program. May be repeated. Maximum 15 hrs. F,Sp.

518Educational Specialist Research and Thesis (3) May be repeated. P/NP only. E.

521Teaching Social Studies in Elementary and Middle Schools (3) Planning and techniques. Trends in curriculum, development of concepts and generalizations, integration of reading and writing. Prereq: Course in teaching of social studies or consent of instructor. Sp.

523Diagnosis and Correction of Children's Difficulties in Learning Mathematics (3) Children's difficulties in learning mathematics and procedures for helping classroom teacher correct difficulties. Prereq: 522 or equivalent or consent of instructor. Sp.


525Strategies, Programs, and Materials for Teaching Elementary Social Studies (3) Analysis of new and innovative social studies program materials and techniques; preparation of innovative social studies education. Prereq: Previous course in teaching of social studies or consent of instructor.


528Teaching Language Arts Elementary and Middle School (3) Recent trends and current materials and methods in teaching elementary language arts (except reading). Prereq: Course in language arts or consent of instructor. Sp, Su.

529Practicum in Diagnosis and Remediation of Difficulties in Learning Mathematics (3) Internship experience with children with difficulties in learning elementary school mathematics. Prereq: 523 or consent of instructor. Su.

530Teaching 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. F, Sp.

534Seminar in Reading Education (1-6) May be repeated. Maximum 6 hrs. E.

536Psychology of Reading (3) Reading act, relationship between learning theory and reading, role of reading in child's overall intellectual development. Affective and cultural factors. Prereq: 500-level course in reading education or consent of instructor. F.

537Diagnosis and Correction of Classroom Reading Problems (3) Procedures, methodologies, materials for diagnosing and correcting classroom reading problems. Prereq: Course in reading education, or equivalent teaching experience, or consent of instructor. Sp, Su.

539Practicum in Diagnosis of Reading Problems (3) Thorough and systematic reading instruction and testing of reading difficulties. Prereq: 523 or consent of instructor. Sp.

553Assessment of Exceptional Students (3) Current issues related to assessment; advanced study of evaluation models for special education populations and other innovative assessment approaches; advanced study of application to educational programming; basic statistics and application in assessment.

554Developmental Reading Practicum (2) Diagnosing and teaching reading difficulties and corrective reading needs. Prereq: Course in diagnosis and correction of reading problems or consent of instructor. May be repeated. Maximum 6 hrs. Su.

555Characteristics of Affective/Motivational Functioning in Children with Disabilities (3) Definition, methods, identification and symptoms of children with affective/motivational development in disabled young persons. Comparison to normal children and that of children labeled disturbed or behavior disordered.

556Instructional 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: 553 or consent of instructor.

557Positive Preventive Discipline (3) Instructional, classroom and preventive/proactive strategies for use in classroom which positively affect efficiency of classroom. Prereq: Course in teaching of social studies or consent of instructor.

558Supervised Readings (1-3) Prereq: Admission to graduate program. May be repeated. Maximum 9 hrs. S/NC or letter grade.


565Seminar in Research Techniques in Special Education (3) Evaluation of appropriate research methodologies with handicapped students.

566Clinical Assessment of Children with Disabilities (3) Current issues related to assessment; advanced study of evaluation models for special education populations and other innovative assessment approaches; advanced study of application to educational programming; basic statistics and application in assessment.

571Clinical Studies (4) Relationship between educational theory and application during internship; research process, development of portfolio, and capstone experience.

573Independent Study (1-3) May be repeated. S/NC or letter grade.

585Supervised Readings I (1-5) May be repeated. S/NC or letter grade.

591Special Topics (1-3) May be repeated. S/NC or letter grade.


599Seminar in Social Studies Education (3) Seminar and practicum experience with children having difficulties in learning elementary school social studies. Prereq: 522 or consent of instructor.

600Doctoral Research and Dissertation (3-15) P/NP only. E.

602Seminar in Reading Education (1-6) May be repeated. Maximum 6 hrs. E.

604 Seminar in Curriculum and Instruction (1-3) Required 2 consecutive semesters. S/NC only. E
606 Research in Elementary Education (3) Analysis of research in elementary education with application to classroom teaching. Prereq: Research course. Su
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 hrs. S/NC only.
617 Trends and Issues in Curriculum and Instruction: An Interdisciplinary Perspective (3) Current trends and issues in field of curriculum and instruction. Prereq: Admission to Ed.S. program.
620 Internship in Research in Special Education and Rehabilitation (3-9) Placement with professional engaged in theoretically-based research. Prereq: Recent course in English, statistics, and research methods. May be repeated. Maximum 9 hrs. S/NC only.
621 Seminar in Social Studies Research and Theory (2) Status of research and theory. Need for related research from other fields, and application of research. Prereq: Recent course in teaching of social studies or consent of instructor. May be repeated. Maximum 4 hrs. E
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 hrs. S/NC 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. Sp
679 Special Topics (1-3) Prereq: Admission to doctoral program. May be repeated. Maximum 9 hrs. S/NC or letter grade.
689 Internship (1-3) Prerequisites in application of principles and practices of curriculum development and instructional improvement. Prereq: Program prerequisites and consent of instructor. May be repeated. Maximum 9 hrs. S/NC only. E
693 Independent Study (1-3) May be repeated. S/NC or letter grade. E
694 Supervised Reading (1-3) May be repeated. S/NC or letter grade. E
695 Special Topics (1-3) May be repeated. S/NC or letter grade. E

Human Ecology
(College of Human Ecology)

MAJOR

Human Ecology .................................................. Ph.D.

The College of Human Ecology offers the Doctor of Philosophy degree with majors in Human Ecology.

ADMISSION REQUIREMENTS

A completed file for review includes the Graduate School application, Graduate Record Examination (GRE) scores for the general section, and three Graduate School Rating Forms completed by individuals who can attest to the potential for graduate education. Forms may be obtained from the Dean's Office, College of Human Ecology.

THE DOCTORAL PROGRAM

Graduate study leading to the Doctor of Philosophy degree with a major in Human Ecology is available in the Departments of Child and Family Studies; Health, Leisure, and Safety Sciences; Human Resource Development; Nutrition; and Textile, Retail, and Consumer Sciences. Concentration areas are child development, family studies, community health, human resource development, nutrition science, textile science, and retail and consumer sciences. A major challenge of the doctoral program in Human Ecology is to draw upon basic research generated from the natural sciences, social sciences, humanities, and the arts, and to provide a holistic perspective that contributes to the improvement of individual and family well-being. Within the College of Human Ecology, research from one discipline is enhanced by encompassing and utilizing the findings of research from other disciplines.

The Ph.D. is a research degree granted only to individuals who demonstrate proficiency in conducting original research. Course requirements for the degree are determined by the student's faculty committee, based upon college and departmental requirements and student needs and interests. The Graduate School sets minimum requirements for the doctoral degree.

More specific information about the course of study is given under the individual academic departments that administer the Ph.D. concentrations.

MINOR IN GERONTOLOGY

An interdepartmental/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 Human Ecology, Education, 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 work within an aging society.

Declaration of a Minor

Prior to earning more than one-half of the total hours required for this minor, students must complete a "Declaration of a Minor in the College of Human Ecology" form. Copies of this form are available in the Dean's Office, Room 110, Jessie Harris Building.

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 needs to comply with the following framework:

1. 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, Psychosocial Studies 585, Social Work 585, and Sociology 585. S/NC only.
2. Applied practicum: 2 hours required. Students should register under practicum experiences in the "home" department of the supervising faculty.
4. Successful completion of a written comprehensive examination covering subject matter of the minor.

Graduate Committee

At least one faculty member from the Graduate Policy Committee who is qualified to work with graduate students, must serve on the graduate committee of each student who declares a gerontology minor. Contact Dr. Jim Moran, Associate Dean in Human Ecology, for a current list.

Admission to Candidacy

When application is made for admission to candidacy, indication of the minor must be noted on the Admission to Candidacy form.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The Ph.D. program in Human Ecology is available to residents of Alabama, Kentucky, Mississippi, and Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E
502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when he/she uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
510 Integrative Nature of Home Economics (3) History and philosophy of home economics. Analysis of current programs and future directions in the field. Examination of research, integrative frameworks, etc.
520 Directed Study in Human Ecology (1-3) Integrative topics. Prereq: At least 9 hrs of graduate study in college including courses from at least two departments or consent of instructor. May be repeated. Maximum 6 hrs. E
525 Practicum in Human Ecology (1-6) Field based experiences. Prereq: Consent of instructor. E
545 Evaluation in Home Economics Education (3) Assessment of programs and pupil progress; techniques, methods and purposes. Prereq: 540; Coen: 575. F, Sp
563 Family Life Education Programs (3) (Same as Child and Family Studies 563.)
574 Analysis of Teaching for Professional Development (2) Strategies to document and analyze effectiveness of teaching and of professional development. Study and application of approaches. Coen: 575. F
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. S/NC only. F, Sp
580 Special Topics in Home Economics Education (1-3) Current issues and trends in home economics. Prereq: Consent of instructor. May be repeated. Su, A
581 Directed Study in Home Economics Education (1-3) Prereq: Consent of instructor. May be repeated. E
585 Seminar in Gerontology (1) Scope of gerontology as discipline and as related to academic and professional disciplines. Speakers both internal and external to UTK. Prereq: Consent of instructor. May be repeated. Maximum 3 hrs. (Same as Counselor Education and Counseling Psychology 585, Exercise Science 585, Nursing 585, Public Health 585, Psychosocial Studies 585, Social Work 585, and Sociology 585.) S/NC only.
591 Clinical Studies (1-4) Group and individual seminar activities during full-time internship. Application and evalu-
organization of professional core competencies. Completion and presentation of portfolio and analysis of teaching project. Coreq: 575.

630 College Teaching and Professional Roles in Human Ecology (3) Instructional effectiveness, techniques, organization and evaluation in college teaching. Systems and ecological theoretical framework. Professional roles and responsibilities related to higher education programs in human ecology. Sp

Human Resource Development
( gorge of Human Ecology)

MAJORS DEGREES
Human Ecology ................................ Ph.D.
Human Resource Development .......... M.S.

Peter J. Dean, Head


Associate Professors: Brewer, Ernest, Ph.D. ........ Tennessee Dean, Peter J., II, Ph.D. .............. Iowa Hanson, R., Ph.D. ........................ Purdue McInnis, Jackie H., Ph.D. .......... Florida State Stout, Vickie J., Ed.D. .................. Tennessee

Assistant Professors: Minb, Cheryl, Ph.D. ........ Virginia Tech Pierce, R., Ph.D. ..................... Ohio State

THE MASTER'S PROGRAM

The Department of Human Resource Development offers a graduate program leading to the Master of Science with a major in Human Resource Development. The program is designed to provide opportunities for graduate students to achieve professional objectives, develop needed competencies, and gain desirable experiences and understanding of human resource development. In addition, a teacher licensure concentration is available. Both thesis and non-thesis options are offered.

General degree requirements are 39 hours (36 hours if statistics is waived) and 36 hours for the thesis option (33 hours if statistics is waived).

Departmental Core: Students must complete 504, 510, 511, and 512. The required departmental core for teacher licensure concentration is 504, 521, 522. Human Ecology 574, Human Ecology 591.

Concentration: Students must complete 12 hours (9 hours for thesis option) from one of the following concentration areas: education (business and marketing education, family and consumer sciences education, industrial education, vocational-technical education),

organizational learning systems, workforce training).

Teacher licensure concentration students must complete 12 hours (9 hours for thesis option) from one of the following concentration areas: business education, family and consumer sciences education, marketing education, technology education.

Statistics (3 hours): May be waived upon committee approval.

Cognate or Related Studies (6 hours): Must support specialization or can consist of additional specialization courses. Not required for teacher licensure concentration.

Culminating Experiences: Thesis Option (6 hours): Problems in Lieu of Thesis Option (6 hours): Internship (6 hours) for students changing career path; Internship Human Ecology 575 (12 hours) required for non-thesis option teacher licensure concentration.

Note: For students in the Nashville area, only the Workforce Training (formerly Industrial Training) is available.

THE PH.D. CONCENTRATION

The Doctor of Philosophy degree with a major in Human Ecology and a concentration in human resource development is designed to provide opportunities for graduate students to achieve professional objectives, develop needed competencies, and gain desirable experiences and understanding of human resource development. Students must possess a Master's degree before acceptance to the program. A minimum of 85 hours above the bachelor's degree is required.

Concentration (21 hours): Must include courses to support Human Resource Development and may be taken from the Master's degree.

Departmental Core (11 hours): Must include 510, 511, 512 or equivalents and 604.

Specialization (12 hours): Must support career path of either university faculty member or manager of education/training.

Cognate (6 hours): Must be obtained from an academic unit outside the department, support specialization, and be represented by a committee member.

Related Studies (6 hours): Research and theory in support of theoretical framework.

Research and Statistics (15 hours): Statistics must include advanced statistics such as multivariate analysis and computer applications, 9 hours minimum; research methodology must include 504 and 610 or equivalents, 8 hours minimum.

Internship (0-6 hours): Required for those changing career path.

Dissertation (24 hours): Must be original research project.

Detailed information regarding the Ph.D. concentration program of study may be obtained from the departmental liaison for graduate studies.

GRADUATE COURSES

401 Utilization of Community Resources (3) Strategies of developing linkages between vocational education and private sector through advisory committees, councils, and working partnerships. Development and management of public relations programs. Prereq: 3 yrs teaching experience. Sp

415 Coordination Techniques (3) Necessary procedures, duties and responsibilities to implement, maintain, and evaluate successful cooperative education program. Prereq: Senior standing and consent of instructor. Sp

430 Principles and Organization of Business and Marketing Education (3) Historical background and development of business and marketing education in business and marketing, curriculum implications, establishing, evaluating, and improving programs.

432 Methods and Materials in Business and Marketing Education (3) Teaching techniques, aids and evaluation in subject matter fields. Prereq: Consent of instructor. F, Su

436 Supervised Occupational Experience (3-9) Practical field experience in business and marketing settings under supervision of practitioner and departmental representative. May be repeated. Maximum 9 hrs.

439 Area of Marketing (3) Marketing, personnel development, operations, and management as affects instructional leadership program in marketing education. Prereq: 432. F, Su

451 Adapting Vocational Instruction for Special Needs Learners (3) Modification of vocational-technical programs for special needs learners. Economic, social, educational and legal considerations for providing relevant vocational-technical education for special needs learners.

454 Training Aids Development (3) Study and preparation of instructional aids and non-print media commonly used by technical instructors and trainers. Prereq: Senior standing or consent of instructor. F, Su

455 Performance-Based Evaluation (3) Assessing effectiveness of training through development of performance-based measures. Evaluation of incumbent worker job performance. Prereq: Senior standing or consent of instructor. Sp, Su

456 Organization and Operation of VICA/HOSA (3) Planning, organizing and implementing youth-club activities in vocational-technical programs. Prereq: Senior standing or consent of instructor. Sp, Su

500 Thesis (1-15) P/NP only. E

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 classes before degree completion. May not be used toward degree requirements. May be repeated. S/NC only. E

503 Problems in Lieu of Thesis (3) May be repeated. Maximum 6 hrs. S/NC only. E


505 Selection, Placement, and Follow-up Procedures In Human Resource Development (3) Methods and procedures utilized in establishing criteria for trainee selection and placement in instructional programs and in jobs. Collecting, analyzing, and reporting follow-up data appropriate for making program improvements. Prereq: Consent of instructor. Sp, Su

506 Developing Organizational Resources (3) Strategies for developing human and organizational resources through community partnerships and learning. Effective utilization of human resources through active learning programs. Sp

509 Internship in Human Resource Development (3) Practical field experiences in selected settings under supervision of practitioner or representative. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

510 Foundations of Human Resource Development (3) Historical, philosophical, economical, social, and psychological foundations of vocational, technical and adult education and human resource development; fundamental principles and contemporary objectives. Prereq: Consent of instructor. F

511 Issues and Trends in Human Resource Development (3) Academic, social, economic, cultural, and other handicaps of special students. Prereq: 9 hrs of graduate credit. F, Su

512 Human Resource Management (3) Process-systems approach to human resource management: interdependent human resource activities (planning, work design, staff development, training and development, compensation, etc.) and organizational goals.
504 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.

505 Neurophysiological and Health Disorders: Educational Implications (3) Neurophysiological, physical, and emotional implications in education. Prereq: 553 or consent of instructor. May be repeated. Maximum 9 hrs. S/NC or consent of instructor.

564 Psychosocial Development of Gifted and Talented Children (3) Phenomena of talent development. Prereq: 553 or consent of instructor. May be repeated. Maximum 9 hrs. S/NC 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 hrs. S, Su.

567 Application of Theory in Early Childhood Education (K-3) (3) Principles and practices from selected theoretical orientations. Prereq: Course in early childhood education or consent of instructor. May be repeated. Maximum 6 hrs. F, Su.

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. Prereq: 553 or consent of instructor.

575 Creative Problem-Solving Strategies for Special Educators (3) Techniques for solving problems encountered by special educators in any setting. Prereq: 553 or consent of instructor.

579 Special Topics (1-3) Prereq: Admission to graduate program. May be repeated. Maximum 9 hrs. S/NC or letter grade.


591 Clinical Studies (4) Relationship between educational theory and application during internship; research project, development of portfolio, and capstone experience. Prereq: 553 or consent of instructor.

593 Independent Study (1-3) May be repeated. S/NC or letter grade. E

594 Supervised Readings (1-3) May be repeated. S/NC or letter grade. E

595 Special Topics (1-3) May be repeated. S/NC or letter grade. E

600 Doctoral Research and Dissertation (3-15) P/NP only. E

604 Seminar in Curriculum and Instruction (1) Required 2 consecutive semesters. S/NC only. E

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 hrs. S/NC only.

620 Internship in Research in Special Education and Rehabilitation (3-9) Placement with professional engaged in theoretically-based research; public school, institutions, agencies or university settings. Prereq: S, Su in statistical and research methods. May be repeated. Maximum 9 hrs. S/NC 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 hrs. S/NC only.


650 Advanced Studies in Early Childhood Education (3) Prereq: 3 graduate courses in early childhood education and consent of instructor. May be repeated. Maximum 6 hrs. S/NC only. E

659 Special Topics (1-3) Prereq: Admission to doctoral program. May be repeated. Maximum 9 hrs. S/NC or letter grade.

669 Internship (1-3) Prereq: Program prerequisites and consent of instructor. May be repeated. Maximum 9 hrs. S/NC only. E

693 Independent Study (1-3) May be repeated. S/NC or letter grade. E

694 Supervised Reading (1-3) May be repeated. S/NC or letter grade. E

695 Special Topics (1-3) May be repeated. S/NC or letter grade. E

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**Industrial and Organizational Psychology**

(Change of Business Administration)

**MAJOR**

**DEGREES**

Industrial and Organizational Psychology ........................................ M.S., Ph.D.

**Robert T. Ladd (Liaison), Director**

**Committee:**

- Fowler, Oscar S., Management
- James, Lawrence R., Management
- Larsen, John M., Jr. (Emeritus), Management
- Rush, Michael C., Management
- Russell, Joyce E. A., Management
- Schumann, David W., Marketing, Logistics & Transportation

The master's and doctoral programs are designed to prepare students for professional, managerial, and organizational research; for university teaching; and for consulting relationships with industry. The program emphasizes the principles of industrial and organizational psychology as applied to behavior, management, and personnel practice. The program provides an interdisciplinary perspective that is consistent with the needs of the modern workforce.

**ADMISSION REQUIREMENTS**

Applicants for admission should request information and application forms from both the Office of Graduate Admissions and Records (218 Student Services Building) and the Director, Industrial and Organizational Psychology Program, (405 Stokely Management Center, The University of Tennessee, Knoxville, TN 37996).

Two separate applications must be completed: one for admission to the Graduate School (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 the Graduate Admissions and Records Office by February 1.

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**GENERAL REQUIREMENTS**

At least one year of college mathematics and one course in statistics are required. Ordinarily, an undergraduate grade point average of 3.5 or above is required. A strong 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, students admitted to the program have performed at or above the 60%-70th percentile on the general tests. (This corresponds to a raw score of approximately 600 on each of the tests.)

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**THE MASTER'S PROGRAM**

A thesis is required with 6 semester hours of Management or Psychology 500. The master's degree can be completed with a minimum of 33 semester hours in the major as follows:

- Management 567, 568 or Psychology 517-18; Psychology 557; Statistics 537, 538.

- Twelve hours of additional coursework to be selected primarily from the following with the approval of the student's advisor: Management 511, 522, 610; Management 625, 626, 627, 638; Psychology 505, 550, 610, 620, 624.

Electives, as approved for an individual's plan of study, may be selected from graduate courses in psychology, social work, sociology, management, education, planning, etc. Students who wish to pursue special research interests aside from their thesis may register for Management 525, 526 (Maximum 6 hrs per term; courses may be repeated) or Management/Psychology 690.

An internship, practicum, or field experience is recommended. A student is expected to be in residence full time one year (two years recommended).

A master's candidate must pass a final oral examination.

In addition to course requirements, a master's student must complete a comprehensive examination in general psychology within no more than two years by attaining a score of 630 or above on the Subject GRE (Psychology-81).

An overall "B" average is required in the course sequence Management 567-68 or Psychology 517-18 to continue in the program beyond the first year.

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**THE DOCTORAL PROGRAM**

Any student in the doctoral program may be required to prepare a master's thesis by the Industrial and Organizational Psychology Committee. This policy will be implemented by the committee at such time as a review of the student's record suggests that additional data on
the qualifications for pursuing a Ph.D. are required.

A dissertation is required with a minimum of 24 semester hours of Management or Psychology 600.

The doctoral degree can be completed with a minimum of 54 semester hours in the major as follows:

Management 567-68 or Psychology 517-18, Psychology 557, Statistics 537-38.

A minimum of five doctoral seminars (15 hours) selected from: Management 610; Management/ Psychology 625, 626, 627, 638; Psychology 620, 624. (Five doctoral seminars are viewed as the absolute minimum; more are recommended. Statistics 671 and Psychology 665 are also recommended.)

Electives, as approved for an individual's plan of study, may be selected from graduate courses in psychology, social work, sociology, management, education, planning, etc. Students who wish to pursue special research interests aside from their dissertation may register for Management 525, 526 (Maximum 6 hrs per term; courses may be repeated) or Management/ Psychology 690.

An internship, practicum, or field experience is recommended. A student is expected to be in residence full-time one year (two years recommended).

Doctoral candidates must pass a final oral examination on their dissertation research.

In addition to course requirements, a doctoral student must attain a score of 650 (90th percentile) on the Subject GRE (Psychology) prior to or during the third fall semester, and successfully complete the qualifying examination covering scientific methodology before or during the third fall semester, and successfully complete the comprehensive examination in the areas of the student's major research and professional interests.

An overall B average is required in the course sequence Management 567-68 or Psychology 517-18 to continue in the program beyond the first year.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. program in Industrial and Organizational Psychology is available to residents of the states of Alabama or West Virginia. The Ph.D. program is available to residents of Alabama, Arkansas, Kentucky, Virginia, or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

Industrial Engineering

(College of Engineering)

MAJOR  DEGREE

Industrial Engineering  M.S.

C. H. Aikens, Head

Professors:

Bontadelli, J. A., P. E., Ph.D.  Ohio State


Associate Professors:


Assistant Professors:

Ford, R. E., Ph.D.  Tennessee Kress, T. A., Ph.D.  Tennessee Sawhney, Rupy S., Ph.D.  Tennessee

The Department of Industrial Engineering offers a graduate program leading to the Master of Science degree with a major in Industrial Engineering, concentrations in traditional industrial engineering and engineering management. The Ph.D. with a major in Engineering Science is available through the Department of Mechanical and Aerospace Engineering and Engineering Science with a concentration in industrial engineering.

THE MASTER'S PROGRAM

Students who enroll in the Master of Science degree may select a concentration in either industrial engineering or engineering management. Admission is open to graduates of ABET-accredited undergraduate programs in engineering, or to graduates of other technical curricula who satisfy prerequisites depending on their academic backgrounds. Policies concerning prerequisite requirements will be determined by the Industrial Engineering faculty.

Industrial Engineering

Under the industrial engineering concentration, students may select either the thesis or non-thesis option. The thesis option requires 27 hours of coursework and 3 hours of thesis. The non-thesis option requires 30 hours of coursework plus a 3-hour design project.

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, manufacturing and production systems, human factors engineering, information systems engineering, maintenance and reliability engineering, or general industrial engineering.

Engineering Management

The engineering management concentration has an additional admission requirement of two years' U.S. industrial engineering experience as a practicing engineer or scientist, or current full-time employment in an appropriate engineering or applied science position. The program is non-thesis and requires 33 hours of coursework plus a 3-hour capstone project. This concentration is fully supported on campus utilizing electronic media for video taping and interactive distance teaching methods.

Note: Any 400-level course required in the Bachelor of Science in Industrial Engineering program at UT Knoxville may not be used for graduate credit in the M.S. degree program.

Industrial Engineering

GRADUATE COURSES


402 Production System Planning and Control (3) Theory and application of forecasting systems, regression analysis and planning for overall quality, reliability, and statistical techniques of production control. Prereq: 400.

403 Production Facilities Design and Material Handling (3) Design of production facilities, plant layout, analysis and planning for overall quality, reliability, and statistical techniques of production control. Prereq: 400.

405 Engineering Economy (3) Methods and problems in selection, replacement, and design of equipment. Decisions among engineering alternatives involving capital recovery, economic life of equipment, and rate of return on investment.


412 Quantitative Methods in Project Management (2) Project planning, scheduling, and control based on network and precedence diagramming methods. Resource allocation and time-cost trade off algorithms, multi-project control, computer applications, and PERT methods of handling uncertainty in activity time estimates.


421 Informational Systems I (3) Systems engineering approach to design, development, implementation, and evaluation of systems of information. Informational aspects of IE systems. Data structures and database management systems. Prereq: Senior standing.

422 Senior Industrial Engineering Problems Analysis (3) Application of industrial engineering to field assignments in local organizations, problem definitions, analysis and presentation. Prereq: 423, 403, and 405.


440 Total Quality Management (3) Philosophy of continuous improvement in organizations: management and implementation issues; definition, identification and analysis of systems; comparison of process analysis and improvement: flowcharts, pareto diagrams, cause and effect diagrams and seven new tools; data collection and control strategies; capability analysis; quality of design, components of variation, measurement issues; issues relevant to continuous processes; managing quality in short-run environments; use of classical statistical tools.
correlation and experimental design to improve system values. Lab. Prereq: Quality Control or consent of instructor.

500 Thesis (1-15) P/NP only. E


523 Linear Programming and Extensions (3) Simplex and revised simplex methods, duality, parametric and post-optimal analysis, and quadratic, separable, integer, goal, and fuzzy linear programming. Prereq: Operations Research or Engineering Management 537.


525 Dynamic System Simulation (3) Discrete, continuous, and combined systems simulation using current simulation software. Systems modeling, design of simulation experiments, and analysis of output. Prereq: Probabilistic and Statistical Models for Scientists and Engineers I.

526 Human Factors and ProductSafety Engineering (3) Role of human factors and safety engineering, legal implications in product design, product liability, and systems safety. Prereq: Probability and Statistics for Scientists and Engineers I. (Same as Industrial Engineering 518.)


529-92-93 Special Topics in Industrial Engineering (3,3,3) Individual or group research projects. Prereq: Consent of instructor. May be repeated.

591-92-93 Special Topics in Industrial Engineering (3,3,3) Individual or group research projects. Prereq: Consent of instructor. May be repeated.

601 Operations Research Models in Engineering Economy (3) Mathematical programming techniques applied to capital budgeting; advanced topics in multiple attribute decision analysis; Bayesian analysis of sequential decision making; applications of game theory in complex decision analysis. Prereq: 525, 528.


603 Advanced Topics in Optimization (3) Multi-stage optimization techniques applied to capital budgeting, advanced topics in multiple attribute decision analysis, and Bayesian analysis of sequential decision making. Prereq: 525, 528.


606 Advanced Topics in Human Factors, Safety and Biomedical Engineering (3) Application of advanced engineering analysis and design methods to human systems analysis and design. Research into system failures: prevention of injuries. Prereq: Consent of instructor.

691-92-93 Advanced Topics in Industrial Engineering (3,3,3) For study individually or in groups. Prereq: Graduate standing and consent of instructor. May be repeated with consent of instructor.

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. S/NC only.

516 Statistical Methods in Industrial Engineering (3) (Same as Engineering Management 516.)

518 Advanced Engineering Economy (3) (Same as Industrial Engineering 518.)

531 Motivation and Culture in Engineering Management (3) Motivational theories and practices to improve individual and organizational capabilities. Success in meeting goals, improving productivity, innovation, and development; personal interrelationship skills. Improvements through organizational structure, policies, and work design. Prereq: 533 or consent of instructor.

532 Productivity and Quality Engineering (3) Productivity and quality measures defined and used to analyze current or proposed engineering systems. Prereq: Consent of instructor.

533 Theory and Practice of Engineering Management (3) Manager perspective: business definition, strategic planning, and management; marketing and competition, and value chain; organizational roles and responsibilities; systems thinking; team building; corporate culture and leadership in new organization; and quality, empowerment, and total quality management. Prerequisite: Application to work settings and case studies.


535 Management of Technology (3) Creativity and innovation; incorporation of advanced technology equipment and software in systems engineering; systems engineering and contract management; application of scientific methods to new ventures. Prereq: 533 and Industrial Engineering 519.

536 Project Management (3) Development and management of engineering and technology projects. Project proposal preparation; resource and cost estimating; 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 of current 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, layout design, and budgeting, and control. Prereq: 536 and Industrial Engineering 519.

538 New Venture Formation (3) Factors other than mechanical or chemical which enter into successful business ventures: the critical decision-making problem in creating an 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.


541 Total Quality Management and Beyond (3) Continuous improvement in capabilities, competitiveness, and productivity of organizations. Principles of total quality management; systems theory and analysis; perfor-
Information Sciences

(Office of the Vice Chancellor for Academic Affairs)

MAJOR DEGREE

Information Sciences .................................. M.S.

W. David Penniman, Interim Director
Kristie Atwood, Assistant Director
Shawn Collins, Budget Officer and Computing Services Coordinator
George Hoemann, Distance Education Coordinator

Professors:

Penniman, W. David, Ph.D. ..................... Ohio State
Purseell, Gary R. (Emeritus), Ph.D. .......... Case Western
Tenopir, Carl, Ph.D. .............................. Illinois
Wilson, P. (Emeritus), Ph.D. .................. Michigan

Associate Professors:

Fisher, Patricia L., Ph.D.......................... Florida State
Pemberton, J. Michael, Ph.D. ................. Tennessee
Pollard, Richard, Ph.D. ......................... Brunel (UK)
Robinson, William C., Ph.D. .................... Illinois
Sinkankas, George M., Ph.D.................. Pittsburgh

Assistant Professors:

Rabar, Douglas, Ph.D. .......................... Indiana
Wang, Pelling, Ph.D. ............................. Maryland
Watson, Jinx, Ed.D. ............................. Vanderbilt
Whitney, Gretchen, Ph.D. ...................... Michigan

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 Ph.D. degree program may also be pursued with a major in Communications, 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 goals and objectives of the school are:

1. To prepare students to understand the nature of information and the role of the library and other information agencies in the management of information resources, and the facilitation of information transfer. Students will demonstrate:

   1. Knowledge of the generation, production, management, dissemination and uses of information.

2. Knowledge of the roles of various organizations/institutions in promoting the flow of information.

3. An understanding of the role of the information professional as mediator between information resources and their users.

4. An understanding of the roles of various tools and technologies in facilitating access to information.

5. An understanding of the structure and content of information resources in various formats and subjects.

6. Knowledge of theoretical and practical evolution of information sciences and technologies and their relationship with other disciplines.

7. Competence in creating, managing and accessing information in a variety of formats.

8. To provide services to the state, region, and nation in association, consulting and continuing education activities which will promote the development and improvement of information systems and services such that the school's contributions reach beyond its immediate academic programs. The school will provide:

   1. Continuing education for information professionals and, on a selective basis, to persons outside the information field.

   2. Advisory services to information organizations.

   3. Leadership for professional associations.

   4. To conduct basic and applied research which promotes the generation of new knowledge, services and technology. The school will encourage:

      1. Research which strengthens its instructional and public service programs.

      2. The use of a variety of research methods.

      3. Sharing the results of its research.

      4. Increased research quality and productivity.

ADMISSION REQUIREMENTS

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 degree.

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 recommendations (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.

THE MASTER'S DEGREE

The program leading to the Master of Science involves a total of 43 semester hours of graduate courses, 16 hours of which form a core curriculum required of all students. Either a thesis or a non-thesis option is available, with 6 hours required for thesis credit. At least 37 hours must be taken in the School of Information Sciences, allowing up to 6 hours outside the school with a maximum of 6 from outside the University.

Core Curriculum

The core curriculum is a 16 semester hour sequence of six courses required of all students: 450, 520, 530, 560, 580. These courses address the evolving information environment; foundations of information sciences and technologies; information resources selection, acquisition and evaluation; information content representation; information access and retrieval. The core curriculum includes a one-hour electronic information and communications laboratory experience required of students during the first semester: 504.

The 16 hour core is prerequisite to all elective courses for students enrolled in the MS degree program. Elective courses may begin in the final semester of core course work with permission of the advisor and the instructor of each elective course selected.

Concentrations

Upon completion of the core curriculum, students may select a concentration from one of the following:

Corporate Information Systems and Services: The concentration includes 15 hours (531, 532, 533, 586, 587) of required courses and 9 hours of elective courses, one selected from each of these groups: information systems (530, 531, 532, 533, 534); information technologies (581, 582, 583, 584, 585, 586); information services (521, 524, 525, 526, 527). The concentration includes 6 hours of Thesis 500 and successful defense or 3 hours of Thesis 500 with permission of the advisor and the instructor of each elective course selected.

Electronic Publishing: The concentration includes 15 hours (531, 532, 533, 534, 535) of required courses plus 3 hours of Thesis 500 for non-thesis option students and six required hours of 500 for thesis option students, as well as 9 hours of elective courses, one selected from each of these groups or all electives selected from one group: development and design aspects (430, 523, 555, 566, 580); standards and technical aspects (567, 583, 584, 585, 589); policy and market aspects (539, 539, Communications 550 or 560). Note: thesis option students may substitute 3 hours of 500 for an elective.

Information Systems and Technology: The concentration includes 18 hours (540, 583, 584 or 586, 587, 588, 589, either); Journalism 460 or 535 or 540); standards and technical aspects (567, 583, 584, 585, 589); policy and market aspects (539, 539, Communications 550 or 560). Note: thesis option students may substitute 3 hours of 500 for an elective.

Scientific and Technical Information: The concentration includes 18 hours (450, 532, 535, 540, 555, 559) of required courses and 9 hours of elective courses.

Youth Services in Public and School Libraries: The concentration includes two specializations: public library youth services and school library media services. Within the concentration, 21 hours (567, 571, 572, 573, 585, 599, one elective) are common and 6 hours are taken in the specialization (library: 554, 592, school library: 475, 551).

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 (IS 500) must be taken within the 43 hours required for graduation. (Students may register for more than 6 hours of 500, but only 6 hours will count toward graduation.) Students must be registered for IS 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 that is taken in the student's last term. A culminating experience (15 hours maximum) is also required which must be completed in one of the student's last two terms with a grade of B or better (or as noted) selected from the following and approved by the student's advisor: 587 Information System Design Project, 590 Problems in Information Sciences, 591 Supervised Readings in Information Sciences, 592 Seminar in Information Sciences, 593 Independent Study, 594 Graduate Research Participation (S/N/C only), 599 Practicum.

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 libraries 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 offer 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 M.S. in Information Sciences, write to Admissions, School of Information Sciences, University of Tennessee, 804 Volunteer Blvd., Knoxville, TN 37996-4330

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. program in Information Sciences is available to residents of the states of Arkansas, Georgia, Virginia, or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

430 History of the Book (3) History of writing and various methods of bookmaking.
450 Writing About Science, Technology and Medicine (3) (Same as Journalism 450.)
475 Utilization of Instructional Media (3) (Same as Education in the Sciences, Mathematics, Research and Technology 475.) E
465 Electronic Communications and Information Resources on Internet (3) Exploration of worldwide information resources, including e-mail, gopher, Archie, Verónica, WAIS, WWW, and newsgroups, F, Sp
490 Information Environment (3) Generation, production, management, dissemination, and use of information. Roles of information in society, information systems, and user behavior; information industry, economics of information products and services, technological and organizational change, information professions, and issues, F, Sp, Su, A
500 Thesis (1-15) P/NP only, E
502 Registration and Use of Facilities (3-15) Required for the student not otherwise registered during the fall and spring semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S, C only, E
504 Electronic Information and Communications Laboratory (1) Methods for creating and managing information in electronic form. Communication of electronic information in networked environment. Location and uses of electronic information resources. For GSIS graduate students only; must be completed satisfactorily in first semester. SNC only. F, Sp
520 Information Content Representation (3) Principles of distinguishing, describing, and indexing intellectual works; current approaches; citation systems, descriptive cataloging, non-subject indexing, and post and post-coordinate subject indexing, classification, and categorization; authority control of index terms; standards, F, Sp, Su, A
521 Cataloging and Classification (3) Basic library-oriented cataloging and classification techniques, tools, and support operations. Descriptive cataloging, choice and form of non-subject entries, classification, authority control, bibliographic utilities, online library catalogs, F
522 Advanced Cataloging and Classification (3) Cataloging and classification of more difficult materials, use of larger classification systems and subject heading systems. Library of Congress Classification, Library of Congress Subject Headings, and introduction to Medical Subject Headings. Prereq: 521, Sp
523 Abstracting and Indexing (3) Philosophies, standards, and procedures for manual and automatic document indexing, back-of-the-indexing, vocabulary control, thesaurus construction, and abstracting.
530 Information Access and Retrieval (3) Media for information storage, logical and physical information structures, query logic and languages, search strategies and heuristics, user interfaces, evaluation of retrieval system performance. Search techniques for various types of databases including multi-media, full-text, numeric, bibliographic, F, Sp, Su, A
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 agencies.
535 Advanced Information Retrieval (3) Bibliographic, non-bibliographic, full-text databases, e.g., non-bibliographic formula and structured databases, full-text databases, patents; document delivery alternatives, evaluation, and testing.
536 Creation and Distribution of Information and Knowledge Resources (3) Historical, political, and technological dimensions of creating, distributing, and institutionalization of information and knowledge from Aristotle's Lyceum to twentieth-century university and research environments.
537 Information Industry (3) Issues and trends concerning the economic, social, cultural, and legal concerns of the industry. 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 various 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 management of information, national and international policy areas relevant to information creation, production, and distribution; development of information policy for organizations.
540 Research Methods (3) Research methods in variety of information environments; primary and secondary research; research project design; research results interpretation; analysis of published research; techniques supporting research process.
550 Management of Information Organizations (3) Supervision and management concepts, strategies, and techniques applicable to information professional working in libraries, archives, records management, and other information organizations.
551 School Library Media Centers (3) Planning, implementing, and evaluating school library programs. Curricular involvement, role of technology, site-based management, relationships with district and state services.
552 Information Centers in Higher Education (3) Development, mission, issues, users, services, and environment of campus information centers including libraries and alternatives; learning resources center and library-computer center models.
553 Corporate Information Services (3) Development and present status, scope and objectives. Information resources external to organizations.
554 Public Library Management and Services (3) Development, roles, political environment, governance, organization, fiscal management, services, marketing, and performance evaluations.
555 Scientific and Technical Communications (3) Evolution of scientific and technical communication; current trends, roles of formal and informal communications; major STI organizations and their roles.
557 User Instruction (3) Theory, strategy, design, and practice in providing instructional services and technology for end users of information and information systems. Includes practical experience.
558 Information Resources Selection, Acquisition, and Evaluation (3) Principles of development and management of collections in information agencies; community analysis; users and uses; policies and procedures; evaluation of items and collections; selecting items to meet particular needs.
561 Contemporary Book Publishing (3) Creation, design, production, marketing, and distribution, various types of publishers.
563 Graphic Design and Media (3) Principles and practice in visual aspects of communications. Graphic design, typography, production techniques and publication design, as these apply to electronic information delivery systems.
564 Corporate Information Systems (3) Objectives and function elements of records systems, archival programs, management information systems and techniques within various types of organizations. Management of information internal to organizations.
566 Environmental Scanning for Information Professionals (3) Principles and practice of environmental scanning; information evaluation and synthesis; role of strategic information in modern organization.
567 Information Network Applications (3) Scholarly and community-based electronic communications. National and international standards, tools, resources; identification, analysis, evaluation, and management of tools and resources, construction of local technologies as developed and applicable.
569 Advanced Production of Audiovisual Software (3) (Same as Education in the Sciences, Mathematics, Research and Technology 569.) F, Sp

572 Resources 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. Su

573 Programming for Children and Young Adults (3) Philosophy and objectives of public and school library services for children and young adults. Reading, listening, and viewing guidance for individuals and groups, Program planning, implementation, and evaluation. Prereq: 571 or 572. Su

574 Adult Materials and Services (3) Popular informational and recreational materials and services to meet adult interests in variety of formats. Development of specialized collections.

580 Foundations of Information Sciences and Technologies (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 informetrics; relationships with other disciplines. F,Sp,Su,A

581 Seminar in Radio and Television (3) (Same as Broadcasting 580.)

582 Library Automation (3) Computer-based applications and systems for libraries including MARC, bibliographic utilities, retrospective conversion, circulation systems, online catalogs, computer-based reference services, acquisitions and serials control, systems planning and implementation.

583 Information Systems (3) Systems concept, defining system, analysis and design of information systems. Selecting and using information systems to support various activities. User involvement in the development process. F,Sp

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 applications using database management system. Sp

585 Information Technologies (3) Evolution, trends, capabilities, and impacts of technologies applied to information capture, storage, preservation, access, and distribution. F,Sp

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 hyper-text.

587 Information System Design Project (3) Supervised and structured experience in design and development of computer-based information systems. Prereq: 583, 584 or 586, 588, and 589. F,Sp

588 Psychology of Human-Computer Interaction (3) Survey of human-computer interaction and introduction to psychological and other behavioral science knowledge and techniques useful in design of computing systems for human use. Basic psychological phenomena of human cognition, memory, problem solving, and language and how these processes relate to and condition interaction between humans and interactive computing systems.

589 Information Networking Technologies (3) Concepts and terminology of information transmission, information network architecture and standards. Contemporar-ry and emerging information networking technologies. F

590 Problems in Information Sciences (3-6) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

591 Supervised Readings in Information Sciences (3-6) Prereq: Consent of instructor. May be repeated with consent of advisor. Maximum 6 hrs.

592 Seminar in Information Sciences (3-6) Prereq: Consent of instructor. May be repeated with consent of advisor. Maximum 6 hrs.

593 Independent Study (3-6) Prerequisite: Consent of advisor. Maximum 6 hrs. F,Sp

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. S/N Only. F,Sp

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. E

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.

### Interdisciplinary Programs

(College of Arts and Sciences)

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, Ancient Mediterranean Civilizations, Asian Studies, Cinema Studies, Comparative Literature, Latin American Studies, Linguistics, Medieval Studies, Russian and East European 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.

### African and African-American Studies

**GRADUATE COURSES**


450 Issues and Topics in African-American Studies (3) Problems, topics, issues, and individuals. May be repeated. Maximum 6 hrs.

452 Black African Politics (3) (Same as Political Science 452.)


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 hrs.

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. E

### American Studies

**GRADUATE COURSES**

510 Special Topics (3) May be repeated. Maximum 6 hrs.

### Ancient Mediterranean Civilizations

**GRADUATE COURSES**

510 Special Topics (3) May be repeated. Maximum 6 hrs.

### Asian Studies

**GRADUATE COURSES**

400 Special Topics (3) May be repeated. Maximum 6 hrs.

420 French Cinema (3) (Same as French 420.)

421 Topics in Italian Literature and Cinema (3) (Same as Italian 421.)

433 Modern Art and Film (3) (Same as Art Media/Photography 433.)

489 Special Topics in Film (3) (Same as English 489)

510 Special Topics (3) May be repeated. Maximum 6 hrs.

### Cinema Studies

**GRADUATE COURSES**

401-02 Special Topics in Comparative Literature (3,3) Content varies. May be repeated. Maximum 9 hrs.

402 Latin American Studies Seminar (3) Selected topics. May be repeated. Maximum 8 hrs.

510 Special Topics (3) May be repeated. Maximum 6 hrs.

### Comparative Literature

**GRADUATE COURSES**

401-02 Special Topics in Comparative Literature (3,3) Content varies. May be repeated. Maximum 9 hrs.

420 Comparative Literature (3) (Same as Political Science 420.)

489 Special Topics in Film (3) (Same as English 489.)

510 Special Topics (3) May be repeated. Maximum 6 hrs.

### Latin American Studies

**GRADUATE COURSES**

510 Special Topics (3) May be repeated. Maximum 6 hrs.

### Linguistics

**GRADUATE COURSES**

400 Topics in Linguistics (3) Content varies. May be repeated. Maximum 6 hrs.

411 Linguistic Anthropology (3) (Same as Anthropology 411.)

420 The Development of Historical Linguistics as a Science (3) Scientific understanding of language change. Emergence of Neogrammarian paradigm from 19th-century intellectual trends. Impact of synchronic, descriptive, structural and transformational-generative linguistics on contemporary diachronic theory. Prereq: 6 hrs of courses required for linguistics concentration or consent of instructor.

425 Introduction to Descriptive Linguistics (3) (Same as French 425, German 425, Russian 425, and Spanish 425.)
510 Special Topics (3) May be repeated. Maximum 6 hrs.

422 Women Writers in Britain (3) (Same as English 422.)

425 Women's Health (3) (Same as Health 425.)

434 Psychology of Gender (3) (Same as Psychology 434.)

466 Rhetoric of the Woman's Rights Movement to 1930 (3) (Same as Speech Communication 466.)

476 Rhetoric of the Contemporary Feminist Movement (3) (Same as Speech Communication 476.)

483 African-American Women in American Society (3) (Same as African and African-American Studies 483.)

510 Special Topics (3) May be repeated. Maximum 6 hrs.

**Journalism**

(College of Communications)

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<th>MAJOR</th>
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<tr>
<td>Communications</td>
<td>M.S., Ph.D.</td>
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James A. Crook, Director

Professors:

- Adamson, June N. (Emeritus), M.S., Tennessee
- Ashdown, Paul G., Ph.D., Bowling Green
- Bowles, Dorothy, Ph.D., Wisconsin
- Cade, Dozier C. (Emeritus), Ph.D., Iowa
- Caudill, C. Edward, Ph.D., North Carolina
- Crook, James A., Ph.D., Iowa State
- Everett, George A. (Emeritus), Ph.D., Iowa
- Haskin, Jack B. (Emeritus), Ph.D., Minnesota
- Lain, John L. (Emeritus), M.A., Iowa
- Leiter, B. Kelly (Emeritus), Ph.D., Southern Illinois

Associate Professors:

- Dimnick, Susan L., Ph.D., Michigan State
- Heizer, Robert B., M.A., Syracuse
- Morrow, Jerry L., Ph.D., Toledo

Assistant Professors:

- Foley, Daniel, M.S., Northwestern
- White, Candace L., Ph.D., Georgia

The School of Journalism offers a concentration area for the master's with a major in Communications and participates in the interdisciplinary doctoral program. See Communications for additional information.

**Journalism**

<table>
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<th>GRADUATE COURSES</th>
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| 403 International Communications (3) Development and operations of world mass communications channels and agencies. Comparative analysis of media, media practices, and flow of news and information. |}

**GRADUATE COURSES**

| 403 International Communications (3) Development and operations of world mass communications channels and agencies. Comparative analysis of media, media practices, and flow of news and information. |

| 412 Opinion Writing (3) Analysis of editorial positions, practices, and pages. Writing of editorials and columns for newspapers, magazines, and company publications; study and use of rhetorical devices and logic. Prereq: Writing for Mass Communication or consent of instructor. (Same as Public Relations 412.) |

| 414 Magazine Article Writing (3) Techniques of writing in-depth articles of mass circulation and specialized magazines. Organizing and presenting material, problems in specialized areas: business, science, agriculture, humanities. Prereq: Communications 200, or consent of instructor. |

**Russian and East European Studies**

**GRADUATE COURSES**

| 401-02 Advanced Grammar, Conversation, and Composition (3,3) Prereq: Russian Composition and conversation or equivalent. (Same as Russian 401-02.) |

| 451 Senior Seminar (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. (Same as Russian 451-52.) |

**Urban Studies**

**GRADUATE COURSES**

| 401 The City in the U.S. (3) (Same as Planning 401.) |

| 441 Urban Geography (3) (Same as Geography 441.) |

| 464 Urban Ecology (3) (Same as Sociology 464.) |
**Public Relations**

**GRADUATE COURSES**

412 Opinion Writing (3) (Same as Journalism 412.)

416 Issues in Public Relations (3) Topics vary. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

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: Public Relations Principles or equivalent. F, Sp

516 Seminar in Public Relations Issues (3) Topics vary. May be repeated. Maximum of 6 hrs.

520 Press-Government Relations (3) (Same as Journalism 520.)

525 Public Opinion (3) (Same as Journalism 525.)

571 Public Relations Management (3) Analysis and management of problems in communication between institutions and organizations and their publics. Measurement and evaluation of effectiveness of communication programs. Prereq: 470 or consent of instructor.

597 Independent Study (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

598 Internship (3) Professional work in journalism supervised by editor or manager with faculty approval. No retroactive credit for previous work experience. Prereq: Completion of core curriculum.

**At Education**

**GRADUATE COURSES**

510 Isley and Isolophy o Art Education (3) United States from 1860'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 disciplines based art education.

540 Instructional Materials and Production Related to the Teaching of Art (3) Development and use of instructional aids concerned with all aspects of teaching art. Videotapes, audiotapes, slides, charts, and learning packs.

590 Special Topics in Art Education (3-6) Prereq: Consent of instructor. May be repeated. Maximum 5 hrs.

**Language, Communication, and Humanities Education**

**GRADUATE COURSES**

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 language and Latin. Prereq: Completion or near completion of foreign language 400 hours for certification and Admission to Teacher Education Program.

459 Teaching English in the Secondary School (3) Techniques of teaching composition, language, and literature. Prereq: Admission to Teacher Education Program.

460 Teaching Reading and Literature in the Secondary School (3) Approaches for teaching basic reading skills and ways of teaching literature. Sp

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. E

500 Thesis (1-15) P/NP only. E

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. S/NC only. E


507 Teaching Poetry Grades 7-12 (3) Research and theory in application to teaching of poetry. Design of strategies and materials for teaching reading and writing and reading of poetry. Review of textbooks and materials. F

508 Teaching Composition in the Secondary School (3) Teaching narrative, description, exposition, and argumentation; writing process and marking of student papers. Sp

509 Teaching Fiction in the Secondary School (3) Teaching of novels and short stories. F

518 Educational Specialist Research and Thesis (3) May be repeated. P/NP only. E

521 Interdisciplinary Aesthetics (3) Discussion, visual and audio presentations concerned with aesthetic considerations of art: history, philosophy of art, theory, literary influence, music, visual arts and drama.

533 Reading in Community College: Research and Theory (3) Analysis of components of effective community college reading programs. Attention to research and theoretical bases. Prereq: Course in reading education or consent of instructor. Su

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.

579 Teaching English as a Second Language (3) Instructional methods, utilization of assessment procedures to diagnose English proficiency; materials for non-native speaker in K-12 classroom. Required for Tennessee ESL (K-12) license. Prereq: 578 or consent of instructor. Sp


590 Seminar in Teaching English in Secondary Schools (3) Content varies. Theoretical and practical approaches to teaching English in secondary school. May be repeated. Su

592 Linguistics and the Teaching of English (3) Grammar, usage, semantics, dialectology, history of language, and lexicography. Su

593 Independent Study (1-3) May be repeated. S/NC or letter grade. E

594 Supervised Readings (1-3) May be repeated. S/NC or letter grade. E

595 Special Topics (1-3) May be repeated. S/NC or letter grade. E

597 Teaching Drama Grades 7-13 (3) Strategies and materials for teaching creative dramatics, enacting and writing of plays, reading of scripts. Sp

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. Sp
Large Animal Clinical Sciences

See College of Veterinary Medicine and Comparative and Experimental Medicine

Law

(College of Law)

MAJOR DEGREES

DEGREE OF DOCTOR OF JURISPRUDENCE

The degree of Doctor of Jurisprudence will be conferred upon candidates who complete, with the required average, six semesters of resident law study and who have 88 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 J.D. degree is awarded for grades of D- or F.

Eligible law students may receive up to six (6) semester hours of credit toward the J.D. degree for acceptable performance in upper-level courses that materially contribute to the study of law and which are taken in other departments at The University of Tennessee. 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
841 Contract Drafting Seminar
833 Representing Enterprises

None of the above courses may be taken on an S/NC basis (with the exception of 826).

*This course is not required for students who have an undergraduate major in accounting, finance, or business administration, who hold the MBA degree, or who are enrolled in the dual J.D.-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
905 Advocacy Clinic
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 S/NC basis.

DUAL J.D.-MBA DEGREE PROGRAM

The College of Business Administration and the College of Law offer a coordinated dual degree program leading to the conferral of both the Doctor of Jurisprudence and the Master of Business Administration degrees. A student pursuing the dual program is required to take fewer hours of coursework than would be required if the two degrees were to be earned separately.

Admissions

Applicants for the J.D.-MBA program must make separate application to, and be competitively and independently accepted by, the College of Law for the J.D. degree and The Graduate School and College of Business Administration for the MBA degree, and by the Dual Degree Committee. Students who have been accepted by both colleges may commence studies in the dual program at the beginning of any term subsequent to matriculation in both colleges provided, however, that dual program studies must be started prior to or together with the last 28 hours required for the J.D. degree and the last 16 hours required for the MBA degree.

Curriculum

A dual degree candidate must satisfy the graduation requirements of each college. Dual degree students withdrawing from the dual degree program before completion of both degrees will not receive credit toward graduation from either college for courses in the other.
Admission

Applicants for the J.D.-M.P.A. program must make separate application to, and be independently accepted by, the College of Law for the J.D. degree and the Department of Political Science and The Graduate School for the M.P.A. 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 M.P.A. program. Application may be made prior to matriculation in either the J.D. or the M.P.A. program, but application to the dual program must be made prior to entry into the last 29 semester hours required for the J.D. degree and prior to entry into the last 16 hours required for the M.P.A. degree.

Curriculum

A dual degree candidate must satisfy the requirements for both the J.D. and the M.P.A. degrees, as well as the requirements for the dual program. The College of Law will award a maximum of 9 semester hours of credit toward the M.P.A. degree for successful completion of approved graduate level courses (500 or 600 level) offered in the Department of Political Science. The M.P.A. program will award a maximum of 9 semester hours of credit toward the J.D. 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 J.D.-M.P.A. coordinators in the College of Law and the Department of Political Science. All candidates for the dual degree must successfully complete the Administrative Law (Law 821) and are encouraged to take Local Government (Law 824). An internship is strongly recommended for students in the dual program, as it is for all M.P.A. 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 M.P.A. program. During those first two years, students may not take courses in the opposite area without the approval of the J.D.-M.P.A. 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 J.D. or the M.P.A. degree for courses taken in the other program except as such courses qualify for credit without regard to the dual program.

TAKING LAW COURSES

Grades

All courses for which the student earns a grade of B or higher and a grade of No Credit for any lower grade. The official academic record of the student maintained by the Registrar of the University shall show the actual grade assigned by the instructor without conversion.

POLICY FOR GRADUATE STUDENTS 

TAKING LAW COURSES

Students pursuing a graduate degree in another college may, upon approval of the College of Law and the major chairperson, take up to 6 semester hours of law courses and receive credit toward the graduate degree. The 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 J.D.-M.B.A. or J.D.-M.P.A. 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 grade point average for law courses only will be carried until graduation, at which time both the graduate and the law cumulative will be shown on the permanent record.

PROFESSIONAL COURSES

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.
809 Criminal Law (3) Substantive aspects of criminal law; general principles applicable to all criminal conduct; specific analysis of individual crimes; defenses to crimes.

810 Property (4) Introductory course treating issues of ownership, possession, and security interests in the areas of landlord and tenant, co-ownership and marital property; real estate sales agreements and conveyances; title assurance and recording statutes; evidentiary aspects of nuisance law, eminent domain and zoning.

812 Constitutional Law 1 (3) Judicial review, limits on judicial power; national legislative power; regulation of commerce; power to tax and spend; other sources of national power; treaties; federal taxation and regulation of commerce; intergovernmental immunities.

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.

816 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 formal 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.

824 Local Government (3) Distribution of power between state and local governmental units; sources of authority for limitations on local government operations; creation of local boundaries;home rule; problems created by fragmentation of local government units; financing of local services; influence of federal programs on local government finance and decision-making.

826 Introduction to Business Transactions (2) Non-technical introduction to accountancy, finance, and the functional relationships among the various actors in business transactions. Analysis of business transactions with view toward needs of business clients. Not available for students with business background.

827 Business Associations (4) Legal problems associated with formation, operation, and dissolution of unincorporated and incorporated business firms; legal rights of duties of firm members; principals and agents, partners and limited partners, managers, and governors of limited liability companies, and corporate shareholders, directors, and officers; and others with whom members interact in connection with firm's business.

828 Corporate Finance (3) Legal issues arising in conjunction with corporate financial transactions: issuance of debt and various types of equity securities, distributions to shareholders, mergers and other corporate acquisitions. Legal valuation of corporate securities.

830 Securities Regulation (3) Basic structure of federal securities law. Legal problems associated with raising of capital by new and growing enterprises; securities transactions by promoters, officers, directors and other insiders; regulation of public-held companies; litigation under Rule 10b-5 and other antifraud provisions; and provision of legal and other professional services in connection with securities transactions. Recommended prereq: cor: 827.

833 Representing Enterprises (3-5) Capstone course for concentration in business transactions. Simulated business transactions and completion of major planning and drafting project. Topics include: initial organization of new business, acquisition of existing business, development of real estate project, various financing transactions and corporate reorganization. Exploration 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 and 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.

846 Constitutional Law II (3) First Amendment rights to freedom of religion, expression, association and press; Fourteenth Amendment rights against discrimination as to race, sex, etc.; rights to franchise and apportionment; substantive and procedural rights under federal laws enforcing post-Civil War Amendments to Constitution.

848 Civil Rights Acts (3) Litigation to vindicate constitutional rights in private actions against the government and its officials 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.

854 Criminal Procedure I (3) Police practices and constitutional rights of persons charged with crimes: arrest, search, 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.

856 Employment Law (3) Legal regulation of employment relationships; legal, social and economic influences on employee-employer relationships; employment discrimination; legally prescribed minimum standards of compensation and safety; restraints on termination of employment; regulation of retirement systems.

858 Arbitration Seminar (2) Arbitration of labor agree- ments: judicial and legislative developments; nature of procedural relationship to collective bargaining contracts; presentation of arguments including discussion of arbitration problems on various topics under collective agreements; and role of lawyers and arbitrators. Prereq: 856.

859 Family Law (3) Survey of laws affecting informal and formal 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, alienation, and property settlement; child custody and child support; adoption; illegitimacy.

866 Environmental Law and Policy (3) Study, through methods of public policy analysis, of responses of legal systems to ecological change. Topics include: Clean Air Act; Clean Water Act; National Environmental Policy Act; and selected regulatory issues.

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 examination of economic analysis of law. Designated for students with no undergraduate background in economics or mathematics.

881 Law and Literature (3) Reading literary works, development of philosophy and reading technique applicable to both law and life.

882 Family Law (3) Survey of laws affecting informal and formal family relationships: premarital disputes, antenuptial contracts; creation of common law and formal marriage; legal effects of marriage; support obligations within family; legal separation, annulment, divorce, alienation, and property settlement; child custody and child support; adoption; illegitimacy.

883 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.

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 (3) Legal status of persons abroad; acquisition and use of property within a foreign country; doing business abroad as a foreign corporation; engaging in business within a foreign country; acquisition or annulment of contracts or concessions.

889 International Law Seminar (2) Current international law problems. Prereq: 886 or 887.

895 Children and the Law (3) Political, social, and economic influences in development of federal labor relation- ship law; employee rights in unions; federal and employer unfair labor practices; strikes, lockouts, boycotts, and collective bargaining processes; enforcement of collective agreements; individual rights of employees; federal preemption and employer regulation.

896 Employment Law (3) Labor law regulating employment relationships; legal, social and economic influences in employee-employer relationships; employment discrimination; legally prescribed minimum standards of compensation and safety; restraints on termination of employment; regulation of retirement systems.

897 Labor Relations Law (3) Political, social and economic influences in development of federal labor relation- ship law; employee rights in unions; federal and employer unfair labor practices; strikes, lockouts, boycotts, and collective bargaining processes; enforcement of collective agreements; individual rights of employees; federal preemption and employer regulation.

898 Arbitration Seminar (2) Arbitration of labor agree- ments: judicial and legislative developments; nature of procedural relationship to collective bargaining contracts; presentation of arguments including discussion of arbitration problems on various topics under collective agreements; and role of lawyers and arbitrators. Prereq: 895.

899 Arbitration Seminar (2) Selected labor rela- tions law problems. Prereq: 895.

905 Advocacy Clinic (5) Supervised field work requiring student to assume substantial responsibility for representing clients with various civil and criminal legal problems. Exploration and development of fundamental professional skills involved in self-organized legal practice; interviewing and counseling clients, negotiating with other attorneys, planning for transactions and dispute resolutions, initiating and defending claims, exercising investigatory and presenting evidence. Prereq: 902 and third-year standing.

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.

917 Remedies (4) 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 settlement, trial problems and trial strategy; professional responsibility; fact investigation and witness preparation; discovery and presentation of evidence; selection and instruction of expert witnesses and writing arguments. Written work: pleadings, motions, interrogatories, and memoranda. Coreq: 913 for students electing concentration in advocacy. Prereq: 913 for all other students.

921 Pre-Trial Litigation (3) Civil pre-trial process: Drafting of actual client documents in all cases; compliance, 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 techniques: advanced direct and cross-examination, expert witness preparation and examination, jury instruction, technology in courtroom, and motion practice. Prereq: 920.

923 Complex Litigation (3) Advanced civil procedure course dealing with the tactics and issues involved in litigation involving multiple claims and multiple parties; permissive and compulsory joinder; intervention; duplicative or related litigation; class actions; discovery in complex cases; judgment as a control of complex litigation; redress and collateral estoppel problems.

925 Appellate Practice Seminar (2) Federal and Tennessee Rules of Appellate Procedure, local rules of federal circuits; review of complete records of several United States Supreme Court cases and preparation of an appellate brief based on record of actual case.

927 Interviewing, Counseling and Negotiation (3) Development of conceptual and practical frameworks for understanding interviewing, counseling, and negotiation, and lawyer's role in negotiating. Development of interview skills and techniques. Realistic 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.

929 Teaching Clients the Law (3) Communication of law as basis for decision by persons other than lawyers. Development of skills by teams-teaching a practical law course to high school or adult students and by writing research papers that synthesize Tennessee or federal law in plain language.

935 Gratuitous Transfers (4) Nature, creation, termination, and modification of trusts; fiduciary relationships; intestate succession; execution, revocation, probate and contest of wills; creation and construction of various types of future interests; power over property; limitations; applicability of the rule against perpetuities.


940 Land Finance Law (3) Financing devices: mortgagee, deed of trust, prime lien, secondary lien, and covenants. Problems of priorities; transfer of secured interests when debt assumed or taken subject to security interest; default, exercise of equity of redemption and statutory right of redemption; mechanics lien law; condemnation; 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 servitudes, and home owner associations; public land use controls, zoning, subdivision controls, eminent domain, and regulatory takings.

950 Computers and Law (3) Impact of computers on law and legal practice: expert systems; legal research required in building expert systems; common law office uses of computers; and computerized research. Prereq: 818. This course cannot be effectively used concerning use of computers. Prior computer experience is 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 contracts; talent negotiations; labor unions; and performing right organizations.

957 Law, Science and Technology (3) Legal implications of advanced technologies: adoption of law to challenges posed by new kinds of knowledge and new solutions to scientific questions. Biotechnology, regulation of scientific research, space law, legal implications of truth determination and identity technologies, and others designated by instructor.

958 Women and The Law (3) Treatment and status of women in American legal system: women in political, family, and economic roles; women as targets of violence and as members of legal profession. Introduction to current approaches and trends in sex equality in the law.

959 Intellectual Property (3) Intellectual property and related interests under federal and state law; patents; trademarks; trade secrets; copyright; right of public performance; unfair competition.

962 Law and Medicine Seminar (2) Problems of medical malpractice: 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 confidentiality; consent, informed consent, conception and abortion, choice of treatment, and death and dying; control of communicable diseases; organ transplantation and medical resource allocation.

970 Income Tax II (3) Corporate reorganizations and distributions; transactions among corporation and shareholders. Prereq: 816.

972 Income Taxation of Business Organizations (3) Survey and comparison of income tax treatment of partnerships, subchapter C corporations, subchapter S corporations, and limited liability companies; introduction to tax research and business planning. Required written exercises: drafting of portions of partnership agreements, opinion letters, and legal memoranda. Prereq: 816.

973 Wealth Transfer Taxation (3) Taxation of 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 federal and state tax systems. Income tax, property tax, sales tax, estate and gift tax, consumption tax, sales tax, and value-added tax. Required preparation of observatory 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; insurance companies, agencies and brokers, and representations; coverage and exclusions; duties of agents; excess liability; subrogation; and bad faith actions against insurers. Liability insurance defense problems.

983 Products Liability (3) Scope of doctrines of recovery; potential plaintiffs and defendants; statutory and contractual limitations on recovery; damages, causation, and defenses.

985 Social Legislation (3) Systems other than traditional legal systems for compensating victims of work-related accidents and diseases, and for compensating disabled persons. Workers' compensation; requirements for covered employers and employees; workers' compensation; accidents; disability; and death benefits; exclusions of compensation; remedies against employer and co-employees; and rights and liabilities of non-employees; administration and ethical aspects of workers' compensation practices and various law reform measures. Brief introduction to and sampling of cases involving Social Security disability claims.

990 Issues in the Law (3) Selected topics. May be repeated.

991 Issues in the Law Seminar (2) Selected topics. May be repeated.

992 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 per 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 per semester during last three semesters of study.

996 Law Review (1) Completion of a potentially publishable case note, comment, or other article for the Tennessee Law Review. May be repeated. S/NC only. (Will not count toward total number of elective upper division courses taken S/NC.)

997 Moot Court (1) Participation as member of faculty-supervised interscholastic moot court competition. May be repeated. S/NC only. (Will not count toward total number of elective upper division courses taken S/NC.)

998 Planning and Drafting Project (1) Preparation and completion of planning and drafting project under faculty supervision in conjunction with substantive courses when such planning and drafting project is provided by course instructor. May be repeated.

Leadership Studies in Education (College of Education)

MAJORS

DEGREES

College Student Personnel ..................... M.S. Education ................................ Ed.S., Ed.D., Ph.D. Leadership Studies in Education ..................... M.S.

Grady Bogue, Leader

Professors:

Bogue, Grady (Liaison), Ed.D. ................ Memphs State University
Harris, G. W., Jr., Ph.D. ......................... Michigan State University
Mertz, Norma T., Ed.D. ......................... Columbia University
Ubben, Gerald C., Ph.D. ....................... Minnesota State University

Associate Professors:

Aper, Jeffrey P., Ph.D. ......................... VPI
Connelly, Mary Jane, Ed.D. .................. VPI

The Leadership Studies in Education unit participates in graduate programs leading to degrees, majors, and concentrations in:
students should contact the unit for further
among other requirements, a two-year, on
program. This alternative residence involves, educational units of government and
corporate community and human service agencies, adult diverse settings of schools and colleges,
and instruction to leaders who will serve in
degrees. Full description of all degree requirements.

Supervision

 applicant must also interview with all faculty forms or letters of recommendation. The Ed.D.

ADMISSION REQUIREMENTS

General test of the Graduate Record Examination; writing sample if GRE verbal is below 50th percentile; leadership potential judged by activities in organizations; and rating forms or letters of recommendation. The Ed.D. applicant must also interview with all faculty members on campus or elsewhere.

Educational Administration and Supervision

GRADUATE COURSES

513 Administrative and Organizational Theory in Education (3) Introduction to theoretical administrative and organizational foundations of management and leadership of educational programs and institutions. F, Su

515 Human Relations and Communication in Administration (3) Development and use of effective interpersonal communication skills and channels, intergroup relations, supportive work climates, personnel motivation, conflict management skills, and role of values, attitudes, and expectations in administration. F, Su

516 Research for School Administrators (3) Descriptive, experimental, and quasi-experimental designs to help students without quantitative backgrounds to read and understand technical professional literature. Introduction to inferential statistics, needs assessments, and evaluation procedures. Sp, Su

529 Politics of Education and Educational Environments (3) School/community relations in political context of modern, complex society. Administrator and supervisory competencies: political, social, emotional, cultural, and racial environments in which schools operate. Prereq: M.S. introductory core or consent of instructor. F, Su

535 Administrative Applications of Micro Computers (3) Word processing, data base management, spreadsheet, and computer communications. Review and development of specific administrative applications: scheduling, attendance, student record systems, and accounting. F, Su

544 School Finance and Business Management (3) For prospective building level administrators. Financial and logical management tasks and procedures in individual school setting. Prereq: M.S. Introductory core or consent of instructor. F, Su

547 Educational Facility Planning (3) Concepts and skills for development, evaluation, construction, renovation, maintenance, and operations of quality educational environments and facilities. Prereq: M.S. Introductory core or consent of instructor. Sp, Su

548 Introductory Supervision and Personnel (3) Basic supervisory and personnel concepts and related competencies; building (or micro-organizational) level; interviewing, personnel services, collecting, maintaining employee information, supervision of instructional and non-instructional personnel, clinical supervision, and evaluation. Prereq: Introductory M.S. core or consent of instructor. Sp, Su

553 Strategies of Educational Planning (3) Processes for improving decision-making function through use of both quantitative and qualitative planning techniques. Policy analysis, goal setting, development. Prereq: Introductory M.S. core or consent of instructor. F, Su

554 School Law (3) Logical arrangement of case and statutory materials for public school administrators and teachers; problems concerning law and public education. Prereq: M.S. Introductory core or consent of instructor. Sp, Su

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. Some on-campus classes in conjunction with 583 or 582. Prereq: 21 hrs in educational administration and supervision or consent of instructor. E

582 Educational Leadership and District-Level (3) Role of central administrative team; relationships, behaviors, concepts and competencies for developing and maintaining effective school organization. At end of planned program of study. Prereq: 21 hrs in educational administration and supervision or consent of instructor. F, Su

583 Educational Leadership—Principalship (3) Knowledge, skills and relationships for principal to be effective educational leader. Study of materials and field-based activities. Culminating course with internships at end of planned course of study. Prereq: 21 hours in educational administration and supervision or consent of instructor. F

590 Special Topics (1-3) May be repeated. E

592 Field Problems in Educational Administration and Supervision (3) Topic to be assigned. May be repeated. S/NC or letter grade. E

595 Elementary Principals Seminar (1-3) For in-service training of elementary school administrators. Developments, problems, programs, and trends of elementary schools and management skills of elementary school administrators. Prereq: Presently elementary school administrator or consent of instructor. May be repeated. S/NC or letter grade. F, Sp

596 Middle School Principals Seminar (1-3) For in-service training of middle school administrators. Developments, problems, programs, and trends of middle schools and management skills of middle school administrators. Prereq: Presently middle school administrator or consent of instructor. May be repeated. S/NC or letter grade. F, Sp

604 Seminar in Educational Administration and Supervision (1) Current educational issues, problems and research. Required two consecutive semesters during doctoral residency. May be repeated. S/NC only. E

605 Advanced Seminar in Administrative Theory (2) Interdisciplinary seminar. Readings selected by faculty for research and scholarly value from early to recent classical theoretical studies and contemporary periodical literature in educational administration. Required of Ph.D. students in Education. Prereq: Doctoral student in Education. E

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 practitioners and University representative. May be repeated at discretion of student's committee. Maximum 12 hrs. S/NC only. E

614 Statistical Methods for School Administrators (3) Descriptive and experimental research methods, parametric and non-parametric statistical techniques used in research in educational settings. F

615 Research Designs (3) Statistical methods through multi-variate techniques and applications to various research designs. Prereq: 614 or consent of instructor. Sp

616 Research Methods (3) Overview of descriptive and experimental research designs; data collection, analysis, and interpretation for survey studies and school surveys. Conduct of survey. Prereq: Basic statistics and computer skills or consent of instructor. E

629 Seminar in Politics of Education (3) Political theories and practices as they affect operation of public school systems and higher educational institutions. Interdisciplinary discussion of community power structures and special interest groups, based on literature and research in education and political science. Field inquiry. Prereq: 526, 616 or equivalent or consent of instructor. F

644 Educational Finance and Business Management (3) Contemporary educational finance policies and their interaction upon education, nation and citizens. Supervenience concept, management of school logistic services. Prereq: 544 or consent of instructor. F, Su

646 School Personal Administration (3) Personnel administration functions for professional and supporting staff in educational organizations. Recruitment, selection, placement, personnel policies, employee wage and salary administration, fringe benefits, collective negotiations, human relations, staff development, and staff evaluation. Prereq: 546 or consent of instructor. F, Su

655 State-Federal Relations in Education (3) Interrelationships of federal, state, and local responsibilities and organizations for education, legal, fiscal and functional aspects of educational partnerships. Funding partnerships: discussion of grant proposal development processes. Sp, Su

656 Legal Foundations of Public Education (3) School law: constitutional foundations as they relate to public education at state and local levels. F, Su

658 Conflict Management (3) Social conflict and its management. Causes of interpersonal, intergroup, 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. F

670 Values and Ethics in Educational Leadership (3) Examination of moral and ethical dimensions of work of educational administrators; assistance to current and prospective administrators to deal with dimensions in knowledgeable, reflective and principled ways. (Same as Higher Education 670.)

680 Administration of Complex Organizations (3) Concepts and theoretical formulations to understand, analyze, evaluate, and change complex educational programs and organizations. Prereq: 513 or consent of instructor. Sp, Su

690 Special Topics (1-3) May be repeated. E

Higher Education

GRADUATE COURSES

530 Special Topics (1-3) May be repeated. E
534 Program Evaluation in Education (3) (Same as Education in the Sciences, Mathematics, Research, and Technology 538.)
536 Seminar on Policy Issues in Quality Assurance (3) Exploration of historic and contemporary approaches to definition and demonstration of quality in higher education and examination of contemporary policy issues related to quality assurance in colleges and universities.
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, speech, 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 Introduction to Student Personnel Work in Higher Education (3) Historical, philosophical and organizational perspective. Functional areas comprising field and major issues.
572 Theory and Practice in Student Personnel Services (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.
599 Practicum in College Student Personnel (1-6) Prereq: Consent of Instructor. May be repeated. S/NC only. E
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. Prereq: 543 or consent of Instructor. F
630 Special Topics (1-3) May be repeated. E
640 College and University Law (3) Legal precedent affecting organizations, administration, and finance of higher education. Academic freedom, faculty tenure, religion, tort liability, administrative law, academic due process and affirmative action in employment.
645 Curriculum and Instruction in Undergraduate Higher Education (3) Content and organization of institutional strategies and curricular structure in higher education. F, Su
650 Fiscal Problems in Higher Education (3) Revenue sources, appropriation process, budget procedures, cost analysis, and fiscal management in public and independent colleges and universities.
670 Values and Ethics in Educational Leadership (3) (Same as Educational Administration and Supervision 670.)
695 Practicum in Higher Education (1-6) Supervised practicum in selected areas of higher education administration. Prereq: Consent of Instructor. May be repeated. S/NC only. E
698 Seminar in Higher Education (3) Capstone experience for doctoral students. Examination of major philosophical concepts and policy principles distinctive to American higher education, review of significant and current policy reports and critiques, exploration of contemporary policy issues, and evaluation of recommended reforms in higher education. Travel to state, regional, and national policy agencies for higher education.

Leadership Studies

GRADUATE COURSES
500 Thesis (1-15) P/NP only. E
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. S/NC only. E
518 Educational Specialist Research and Thesis (3) May be repeated. P/NP only. E
695 Independent Study (1-3) May be repeated. S/NC only. E
696 Doctoral Research and Dissertation (3-15) P/NP only. E
696 Leadership Forum (2) Development of research, policy analysis skills and critical analysis and evaluation of philosophical principles underlying American education. Continuous enrollment for 2 years, on campus, for students in Ed.D. alternative residence program. May be repeated. Maximum 12 hrs. S/NC only.
693 Independent Study (1-3) May be repeated. S/NC or letter grade. E

Life Sciences

(College of Arts and Sciences)

MAJOR DEGREES

Life Sciences ........................................ M.S., Ph.D.

W.F. Harris, Chair

Coordinating Council:
Schwarz, O.J., Plant Physiology and Genetics
Harris, W.F., Biotechnology.

The programs leading to the M.S. and Ph.D. degrees in Life Sciences are interdepartmental and intercollegiate and are designed to augment offerings of individual departments in the following concentrations: biotechnology, (M.S. only), 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 program is overseen by a committee and may have unique admission requirements.

ADMISSION REQUIREMENTS

1. A Bachelor's degree with a major in a biological, behavioral, or physical science.
2. GRE (general) scores.
3. Three letters of recommendation.
4. Course work 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.

DEGREE REQUIREMENTS

The master's degree requires a minimum of 30 semester hours of study approved by the student's committee, a thesis, and an oral examination. Within the biotechnology program only, a non-thesis M.S. option is available. Students choosing this option are expected to complete: (1) two summers' co-op experience in an appropriate industry. An evaluation by supervisor and a written report are required (529, Biotechnology Practicum Cooperative Experience, maximum 4 hrs.); (2) A written report in the form of a scientific paper in an area of specialization chosen by the student and advisor. The minimum requirements for the doctoral degree include at least 6 hours above the 600 level, 24 semester hours of course 600, a pattern of courses approved by the student's committee; a comprehensive examination, a doctoral dissertation, and a defense of dissertation. Individual programs may have additional requirements.

CONCENTRATIONS

Biotechnology (M.S. only)

The biotechnology program prepares students to participate in the wide variety of opportunities presented by the use of living cells and their components for the production of useful materials. This will be achieved at the M.S. level by a prescribed course of study of the biology and biochemistry of cells and molecules; by form study of cells and of engineering aspects of biotechnology; and by the development of special expertise in areas such as animal embryo manipulation, automated chemical synthesis of macromolecules, bioprocess engineering, bioproducts and biotransformations, liposomes, microscopy and image processing, monoclonal antibodies and hybridoma technology, plant tissue culture, recombinant DNA technology and risk assessment, and modeling. The production of a research thesis or an industrial co-op experience plus an area of specialization will also be an important part of the training experience.

Required courses are Life Sciences 509, 511, 512, 531, 532; Biochemistry and Cellular and Molecular Biology 511; Microbiology 410; Botany 451; Chemical Engineering 475; and Ecology and Evolutionary Biology 507.

Plant Physiology and Genetics

This program provides the opportunity for intensive training and research experience in areas transcending the usual boundaries of botany, biochemistry, and agricultural plant sciences. It devotes itself to seeking solutions of problems concerning the interactions of physiology and genetics in applied and fundamental aspects of plant science.

Required courses are Life Sciences 510; Botany 521, 522; Biochemistry and Cellular and Molecular Biology 511, 512; Plant and Soil Science 471 or Ecology and Evolutionary Biology 560; Plant and Soil Science 552, Microbiology 410.

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E
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. S/NC only. E
509 Biotechnology Seminar (1-2) Topics of importance to biotechnology. May be repeated. Maximum 6 hrs.
510 Special Topics in Life Sciences (1-3) Specializations in biotechnology: cellular, molecular, and development biology; environmental toxicology; ethology; plant, physiology and genetics; and physiology. May be repeated. Maximum 9 hrs.
511 Advanced Cellular Biology (3) Cell structures and functions at molecular and subcellular levels, membrane structure, function, and biogenesis; cellular communication; receptors and membrane flow; growth regulation and homoeostasis; plant cell structure and function, contractility and mobility; mitosis and meiosis, blood and immune cells.
512 Advanced Molecular Biology (4) Same as Biochemistry and Cellular and Molecular Biology 512.
525 Research Practicum in Life Sciences (1-3) Individual sections for each of biotechnology, cellular, mo-
BUSINESS ADMINISTRATION CONCENTRATIONS
For complete listing of MBA and Ph.D. program requirements, see Business Administration.


Minimum course requirements for management--Three courses from the following: 511, 521, 522, 531, 541, 542, 551, 571, 581, 593, 601, 610, 611, 612, 613. Selection must be approved by the Management Department MBA advisor. For forest industries management--511; Forestry 560, 565. Environmental management: 581 plus two approved courses from the following list: Ecology and Evolutionary Biology 520, 555; Environmental Engineering 510, 555, 558; Chemical Engineering 581; Economics 677, 678; Agricultural Economics 570; Sociology 560, 665; Law 866, 867; Geography 577. Additional courses may be accepted subject to approval by Management Department Chairperson or designated faculty. Ph.D. Concentration: Management. 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.

MINOR IN ENVIRONMENTAL POLICY
The department participates in a program designed to give graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. See Economics for program description.

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E

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. S/NC only. E

504 Management of Organizational Behavior (3) Integration of individual and group differences, organizational theory and design, motivation, leadership, human resources planning, and career implications with strategy, planning, and decision making.

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, configuration, organization design; social influences on organizational effectiveness; motivation, leadership, group behavior, intergroup relations, organization change and development.

521 Personnel Administration (3) Personnel functions and human resources management. Community relations, recruiting, selection, training, performance evaluation, wage and salary administration, legal framework as it affects personnel.

522 Labor Relations and Collective Bargaining (3) American labor history, structure, and philosophy of bargaining, dispute settlement, and contract administration. (Same as Economics 562.)

525-26 Industrial and Organizational Psychology (1-3, 1-3) Readings in industrial and organizational psychology. Available by special arrangement with supervising faculty member. May be repeated. Maximum 6 hrs. S/NC or letter grade.

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.

541 Operations Management I (3) Techniques applicable to design of systems in operations function.

542 Operations Management II (3) Operations planning and control function. Application of models to real-world processes.

551 Management of New Ventures (3) Integration of various functional disciplines and their application to general management of entrepreneurial firms with larger corporations and independently. Preparation of a business plan, case analysis.

567-68 Proseminar in Industrial/Organizational Psychology (3, 3) Basic truth, concepts, and issues required for advanced graduate study in industrial and organizational psychology. Must be taken in sequence during student's first year of study in industrial and organizational psychology program. Consent of instructor required for all non-industrial/organizational psychology program students. (Same as Psychology 517-18.)

571 International Management (3) Analysis of value of international business firms and impact of international and external factors on managerial decisions.

581 Environmental Management (3) Managerial frameworks for addressing environmental issues. Most pressing environmental challenges: options compatible with sustained business performance. Cases, field projects, research papers.

593 Directed Independent Study (1-3) Topic of mutual interest. Available only by prearrangement with supervising faculty member. May be repeated. Maximum 6 hrs. S/NC or letter grade.

595 Selected Topics in Current Management Issues (1-3) 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. E

601 Research Methods (3) Seminar covering broad range of issues: research process as applied to study of strategic management. Literature and examples of research proposals. Research proposals.

610 Seminar in Advanced Organization Theory (3) Analysis of functioning of complex organizations. Classical and open systems models, organization growth and change, organizational effectiveness and design of complex organizations.

611 Seminar in Strategic Management (13) Analysis of concepts and research in strategic management.

612 Seminar in Strategic Management II (3) Analysis of concepts and research in strategic management.

613 Seminar in Strategic Management III (3) Review and analysis of important books and monographs in strategic management. Literature and examples of thought and emergence of distinct paradigms.

625 Seminar in Organizational Psychology (3) In-depth analysis of current theories, concepts, and issues associated with psychology of organizational leadership and work motivation. Prereq: 567, 568, consent of instructor. May be repeated. (Same as Psychology 626.)

626 Seminar in Industrial Psychology (3) In-depth analysis of current issues and problems: performance appraisal/evaluation, development, and training and development. Prereq: 567, 568, consent of instructor. May be repeated. (Same as Psychology 626.)

627 Seminar in Applied Industrial Psychology (3) In-depth analysis of the current issues, concerns, and models: advanced quantitative psychometrics and psychophysiological processes. Prereq: 567, 568, consent of instructor. May be repeated. (Same as Psychology 627.)

638 Current Topics in Industrial/Organizational Psychology (3) In-depth analysis of various topics: organizational change and development, psychology and problems of interpersonal, consumer behavior. Prereq: 567, 568, consent of instructor. May be repeated. (Same as Psychology 638.)

690 Field Work in Industrial and Organizational Psychology (1-12) Supervised field practice in industrial and organizational psychology. 1 hr per 30 hrs of practice. May be repeated. Maximum 12 hrs. (Same as Psychology 690.)
Management Science

(College of Business Administration)

MAJORS DEGREES
Management Science M.S., Ph.D. Business Administration M.B.A.

Melissa R. Bowers, Chairperson

Committee Members:
Bowers, Melissa R., Management; Bozdogan, Hamparsum, Statistics; Edirisinghe, Chanakya F., Management; Fowler, Oscar S., Management; Gilbert, Kenneth C., Management; Laity, Mary G., Statistics; Noon, Charles E., Management; Ralston, Bruce A., Geography; Sinha, M. M., Management.

THE MASTER'S PROGRAM

The M.S. program 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, ecology, and other areas, subject to approval by the Management Science Committee.

Admission Requirements

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 M.S. degree program in Management Science on a part-time basis.

Course Requirements Hours
Core Requirements 16
- Management Science 531, 532, 533, 534, and 691 or 692
- Statistics 563
- Applied specialization area (approved by advisor) 9
- Technical elective: Mathematics (400 level or above as approved by advisor) or Industrial Engineering (400 level or above as approved by advisor) or Other elective (as approved by advisor) 6
- Electives selected from mathematics, statistics, computer science, business, management science, industrial engineering, or other approved area 9

Total 40

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 M.S. 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.

THE DOCTORAL PROGRAM

The Ph.D. program 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:

1. to provide, through management science coursework, a thorough knowledge of common Management Science/Operations Research mathematical models and their uses.
2. 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.
3. 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 Requirements

The doctoral program requires three applicant recommendation forms and the GRE or GMAT. In addition to The Graduate School's requirements.

Coursework

A minimum of 48 semester hours of coursework for the degree (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 6 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, 465, 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 semester 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.

BUSINESS ADMINISTRATION CONCENTRATION

For complete listing of MBA program requirements, see Business Administration.

MBA Concentration: Management Science. Minimum course requirements are 531, 532 and 534.

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any
Hendrix, F. L. (Emeritus), Ph.D. North Carolina
Langley, C. J., Jr., Ph.D. Penn State
Mentzer, J. T. (Business Administration Chair of Excellence), Ph.D. Michigan State
Mundy, R. A., Ph.D. Penn State
Patton, E. P., Ph.D. North Carolina
Woodruff, R. B., DBA Indiana.
Associate Professors:
Foggin, J. H. (Liaison), DBA Indiana
Gardie, S. F., Ph.D. Houston
Reizenstein, R., Ph.D. Cornell
Rentz, J. O. (Liaison), Ph.D. Georgia
Schumann, D. W., Ph.D. Missouri
Assistant Professors:
Dabholkar, P. A., Ph.D. Georgia State
Helcomb, M. C., Ph.D. Tennessee
Moon, M. A., Ph.D. North Carolina

BUSINESS ADMINISTRATION CONCENTRATIONS

For complete listing of MBA and Ph.D. program requirements, see Business Administration.
MBA Concentration: Logistics and Transportation, Marketing
Minimum course requirements for logistics and transportation--501, 506, and one course from the following: 504, 505, 507, 509, and 593. For management--511 and 512.
Ph.D. Concentration: Logistics and Transportation, Marketing.
Minimum course requirements for logistics and transportation--12 hours to include 501, 602, 603, 604, 605, 606.

Marketing

GRADUATE COURSES

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 be repeated. S/NC only.
503 Buyer Behavior--Analysis for Marketing (3) Consumer behavior concepts and processes developed and applied to market analysis and design, and control of marketing programs. Social psychology and demographic factors that affect consumer product, brand and patronage decisions. Prereq: Business Administration 504 and 505 or consent of instructor.
504 Analyzing Market Opportunity for Marketing Decisions (3) Major determinants of opportunity in markets, framework for finding markets and analyzing them for opportunity, application of market opportunity analyses to marketing strategy decisions. Prereq: Business Administration 504 and 505 or consent of instructor.
505 Marketing Research and Information Planning (3) Design of a rigorous marketing study from inception to implementation of results by recognizing key decision points and critically evaluating the merit of research project. Prereq: Business Administration 504 and 505 or consent of instructor.
506 Marketing Strategy (3) Integration of concepts and analytical tools from each component area of marketing to form cohesive, well-organized marketing program. Prereq: Business Administration 504 and 505 or consent of instructor.
507 Global Marketing (3) Strategic issues related to international and multi-national marketing operations; identification and evaluation of opportunities in overseas markets; coordination of strategies in world markets.

Logistics and Transportation

GRADUATE COURSES

501 Survey of Logistics and Transportation (3) U.S. logistics and transportation: physical, economic, social, and political environment, financing, management, maintenance, and enhancing U.S. transport infrastructure.
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 be repeated. S/NC only.
504 Freight Carrier Systems and Management (3) Analysis of freight carrier management's efforts to provide services demanded by carriers in logistics and transportation marketplace.
506 Logistics Systems Management (3) Development of strategy for management of logistics systems. Executive level integration of logistics operations with marketing and production chains, logistics planning, and other decision areas. Practical applications through case approach and simulation game.
507 International Logistics and Transportation (3) Logistics strategy in the multi-national firm: materials management, international sources and distribution, and international transport and transportation market.
Materials Science and Engineering

(College of Engineering)

MAJORS DEGREES

Metallurgical Engineering .......... M.S., Ph.D.
Polymer Engineering ................ M.S., Ph.D.

Joseph E. Spruiell, Head

Professors:
Brooks, C. R., Ph.D. ................. Tennessee
Buchanan, Raymond A., Ph.D. .... Vanderbilt
Clark, Edward S. (Emeritus), Ph.D. California
Fellers, J. P., Ph.D. .................. Akron
Liaw, P. K. (Racheff Chair of Excellence), Ph.D. Northwestern
Lownides, Douglass H., Ph.D. .... Colorado
Lundin, Carl D., Ph.D. .............. Rensselaer
Oliver, Ben F., Ph.D. ............... Penn State
Pedraza, A. J., Ph.D. ............... National (Argentina)
Phillips, Paul J., Ph.D. .......... Liverpool (UK)
Spruiell, Joseph E. (Liaison), Ph.D. Tennessee

Associate Professors:
Becker, William T., Ph.D. .......... Illinois
Benson, R. S., Ph.D. ............... Florida State
Meek, Thomas T., Ph.D. .......... Ohio State

Assistant Professor:
Kit, Kevin, Ph.D. ..................... Delaware

Graduate programs are offered leading to the degrees of Master of Science and Doctor of Philosophy in Metallurgical Engineering or Polymer Engineering. Both the metallurgical and polymer 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. Prospective students should consult materials science and engineering faculty concerning development of individual concentrations or special programs compatible with their backgrounds and goals.

Areas of concentration within the metallurgical engineering program include physical metallurgy; materials processing; welding metallurgy and materials joining; corrosion behavior; failure analysis; and mechanical and physical behavior of materials. Specializations in electronic and ceramic materials are available. Areas of concentration within the polymer engineering program include rheology and polymer processing; polymer morphology; mechanical, physical and chemical behavior of polymers; and composite materials.

THE MASTER'S PROGRAM

Thesis Option
A total of 30 semester hours is required for the M.S. degree in either Metallurgical Engineering or Polymer Engineering. Additional requirements include:

1. A major consisting of 12 to 18 semester hours of graduate courses in metallurgical engineering or polymer engineering. The polymer engineering major must include 540, 541, 543, 546, 549, 550 and 572 unless similar material has been covered in prior coursework.
2. Additional courses amounting to 6 to 12 hours total in any approved engineering, chemistry, mathematics, physics, or other related fields.
3. Master's thesis, 500 totaling 6 to 12 hours. All resident students are required to register for and participate in the graduate seminar in metallurgical engineering or polymer engineering, as appropriate, during each semester in which it is offered. Credits for the seminar do not count towards satisfying the coursework requirements.

Non-Thesis Option
Under certain conditions, a candidate may apply for a non-thesis option. To be eligible, the 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. A departmental faculty meeting will consider each application individually. Upon acceptance, a supervisory committee of three will be appointed, at least two being from the Department of Materials Science and Engineering. The requirements for completion of the non-thesis option are as follows:

1. A total of at least 33 hours in graduate courses in metallurgical engineering, polymer engineering and related areas. The minimum requirements are 21 hours in the Department of Materials Science and Engineering and up to 12 hours in other engineering or science courses.
2. The candidate's degree program must be approved by the faculty committee.
3. Satisfactory performance in an oral examination to be conducted by the faculty committee and covering the review paper and other areas of metallurgical or polymer engineering.

THE DOCTORAL PROGRAM
Students applying for entrance into the doctoral program must display concrete evidence of ability to perform and report independent research to the satisfaction of the department. The master's thesis may be offered as such evidence.

Department requirements consist of the satisfactory completion of:

1. Graduate courses in materials science and engineering amounting to approximately 24 semester hours, at least 8 of which must be in 600 series courses.
2. Supporting courses in related scientific and engineering fields amounting to approximately 24 semester hours, subject to approval by the student's faculty committee. These related fields will normally include chemistry, mathematics, physics, and engineering.
3. The comprehensive examination, usually given in two parts, and covering such topics as materials science and engineering, metallurgical or polymer engineering operations and processes, thermodynamics, technology, mathematics, physics, chemistry, and other related fields.
4. Active participation in graduate seminars conducted by the department. Resident students must register for the appropriate 503 or 504 every semester offered.

CADEMIC COMMON MARKET
An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The Ph.D. program in Metallurgical Engineering is available to residents of the state of Virginia; the M.S. and Ph.D. programs in Polymer Engineering are available to residents of Kentucky, Louisiana, or Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

405 Structural Characterization of Materials (4) X-ray diffraction and fluorescence; scanning and transmission electron microscopy; microanalytical techniques.

421 Mechanical Behavior of Materials I (3) Description of stress and strain; linear elastic constitutive equations; isotropic and anisotropic moduli in various materials; yield criteria; brittle fracture; crazing; plastic strain constitutive equations; forming operations; limit criteria. Prereq: Mechanical Behavior of Materials, Mechanics of Materials I, sophomore mathematics.


426 Materials Joining (3) Processes for joining metals, polymers and ceramics: mechanical, adhesive, fusion-solidification; crystallography; surface characteristics necessary for joining and chemical bonding; thermal effects on structure and properties of joints; design of joints. Prereq: Introduction to Materials Science and Engineering.

429 Introduction to Ceramic Matrix Composites (3) Characteristics of composites: ceramic matrix composites; macromechanics and materials design; overview of fabrication techniques; microstructural characterization; physical and mechanical property evaluation; current and potential applications. Prereq: Introduction to Materials Science and Engineering and Mechanics of Materials.
THE MASTER OF SCIENCE PROGRAM

The Mathematics Department has three graduate degrees: (1) the Master of Mathematics degree, intended primarily for teachers, (2) the Master of Science degree, designed to prepare students for industrial employment and for teaching, and (3) 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 6 hours of resident graduate credit in courses numbered above 400 and approved by both the major department and the Department of Mathematics.

THE MASTER OF MATHEMATICS PROGRAM

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).

The following requirements must be met:

1. Complete 30 hours of coursework of which 21 must be in mathematics. The coursework must include 504, 505, 506, 507, and 6 hours in 509. At most, 6 hours may be taken outside the Department of Mathematics (selected in consultation with the advisor).
2. Pass a final examination upon completion of all coursework. In exceptional circumstances, part of the 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.

THE MASTER OF SCIENCE PROGRAM

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 (588) in which a term paper or project is required.

Concentration in Applied Mathematics

For this concentration, available under the thesis or the non-thesis option, the student must complete the following:

1. Prerequisite courses: a. Numerical Algorithms 371 or Numerical Analysis 472 or Statistical Methods 415 or Statistical Analysis 512 or both Numerical Mathematics 511 or both Numerical Mathematics 471 or both Numerical Mathematics 512 or both Numerical Mathematics 571 or both Mathematical Analysis 512 or both Partial Differential Equations 535-536 or both Partial Differential Equations 535-536.
2. One course from each of the following five areas:

THE DOCTORAL PROGRAM

For the Ph.D. program in Mathematics, the student must meet the following requirements in addition to those of The Graduate School:

1. Satisfy either the standard program or the interdisciplinary mathematical ecology concentration. A student working in mathematical ecology may complete either but is encouraged to complete the interdisciplinary mathematical ecology concentration. A student may elect to switch from one to the other provided the constraints of the latter option have not been violated. A student's status after electing such a transfer is determined by the complete history of the student's earlier mathematics examinations from the standard program and the interdisciplinary mathematical ecology concentration. Descriptions of both programs are given below.

2. Demonstrate proficiency in one foreign language, normally French, German or Russian. This requirement must be met prior to the examination in the area of specialization. A student's doctoral committee may require the student to pass a second language examination.

3. Pass an examination in the field of specialization. After the requirements in 1, and 2 have been met, this examination will be given by a committee appointed by the department head. A student may take this examination only once.

4. Pass a one-year, 500-level sequence in mathematics outside the student's area of specialization. The sequences selected to fulfill this requirement must be approved by the department head and the student's doctoral committee. (Such approval may occur after completion of the sequence.)

Requirements 1-4 must be completed no later than the start of the student's seventh year (as a mathematics graduate student at UT Knoxville).

Standard Program

Demonstrate knowledge in five subjects selected from the groups listed below by passing written examinations in those subjects.


A student's five subjects may not include both Real Analysis and Applied Linear Analysis or both Mathematical Principles of Fluid Mechanics and Mathematical Principles of Continuum Mechanics. A student may not count examinations in both Ordinary Differential Equations and Partial Differential Equations, but both may be included in a student's five subjects. With prior approval of the graduate committee, a student may utilize as a Group IV course a year-long graduate-level sequence from outside the Department of Mathematics. At most one such utilization may be made.

A student may take as many written examinations as desired at any time the examinations are given, subject to the following conditions:

a. The examinations to be taken must be approved in advance by the student's advisory committee.

b. At any one time a student may take at most only the number of examinations necessary to complete the requirements.

c. A student may take a collection of written examinations a maximum of 3 times, but no one
400 Models in Biology (3) Difference and differential equation models of biological systems. May not be counted toward a graduate degree. Prereq: Calculus II or Bioculculus.


421 Combinatorics (3) Introduction to problems of construction and enumeration for discrete structures: sequences, partitions, graphs, finite fields and geometries, or experiments. Prereq: Probability and Statistics 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, 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; I and II. 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 sufficient statistics. Prereq: Probability I or consent of instructor.


443 Complex Variables I (3) Theory of functions of complex variable; residue theory and contour integrals. Prereq: Calculus III. Recommended prereq: 300- or 400-level mathematics course.

444 Complex Variables II (3) Applications of complex variables to steady-state temperatures, electrostatics, and fluid flow. Prereq: 443.

445-46 Advanced Calculus I & II (3, 3) Theory of sequences, series, differentiation, and Riemann integrals of functions of one or more variables. Prereq: Calculus III and Introduction to Abstract Mathematics, or consent of instructor.

455 Matrix Algebra II (3) Matrix theory including Jordan canonical form. Prereq: Matrix Algebra I.

456 Abstract Algebra II (3) Algebraic structures: groups, rings, fields, vector spaces, and linear transformations. Prereq: Matrix Algebra I and Introduction to Abstract Mathematics, or consent of instructor.

478-58 Honors: Abstract Algebra I & II (3, 3) Honors version of 455-56. Prereq: Matrix Algebra I and Introduction to Abstract Mathematics, or consent of instructor.

500 Thesis (1-15) P/NP only. E

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. S/N/NC only. E

504 Discrete Mathematics for Teachers (3) Mathematical logic and methods of argument, sets, functions and relations, combinatorics, first course for students seeking M.M. degree. For students in Master of Mathematics program and for students in graduate programs in College of Education. May not apply toward M.S. degree in mathematics. Prereq: 1 yr calculus or equivalent.

505 Algebra for Teachers (3) Algebraic structures, integral domains and fields and their application to algebra of integers and polynomials. For students in Master of Mathematics program and for students in graduate programs in College of Education. May not apply toward M.S. degree in mathematics. Prereq: 1 yr algebra or equivalent.

506-750 Seminar for Teachers (3) For students in Master of Mathematics program and for students in graduate programs in College of Education. May not apply toward M.S. degree in mathematics. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.


514 Mathematical Principles of Fluid Mechanics (3, 3) Equations of motion, compressible and incompressible flow, shock waves, vortices, Navier-Stokes equations, Prereq: 431, 435, and 445-46 or 404, or consent of instructor.

515-16 Analytical Applied Mathematics (3, 3) Analysis of advanced techniques in modern context for applied mathematics: perturbation theory, variational approaches, transform theory, wave phenomena and conservation laws, stability and bifurcation, distributions, integral equations. Prereq: 446 or 448, 453, and either 511-12 or both 431 and 435.

517-18 Mathematical Methods in Physics (3, 3) (Same as Physics 571-72)
519 Seminar in Applied Mathematics (1-3) May be repeated. Maximum 12 hrs.

521-22 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.

523-24 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 distribution of random vectors and their characteristic functions; weak convergence concept, weak compactness and Levy's continuity theorem in Euclidean spaces; inferences in the central limit problem; general concept and properties of conditional expectation, martingales, Doob's martingale and optional sampling theorems. Prereq: 445-46. Recommended prereq: 423.

525-26 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 of confidence intervals, the Neyman-Pearson lemma, uniformly most powerful tests; general linear models, estimation and tests in linear models; non-parametric methods, rank methods for comparison, regression and independence, robust tests; topics from decision theory. Prereq: 445-46. Recommended prereq: 425.

527 Stochastic Modeling (3) Models in probability applied to real world situations; queuing theory; branching processes; Monte Carlo simulation. Prereq: 445-46 or consent of instructor.


534 Calculus of Variations (3) First necessary conditions for extrema, Euler's equation, broken extremals, Wessner-Strass-Erdmann conditions. Sufficient conditions for extrema-Legrange's and Jacobi's conditions, conjugate points. Multiple integrals. Prereq: 431.

535-36 Partial Differential Equations (3,3) First order equations, classification of equations and properties of elliptic, hyperbolic and parabolic equations in several variables. Prereq: 445-46 and 231 or consent of instructor.


561 Seminar in Topology (1-3) May be repeated. Maximum 12 hrs.


563-64 Algebraic Topology (3,3) Homology, cohomology and homotopy theories; duality theorems and spectral theory of normal operators. Prereq: 541-42. Coreq: 543 or 443. May be repeated with consent of department. Maximum 12 hrs.

565 Seminar in Topology (1-3) May be repeated. Maximum 12 hrs.

567-68 Differential Geometry (3,3) Curves and surfaces in Euclidean space, Gauss map, curvature, Gauss-Bonnet theorem, hyperbolic geometry, Manifolds and Riemannian metrics; connections and geodesics, Jacobi fields, sectional curvature. Differential forms and moving frames. Prereq: 445-46 or consent of instructor. May be repeated with consent of department. Maximum 12 hrs.

569 Seminar in Topology (1-3) May be repeated. Maximum 12 hrs.


575 Matrix Theory and Techniques in Numerical Analysis (3) Advanced topics in study of iterative and direct methods for linear equations; sparse matrix analysis, relationship to modern computer architectures. Prereq: 453, 471-72; or consent of instructor. May be repeated. Maximum 9 hrs. (Same as Computer Science 575.)

579 Seminar in Numerical Mathematics (1-3) May be repeated. Maximum 12 hrs.

581-82 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 581-82.)

583 Mathematical Evolutionary Theory (3) Population genetics and developmental evolution. Prereq: 431, 453 or consent of instructor.

584 Mathematical Systems Theory (3) Analytic approach to discrete and continuous dynamical control systems; optimal control. Applications to ecology. Prereq: 431, 435-46, or consent of instructor. Prereq: 445-46 or consent of instructor.

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, 445-46 or consent of instructor.

589 Seminar in Mathematical Ecology (1-3) May be repeated. Maximum 12 hrs.

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 hrs.

600 Doctoral Research and Dissertation (3-15) P/NP only. E.


619 Seminar in Applied Mathematics (1-3) May be repeated. Maximum 12 hrs.

623-24 Advanced Probability (3,3) Selected topics in modern theory of probability and stochastic processes: Itô's calculus and stochastic differential equations, integration theory, probability on abstract algebraic structures, limit theorems, geometry and probability in Banach spaces, probability methods in analysis. Prereq: 504, 505, consent of instructor. May be repeated with consent of department. Maximum 12 hrs.

629 Seminar in Combinatorics (1-3) May be repeated with consent of department. Maximum 12 hrs.

631-32 Advanced Ordinary Differential Equations (3,3) Theory of ordinary differential equations from advanced viewpoint. Topics from current literature. Subject matter varies according to instructor and the interests and preparations of students. Prereq: 531-32 or consent of instructor. May be repeated with consent of department. Maximum 12 hrs.

635-36 Advanced Partial Differential Equations (3,3) Selected topics in classical and modern theory of partial differential equations. Prereq: 541-42 or 547-48 or consent of instructor. May be repeated with consent of department. Maximum 12 hrs.


643-44 Harmonic Analysis (3,3) Fourier series and Fourier transforms on Euclidean spaces and topological groups: convergence, summability, uniqueness, inversion, duality, Plancherel theorem, Hilbert transforms, Hardy-Littlewood maximal function, interpolation of operators, or Fefferman-Stein duality. Prereq: 541-42 and 443. May be repeated with consent of department. Maximum 12 hrs.

649 Seminar in Analysis (1-3) May be repeated with consent of department. Maximum 12 hrs.

651-52 Advanced Modern Algebra (3,3) Selected topics in modern algebra or number theory. Prereq: 551-52 or consent of instructor. May be repeated with consent of department. Maximum 12 hrs.

659 Seminar in Algebra (1-3) Prereq: Consent of instructor. May be repeated with consent of department. Maximum 12 hrs.


663-64 Algebraic Topology (3,3) Homology, cohomology and homotopy theories; duality theories and Hurewicz isomorphisms. Prereq: 561-62 and one of abstract algebra, 453-56 or 551-52. May be repeated with consent of department. Maximum 12 hrs.

667-68 Advanced Differential Geometry (3,3) Selected topics from Riemannian geometry and analysis on manifolds and Lie groups, Riemannian geometry, Einstein metrics, spectrum of Laplacian, Hodge theory, variational problems, curvature and topology of manifolds. Prereq: 587-68 or consent of instructor. May be repeated with consent of department. Maximum 12 hrs.

669 Seminar in Topology (3) May be repeated with consent of department. Maximum 12 hrs.


679 Seminar in Numerical Mathematics (1-3) May be repeated with consent of department. Maximum 12 hrs.
### Mechanical and Aerospace Engineering and Engineering Science

(College of Engineering)

#### MAJOR DEGREES

<table>
<thead>
<tr>
<th>Aerospace Engineering</th>
<th>M.S., Ph.D.</th>
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<tbody>
<tr>
<td>Engineering Science</td>
<td>M.S., Ph.D.</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>M.S., Ph.D.</td>
</tr>
</tbody>
</table>

**D. W. Dareing, Head**

### Professors:

- Antar, B. (UTSI), Ph.D. — Texas
- Aminli, R. V., Ph.D. — VPI
- Braun, G. W. (Emeritus) (UTSI), Ph.D. — Gottingen
- Carley, T. G. (Liaison), PE, Ph.D. — Illinois
- Collins, F. G. (UTSI), Ph.D. — California
- Crawford, R. A. (UTSI), Ph.D. — Tennessee
- Dareing, D. W., PE, Ph.D. — Illinois
- Dubey, R. V., Ph.D. — Clemson
- Edmondson, A. J., PE, Ph.D. — Texas A&M
- Flandro, G. A (UTSI), Ph.D. — Cal Tech
- Forrester, J. H., PE, Ph.D. — Iowa State
- Fortey, J. W. (Emeritus), Ph.D. — Toulouse (France)
- Frankel, J. I., Ph.D. — VPI
- Garrison, G. W. (UTSI), Ph.D. — NC State
- Hodgson, J. W. (Fisher Prof.), PE, Ph.D. — Georgia Tech
- Holland, R. W. (Emeritus), PE, M.S. — Tennessee
- Jendrucko, R. J., PE, Ph.D. — Virginia
- Johnson, W. S., PE, Ph.D. — Clemson
- Keefer, D. R. (UTSI), Ph.D. — Florida
- Keyhani, M. (Liaison), Ph.D. — Ohio State
- Kim, K. H., Ph.D. — NC State
- Krane, R. J., Ph.D. — Oklahoma
- Krieg, R. D. (Condra Chair of Excellence), Ph.D. — New Mexico
- Landes, J. D., PE, Ph.D. — LaJolla
- Lee, C. W. (Emeritus), Ph.D. — Illinois IT
- Liston, H., Jr. (Emeritus), M.E.A. — George Washington
- Lo, C. F. (UTSI), Ph.D. — Cornell
- McCoy, M. H. (UTSI), PE, Ph.D. — Florida
- McCay, T. D. (UTSI), PE, Ph.D. — Auburn
- Maxwell, R. L. (Emeritus), PE, M.S. — Case Western Reserve
- Milligan, M. W., PE, Ph.D. — Tennessee
- Newman, M. K. (Emeritus) (UTSI), PE, Ph.D. — Columbia
- Parang, M., PE, Ph.D. — Oklahoma
- Parsons, J. R., PE, Ph.D. — NC State
- Peters, C. E. (UTSI), D.A.S. — Brussels
- Pitto, H. (Emeritus), PE, Ph.D. — Illinois IT
- Pitts, D. R. (Emeritus) Ph.D. — Georgia Tech
- Remenyik, C. J. (Emeritus), Ph.D. — Johns Hopkins
- Schultz, R. J. (UTSI), Ph.D. — Tennessee
- Scott, W. E. (Emeritus), Ph.D. — Johns Hopkins
- Shahroki, F. (UTSI), Ph.D. — Oklahoma
- Shobe, L. R. (Emeritus), PE, Ph.D. — North Carolina
- Smith, G. V., PE, Ph.D. — Penn State
- Snyder, W. T., Ph.D. — Northwestern
- Solman, O., PE, Ph.D. — Tennessee
- Speckhart, F. H. (IBM Prof.), PE, Ph.D. — Georgia Tech
- Stair, W. K. (Emeritus), M.S. — Tennessee
- Stoneking, J. E. — PE, Ph.D. — Illinois
- Tucker, J. M. (Emeritus), M.S. — Illinois
- Wasserman, J., PE, Ph.D. — Cincinnati
- Weitsman, Y. J., Ph.D. — Rensselaer
- Willkerson, H. J., PE, Ph.D. — Tennessee
- Wilson, C. C. (Emeritus), Ph.D. — Purdue
- Wu, J. M. (UTSI), Ph.D. — Cal Tech
- Young, R. L. (Emeritus) (UTSI), PE, Ph.D. — Northwestern

### Associate Professors:

- Boulet, J. A. M., Ph.D. — Stanford
- Caruthers, J. E. (UTSI), Ph.D. — Georgia Tech
- Enges, R. C. (UTSI), Ph.D. — VPI
- Hamel, W. R., Ph.D. — Tennessee
- Kawiecki, G., Ph.D. — West Virginia
- Madhukar, M.S., Ph.D. — Drexel
- Mathews, A., PE, Ph.D. — Illinois
- Moulten, T. H. (UTSI), Ph.D. — Illinois
- Nguyen, K. Ph.D. — Colorado
- Stenhoff, J. S. (UTSI), Ph.D. — Chicago
- Vakili, A. D. (UTSI), Ph.D. — Tennessee

### Assistant Professors:

- Cezeaux, J. L., Ph.D. — Rensselaer
- Iannelli, G. S., Ph.D. — Tennessee
- Lynx, J. E., M.D., Ph.D. — NC State
- Pionke, C. D., PE, Ph.D. — Georgia Tech
- Rosch, R. L. (UTSI), Ph.D. — Georgia Tech
- Yuk, N. Ph.D. — California (San Diego)

### 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. In Mechanical Engineering, special options include energy conversion and utilization; propulsion; heat transfer and fluid mechanics; thermodynamics; space engineering; gas dynamics; machine design; dynamics, control, and robotics; power generation; and stress analysis.

### In Aerospace Engineering, special options include energy conversion and utilization; propulsion; heat transfer and fluid mechanics; thermodynamics; space engineering; gas dynamics; flight and aerospace mechanics; aerodynamics; and structures and stress analysis.

### In Engineering Science, special options include solid mechanics, fluid mechanics, computational mechanics, mechanics of composite materials, biomaterials, engineering, and 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 and 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 biomechanics.

### 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. 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 international applicants for admission.

In Engineering Science, entrance into the graduate program is available to graduates of recognized curricula in engineering, mathematics, or one of the physical or biological sciences. A general application is required in addition to the Graduate School's application. The names and addresses of four references must be included with the program application. The general GRE is required of all international applicants for admission.

Each student must satisfactorily complete a program of study that has been approved by his/her advisor committee and complies with the requirements of the Graduate School. In Engineering Science, the student's major professor may be selected from a department other than the Department of Mechanical and Aerospace Engineering and Engineering Science; however, at least one member of the student's graduate advisory committee must be on the faculty of the Department of Mechanical and Aerospace Engineering and Engineering Science.

### THE MASTER'S PROGRAM

In both Mechanical Engineering and Aerospace Engineering, three M.S. options are offered. Option I requires a thesis, while options II and III do not. Option I is the normal program for recent graduates. Options II and III provide graduate students with significant professional work experience the opportunity to focus their programs in special areas through either greater course work or selected engineering problems. Credit requirements for these three options are summarized below.

<table>
<thead>
<tr>
<th>Course Areas</th>
<th>Hours Required</th>
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<tbody>
<tr>
<td>Coursework</td>
<td>24 30 24</td>
</tr>
<tr>
<td>Courses in department (500 level or above)</td>
<td>12 18 12</td>
</tr>
<tr>
<td>Mathematics (400 level or above)</td>
<td>6 6 6</td>
</tr>
</tbody>
</table>
courses is required at the 600 level. These are in the major. A minimum of 9 semester hours of above, with at least 12 of these semester hours numbered 500 or above.

A minimum of 24 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:
1. Participation in the departmental seminar program.
2. Meet all departmental examination requirements, which include passing a written and oral comprehensive examination.
3. Presentation of a dissertation proposal to the student’s advisory committee and approval of that proposal by that committee.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The Ph. D. program in Aerospace Engineering is available to residents of the states of Arkansas or Kentucky. The M.S. in Aerospace Engineering is available to residents of Kentucky. The Ph. D. program in Aerospace Engineering Science is available to residents of the state of Florida (concentration in biomedical engineering only). Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

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. For students majoring in Engineering Science, four hundred-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 and Aerospace Engineering and Engineering Science may take senior (400-level) courses in the Department for graduate credit. Such students should consult with the instructors regarding prerequisites for undergraduate courses.

Aerospace Engineering

NOTE: Not all the courses listed below are available at both the UT Knoxville and the UT Arlington campuses.

**GRADUATE COURSES**

422 Aerodynamics (3) Theory and design of aerodynamic bodies for desired characteristics. Potential flow theory, viscous effects, compressibility effects, Subsonic, transonic, and supersonic flows.

423 Viscous Flow (3) Boundary layer theory; laminar and turbulent flow; compressibility effects; numerical solution methods.

424 Astronautics (3) Propulsion, trajectories, guidance, control, and atmospheric reentry of space vehicle systems. Thermodynamics, Mechanical Vibrations.

425 Propulsion (3) Principles of propulsion devices: turbo-jet, ramjet and rocket engines.

426 Introduction to Aerospace Design (2) Design process, synthesis, safety, reliability, patents, power system, economic analysis, optimization, design standards, design studies. Individual design reports.

494-95 Special Engineering Science Topics (1-3) Problems related to recent developments and practice. Open to juniors or seniors. Consent of Instructor. May be repeated. Maximum 9 hrs.
NOTE: Not all the courses listed below are available at both the UT Knoxville and the UTSI campuses.

**GRADUATE COURSES**


451 Systems and Controls (3) Analytical models of physical systems comprised of combinations of mechanical, fluid, electrical, and thermal components; feedback and control systems; stability analysis, including linear and nonlinear control of linear systems; sampled data systems; digital filters. Prereq: Mechanical Engineering Instrumentation and Measurement. Circuits and Electro Mechanical Components. F, Sp

455 Introduction to Design (2) Engineering economy, optimization, design for automation, reliability, patents, and product liability; design of mechanical engineering solid mechanics systems. Participation in team design effort; design report. Prereq: Dynamics and Vibrations of Machines.

456 Introduction to Thermal Design (2) Engineering economy, optimization, design for automation, reliability, patents, and product liability; design of mechanical engineering solid mechanics systems. Participation in team design effort; design report. Prereq: 332, 344, F


469 Machine Design (4) Design of complete machine; documentation, complete specifications, design calculations, working drawings, and cost analysis. Written and oral report. Prereq: 455, 468, Sp

471 Refrigeration and Air Conditioning (3) Vapor compression and absorption cycles; heat pump systems; psychrometric procedures; air washers, cooling towers; solar radiation; building heat transmission. Prereq: 332, 344.

475 Thermal Engineering (3) Thermal systems, turbomachinery, heat exchangers, combustion and system analysis of internal combustion engines and solar energy. Prereq: 332, 344, F

479 Thermal Engineering Design (4) Design of complete thermal-fluid system, economic, technical and optimization aspects. Participation in team design effort. Final presentations and design report. Prereq: 456, 475 Sp


484-85 Selected Topics in Mechanical Engineering I and II (3, 3) Advanced topics in mechanical engineering. Prereq: Consent of instructor. F, Sp


507 Application of Numerical Linear Algebra in Systems and Control Engineering (3) Same as Chemical Engineering 507 and Electrical Engineering 507.


521-22 Thermodynamics I and II (3, 3) Macroscopic thermodynamics, including First and Second Law analysis, thermodynamic phase diagrams, chemical reaction criteria, combustion, gas mixtures, and property relations, determination of thermodynamic properties from molecular structure, statistical and probabilistic 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 of turbulent flow; applications of conservation equations; phenomenological approach to laminar flames; diffusion and premixed flame theory; single chamber combustion; gasification and de-detonation theory; stabilization of combustion waves in laminar streams; hysteresis stability of premixed laminar flames; introduction to turbulent flames. Prereq: 522, 531, or consent of instructor.

526 Combustion and Chemically Reacting Flows II (3) Advanced topics: phenomenological approaches to turbulent flames; fundamentals of turbulent flow; applications of probability density functions to turbulent flames; turbulent reacting flows with premixed and non-premixed reactants; spray combustion models, fluidized bed combustion, chemically reacting boundary layer flow; gas turbine and jet engine combustion; design of combustion systems and safety. Prereq: 522, 531, or consent of instructor.


551-52 Mechanical Engineering Design (3, 3) Design of mechanical engineering solid mechanics systems. Participation in team design effort; design report. Prereq: Dynamics and Vibrations of Machines.

553 Development of Superior Products and Processes (3) Case studies of latest techniques of superior product and process development practiced in industry. Course work on product or process improvement projects. Prereq: Consent of instructor.

558 Rocket Propulsion I (3) Rocket propellant fundamentals; thermodynamics of nonreacting and chemical rocket nozzle 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.
Mechanical and Aerospace Engineering and Engineering Science

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E

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. S/C N/C only. E


553 Computational Solid Mechanics (3) Finite element analysis techniques in structural mechanics and elasticity, nonlinearity, and two-dimensional nonlinear solid deformation. Prereq: Mechanical and Aerospace Engineering and Engineering Science 532.

matrix iteration techniques. Applications in beams, plates and shells; use of representative computer programs for computational fluid mechanics and structural mechanics. CAD, graphics, solid models, data base management. Prereq: 551.

559 Computational Mechanics Laboratory (1) Utilization of networked X-terminal engineering work station environment for conducting computational mechanics experiments. May be taken for credit with each of courses 551, 552, 553, and 557. Coreq: 551.

576 Expert Systems in Engineering (3) (Same as Nuclear Engineering 575.)

577 Neural Networks in Engineering (3) (Same as Nuclear Engineering 577.)

588 Measurement Science I (3) (Same as Nuclear Engineering 550, Aviation Systems 598.)

589 Seminar (1) All phases of mechanical and aerospace engineering and engineering science. Reports on current research at UTK and UT. May be repeated. S/N only.

600 Doctoral Research and Dissertation (3-15) P/NP only. E

651-52 Advanced Topics in Computational Fluid Dynamics (3,3) Approximate solution analysis of accuracy, convergence, and stability for smooth and non-smooth solutions; shock formation, artificial dissipation; two- and three-dimensional, compressible viscous and inviscid flows, potential; Euler and complete Navier-Stokes descriptions; mixed subsonic-supersonic flows. Algorithm constructions: finite difference, finite element, approximate factorization. Flux vector splitting; finite volume; generalized coordinates and adaptive grids; steady flows, including second-order turbulence closure. Thin layer and parabolic Navier-Stokes equations, reports on current research at UTK and UT. May be repeated. S/N only.

653-54 Advanced Topics in Computational Solid Mechanics (3,3) Fracture mechanics; singular solutions; non-linear constitutive problems, variable stiffness, initial strain and initial stress methods, plasticity, creep; unified creep-plasticity theory; geometrically non-linear, large deflection, stability; shell structures, analysis of accuracy, convergence, adaptive grids. Prereq: 553.

671 Advanced Topics in Applied Artificial Intelligence (3) (Same as Nuclear Engineering 671.)
courses taken for graduate credit after 12 hours and to encourage creative and independent knowledge, to permit the acquisition of technical laboratory rotation periods. The major professor 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.

THE MASTER'S PROGRAM

The program leading to the M.S. 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. Two to three calendar years are usually needed for the course of study that has the following requirements: (1) 30 hours including 6 thesis credits; (2) 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; (3) a 3.0 GPA in courses taken in the department; (4) a complete course sequence in biochemistry or molecular biology; (5) a presentation of a research thesis and its oral defense. The program leading to the Ph.D. is designed to develop the student's ability to pursue independent and original research in microbiology and allied fields, to teach both formal 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 complete the Ph.D. after four or five years; those with the master's degree usually take three or four years to complete the degree. Departmental requirements are: (1) 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; (2) a 3.0 GPA in courses taken in the department; (3) satisfactory performance in at least one semester as a teaching assistant; (4) one semester of physical chemistry; (5) one course in statistics; (6) two seminars of biochemistry or molecular biology; (7) 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; and (8) the presentation of a research dissertation and its oral defense.

GRADUATE COURSES

410 Bacterial Physiology (3) Modern concepts of structure and function of bacterial cell. Prereq: Introduction to Microbiology. F

411 Bacterial Genetics (3) Transmission and expression of genetic information by bacteria. Prereq: Introduction to Microbiology. Sp

420 Medical Microbiology (3) Disease-producing microorganisms, including bacteria, fungi, algae, and viruses. Prereq: Introduction to Medical Microbiology. Sp

429 Medical Microbiology Laboratory (2) Laboratory exercises in medically important areas of microbiology: microorganisms and their identification. Prereq: Introduction to Medical Microbiology. Lab. 430. Coreq: 429. Sp

430 Immunology (3) Principles of inflammation and immunity; immunoglobulin structure and theories of formation and diversity; complement, hypersensitivities, cell cooperation and recognition in immune mechanisms; soluble factors. Prereq: General Genetics. F


470 Microbial Ecology (3) Physiological and taxonomic behavior of microorganisms in natural environments. Functional role of microorganisms in natural and managed ecosystems. Prereq: 310. F

500 Thesis (1-15) P/NP only. E

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. S/NC only. E

575 Applied Microbiology and Bioengineering (3) (Same as Chemical Engineering 575, Environmental Engineering 575, and Agricultural Engineering 575.)

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 General Seminar (1) Lectures and seminars by invited speakers, faculty, and graduate students. May be repeated. Maximum 18 hrs. S/NC only. E

596 Laboratory Rotation (1) Familiarization with laboratory areas in department through series of rotations in laboratories of individual faculty members. May be repeated. Maximum 3 hrs. S/NC only. E

600 Doctoral Research and Dissertation (3-15) P/NP only. E

601 Journal Club in Microbial Physiology (1-3) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/NC only. E

602 Journal Club in Microbial Pathogenesis (1-3) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/NC only. E

603 Journal Club in Immunology (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/NC only. E

604 Journal Club in Virology (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/NC only. E

605 Journal Club in Microbial Genetics (1-3) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/NC only. E

610 Topics in Microbial Physiology (1-3) Prereq: 410 or consent of instructor. May be repeated. Maximum 12 hrs. E

620 Topics in Microbial Pathogenesis (1-3) Prereq: 420, 430 or consent of instructor. May be repeated. Maximum 12 hrs.

630 Topics in Immunology (1-3) Prereq: 430 or consent of instructor. May be repeated. Maximum 12 hrs.

640 Topics in Virology (1-3) Prereq: 440 or consent of instructor. May be repeated. Maximum 12 hrs.

650 Topics in Microbial and Molecular Genetics (1-3) Prereq: 411 or consent of instructor. May be repeated. Maximum 12 hrs.

670 Advanced Topics in Environmental Microbiology (1-3) Prereq: 570 or consent of instructor. May be repeated. Maximum 12 hrs.

Microbiology-Veterinary Medicine

See College of Veterinary Medicine and Comparative and Experimental Medicine

Music

(Major of Arts and Sciences)

MAJOR

DEGREES

Music.................................M.M.

Dolly Davis, Acting Head

Professors:

Ball, Charles H. (Emeritus), Ph.D.........Peabody
Blazas, George C., M.M.......................Converse
Brock, John P. (Liaison), M.M..............Alabama
Carter, W. J. (Emeritus), D.M.A.............Eastman
Coker, J., M.A..............................Sam Houston
Combs, F. M., M.A............................Missouri
DeVine, George F. (Emeritus), Diploma....................Shurz
Dorn, W. (Emeritus), M.A.......................Columbia
Fred, Herbert W. (Emeritus), Ph.D............North Carolina
Hoford, A. G. (Emeritus), M.M..........Northwestern
Applicants for admission to the Master's Program are given by the Department of music education, and music history/literature. These Diagnostic Examinations in music theory, ear-training, and tape recordings of representative works are required of students in composition, musicology, and theory.

All applicants are required to have an interview with members of the faculty of the prospective area of concentration.

All applicants are required to take the Diagnostic Examinations in music theory, ear-training, and music history/literature. These examinations are given by the Department of Music at the beginning of each semester.

GRADUATE COURSES

Music Education

500 Thesis (1-15) P/NP only. E
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 be repeated. S/NC only. E
510 Foundations of Music Education (3) Historical, philosophical and aesthetic bases. Prereq: Consent of instructor.
520 Research in Music Education (3) Definition of research problems, data collection and analysis, and report research writing. Application of research techniques to analysis of existing research literature in music education. Prereq: Consent of instructor.
530 Advanced Band Literature and Conducting (3) Reading, conducting, and interpreting band scores suitable for school, college, and community bands; contemporary and standard band literature. Prereq: Consent of instructor.
550 Curriculum Development and Evaluation in Music Education (3) Principles of curriculum development applied to music education programs. Formulating objectives; construction of evaluation instruments; survey of appropriate literature. Prereq: Consent of instructor.
560 Psychology of Music Teaching (3) Research on musical perception and cognition and its application to teaching of music. Definition and measurement of musical ability. Prereq: Course in general psychology and 1 yr of music theory or consent of instructor.
580 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 hrs.

Music Ensemble

GRADUATE COURSES

503 Small Jazz Ensemble (1) May be repeated. Maximum 12 hrs.
504 Jazz Ensemble (1) May be repeated.
506 Studio Orchestra (1) May be repeated. Maximum 12 hrs.
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 hrs.
520 UT Singers (1) May be repeated.
530 Chamber Singers (1) May be repeated.
540 Opera Theatre (1) May be repeated.
550 Concert Band (1) May be repeated.
552 Campus Band (1) May be repeated.
554 Varsity Band (1) May be repeated.
556 Laboratory 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.
599 Women's Chorus (1) May be repeated.

Music General

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E
501 Graduate Recital (2) E
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 be repeated. S/NC only. E
503 Small Jazz Ensemble (1) May be repeated. Maximum 12 hrs.
510 Lecture Recital (2) E
511 Lecture Recital (2) E
515 Chamber Music Ensemble (1) May be repeated.
518 Marching Band (1) May be repeated.
520 UT Singers (1) May be repeated.
521 Special Topics in Performance (1-3) Prereq: Consent of department head. E
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. E
561 Church Music Performance Project (1-2) May be repeated. Maximum 3 hrs. E

Music History

GRADUATE COURSES

410 Music History Genre (3) Topics vary. May be repeated. Maximum 6 hrs.
420 History of Opera (3) Dramatic, vocal, and orchestral elements in opera of Italian, French, and German schools, 1600-present.
Music Instrumental
GRADUATE COURSES
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.

570 Advanced Suzuki Pedagogy (2) Study of psychology, procedures and literature utilized by Shinichi Suzuki in Japan. Prereq: 495 or consent of instructor. May be repeated. Maximum 8 hrs toward M.M. degree.

580 Band Literature (3) Band literature and origins of band, its important expanded cultivation during past century in United States and Europe.

582 Instrumental Conducting Performance (1) Jury performance; conducting band or orchestra in public.

583 Practicum for Instrumental Conductors (1) Intern experience in choral music. S/NC only.

584 Practicum for Instrumental Conductors (1) Intern experience in field other than area of major interest. S/NC only.

595 Instrumental Conducting Seminar (3) Rehearsal and performance problems and techniques allied to score reading and preparation. Particular attention to individual problems. Prereq: 490 or equivalent.

Music Jazz
GRADUATE COURSES
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.

Music Performance
GRADUATE COURSES
All performance courses require an audition and consent of instructor. May be repeated. Maximum 8 hrs toward M.M. degree.

403 Flute (1-4)
405 Oboe (1-4)
410 Bassoon (1-4)
415 Clarinet (1-4)
420 Saxophone (1-4)
425 Horn (1-4)
430 Trumpet (1-4)
435 Trombone (1-4)
440 Baritone (1-4)
445 Tuba (1-4)
500 Violin (1-4)
505 Viola (1-4)
510 Cello (1-4)
515 Bassoon (1-4)
520 String Bass (1-4)
525 Guitar (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)
575 String Bass (1-4)
576 Electric Bass (1-4)
579 Guitar (1-4)
580 Piano (1-4)
585 Harpsichord (1-4)
590 Organ (1-4)
595 Composition (1-3)
599 Improvisation (1-4)

Music Theory
GRADUATE COURSES
430-40 Counterpoint I (3,3) Study of species counterpoint; modal and tonal styles, works of Palestrina and J.S. Bach. Prereq: 220. 440-40 Writing of contrapuntal forms of 18th century and fugue; analysis of works from 18th through 20th centuries. Prereq: 450.

450 Choral Arranging (2) Analysis of scores and writing of arrangements for choirs. Prereq: Theory IV or consent of instructor.

510 Musical Styles (3) Elements of design and their role in definition of musical styles. Prereq: 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. Prereq: Consent of instructor.

540 Computer Projects (1-3) Programming languages, design and implementation of projects in computer-managed instruction. Prereq: Consent of instructor.

593 Independent Study (1-15) See College of Arts and Sciences. Prereq: Consent of department head.

Music Voice
GRADUATE COURSES
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 hrs.

520 Music Theatre Performance Techniques (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 hrs.

540 Opera Production (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

550-60 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.

570 Vocal Chamber Music Performance (2) Prereq: Consent of instructor.

580-85 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 (3) Expansions and continued refinement of conducting techniques; development of choral rehearsal skills. Prereq: Consent of instructor.

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) Score reading and preparation; problems of interpretation, performance, practices, and conducting techniques. Prereq: 590 or consent of instructor. May be repeated.

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Nuclear Engineering

(College of Engineering)

MAJOR

DEGREES

Nuclear Engineering ................. M.S., Ph.D.

H. L. Dodds, Head

Professors:

Dodds, H. L., PE, Ph.D. .............. Tennessee
Mihalczio, J. T., Ph.D. .............. Tennessee
Miller, L. F., PE, Ph.D. .............. Texas A&M
Uhrig, R. E. (Distinguished Prof.), PE, Ph.D. ......... Iowa
Upadhyaya, B. R., Ph.D. .............. California

Associate Professors:

Groer, P. G., Ph.D. ...................... Vienna
Katz, E. M., PE, Ph.D. .............. Tennessee
Pearsey, R. E., Ph.D. .............. Tennessee
Ruggles, A. E., Ph.D. .............. Rensselaer
Scott, T. H., PE, Ph.D. .............. Florida
Townsend, L. W., Ph.D. .............. Idaho

Assistant Professor:

Hines, J. W., Ph.D. ...................... Ohio State

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 M.S. or Ph.D. program (focusing on fission energy or fusion energy) or a radiological engineering concentration at the master's level.

The radiological engineering concentration prepares students for careers in the radiation safety field (health physics). The program is designed for graduates of undergraduate programs in engineering, physics, biology and chemistry.

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 a course in introductory nuclear engineering. If these competencies do not exist, the student must take appropriate courses for undergraduate credit. The department head is the contact for all interested students, both those with nuclear engineering degrees and those from other disciplines.

**THE MASTER'S PROGRAM**

A graduate program leading to the Master of Science is available to graduates of recognized undergraduate curricula in engineering and physics. Each applicant will be advised as to the necessary prerequisite courses before he/she enters the program.

The student must complete 24 semester hours of coursework approved by the student's advisory committee that includes the following:

1. A major consisting of a minimum of 12 semester hours of graduate courses in nuclear engineering. This must include at least one of the following sequences: 511, 512; 551, 552; 571, 572.

2. A minor of 6 semester hours of elective courses in mathematics, statistics or computer science.

3. Six semester hours in either nuclear engineering or a related field.

The M.S. candidate must also demonstrate research or design capability. This requirement may be satisfied by a thesis project or engineering practice projects as described below:

**Thesis** - The student performs independent research on a topic approved by the graduate committee. He/She submits a thesis on the topic and must pass an oral examination on the thesis and all graduate coursework. The student must enroll for six semester hours of NE 500 (Thesis).

**Engineering Practice** - The student performs independent research on two to four separate topics approved by his/her graduate committee. Each project is similar to a thesis project but smaller in scope. He/She submits a report, in thesis format, on each project. The student must then pass an oral examination on his/her engineering practice reports and all graduate coursework. The student must enroll for six semester hours of NE 598 (Nuclear Engineering Practice).

**THE DOCTORAL PROGRAM**

Students in the field of nuclear engineering desiring to study for the Doctor of Philosophy must have a Bachelor of Science or Master of Science from a recognized university, with a major in engineering or physics. All candidates will be required to demonstrate general competence in a comprehensive examination in the areas of engineering science, mathematics, physics, and nuclear engineering.

Specific course requirements for the Ph.D. in Nuclear Engineering include:

1. A minimum of 48 semester hours beyond the Bachelor's degree, exclusive of credit for the M.S. thesis or Nuclear Engineering Practice.

2. A minimum of 24 semester hours in doctoral research, NE 600.

3. A minimum of 30 semester hours in nuclear engineering courses numbered 500 and above (or the equivalent), with at least 6 semester hours of 600-level courses. These are exclusive of thesis or dissertation credit.

4. A minimum of 12 semester hours in mathematics, computer science, or statistics courses beyond nuclear engineering undergraduate requirements numbered 400 or above.

5. A minimum of 6 semester 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.

6. A reading knowledge of one foreign language may be specified by the student's doctoral committee.

The comprehensive examination is prepared by the nuclear engineering faculty and consists of 12 hours of written examinations. All past examinations are filed in the library, and students are encouraged to review them. Students are invited to take the comprehensive examination after completing approximately 30 semester hours of coursework. A student who fails the written part of the examination must take and pass the examination the next time it is offered to remain in the Ph.D. program. Registration for NE 600 is not permitted until the written examination is passed. The comprehensive examination is completed with a successful oral defense of the dissertation proposal.

A candidate must successfully defend, in an oral examination, all work presented for the degree—all coursework and the dissertation.

**GRADUATE CREDIT FOR UNDERGRADUATE COURSES**

400-level courses in nuclear engineering may be used for graduate credit. However, students must recognize that at least two-thirds of the minimum requirements (30 in a master's degree program) must be taken in courses numbered 500 or above.

**GRADUATE COURSES**

403 Nuclear Engineering Laboratory (3) Cross-section measurement, diffusion properties of neutrons, criticality loading experiment, core rod calibration, statistical weight, shielding, xenon poisoning, dynamics and controls experiments. Prereq: Nuclear Engineering Laboratory or equivalent. Coreq: 471, 405.


406 Reactor Dynamics, Control and Safety (3) Reactor models, transient analysis, safety analysis, control systems and safety systems. Prereq: 470.

409 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 incidents; safety standards; overview of experiments, computational methods, and applications. Prereq: Introduction to Nuclear Engineering.

432 Radiation Risk Analysis (3) Radiation risk estimates for external and internal radiation, dose response models, dose rate effects, prediction of radiation risks, radiation safety standards.

433 Radioassay and Dosimetry Laboratory (3) Measurements of radioactivity in various materials. Charact- erization of radiation fields, radiochemical techniques, alpha and beta spectroscopy, radiation dosimetry.

463 Introduction to Fusion Energy (3) (Same as Electrical Engineering 463.)

464 Introduction to Fusion Energy II (3) (Same as Electrical Engineering 464.)

470 Nuclear Reactor Theory I (3) Fundamentals of reactor physics, neutron transport, thermal and fast reactor core calculations, reactor core design, reactor dynamics. Prereq: Consent of instructor. (Same as Mechanical and Aerospace Engineering 472.)

471 Nuclear Reactor Theory II (3) Thermal spectrum computational methods: heterogeneous effects in fast and thermal spectrum calculations in reactor core design; equations that relate thermal and neutron variables; power distribution calculations and reactivity control methods. Prereq: 470.

494 Special Topics in Nuclear Engineering (3) Problems related to related reactor components and practice. Prereq: Senior standing and consent of instructor. May be repeated. Maximum 6 hrs. 

500 Thesis (1-15) P/NP only. E

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. S/NC only.

511-12 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 different conserva- tion 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 System Dynamics and Control (3) Introduction to state variable methods for system dynamics and control analysis of nuclear systems. Methods to nuclear plant dynamics, simulation and control problems.


541 Reactor Fuel Management (3) Topics relative to nuclear fuel management. Applicable topics in reactor phys- ics, fuel depletion, isotopic inventories, and numerical methods. Prereq: 401.

542 Management of Radioactive Materials (3) Technology for processing, treatment, handling and storage of radioactive nuclides. Analytical and numerical meth- ods for evaluation and control of the impact of radioactive materials. Licensing and regulation issues.

543 Selected Topics in Nuclear Criticality Safety (3) Criticality safety computational and experimental meth- ods for enrichment, fabrication, storage, reprocessing, and transport applications; overview of safety practices and regulatory requirements. Prereq: 421 or consent of instructor.

550 Nuclear Instrumentation (3) Physics and electron- ics associated with radiation detection, methods of data analysis, applicability of particular instrument measure- ments and fundamentals of nuclear instrumentation operation.

551 Radiation Protection (3) Interactions of photons, neutrons, beta particles, and heavy charged particles with matter and mechanisms of energy loss; methods of radiation detection, internal and external radiation do- simetry; chemical and biological effects of radiation; regulations and standards. Prereq: Introduction to Nuclear Engineering and Differential Equations I or equivalent.

552 Radiation Monitoring and Dose Assessment (3) Methods for work-area and environmental monitoring; dose assessment, pathways analysis; risk projections and regulations. Prereq: 551.

571 Reactor Theory and Design (3) Analytical and numerical techniques for neutronics modeling of nuclear systems; reactor and adjoint Boltzmann transport equation, multigroup diffusion theory, Core analysis methods and codes. Prereq: 401 or equivalent.

572 Nuclear System Design (3) Design and analysis of a nuclear system, interface with non-nuclear aspects of systems design; system reliability and economics; class project. Prereq: 571 or consent of instructor.

576 Expert Systems in Engineering (3) Application of expert systems in engineering: logic and rationales, develop- ing expert systems, programming, advanced top- ics. Prereq: Consent of instructor. (Same as Mechanical and Aerospace Engineering and Engineer- ing Science 576.)

577 Neural Networks in Engineering (3) Neural net- work technology for use in intelligent systems; rationale for neural computing, structure of neural computing systems, programming. Prereq: Consent of instructor. (Same as Mechanical and Aerospace Engineering and Engineering Science 577.)

578 Fuzzy Systems in Engineering (3) Fuzzy num- bers, fuzzy environment, uncertainty and randomness, approximate reasoning, fuzzy model and structure, decision process in fuzzy environment, fuzzy comput- ing, fuzzy logic controllers, fuzzy expert systems and other engineering applications. (Same as Engineering Science 578.)

591 Reactor Shielding (3) Application of analytic/ geometric methods for neutrons, gamma rays, neutrons, beta particles, and heavy charged particles. Prereq: 406 or equivalent.

582 Monte Carlo Method (3) Analysis of radiation transport problems by Monte Carlo method, description of general purpose Monte Carlo code, random number generator. Prereq: Consent of instructor. (Same as Mechanical and Aerospace Engineering and Engineering Science 585.)

585 Process System Reliability and Safety (3) Qualitative and quantitative techniques for assessing and improving process systems reliability and safety. Fault tree analysis, importance function, methods of dependent failure analysis. (Same as Chemical Engineering 585.)

588 Measurement Science I (3) Principles of measure- ment, introduction to measuring devices. Prereq: Consent of instructor. (Same as Mechanical and Aero- space Engineering and Engineering Science 588, Aviation Systems 588.)

589 Measurement Science II (3) Modern industrial measurement systems, advanced topics in measurement. Prereq: 588. (Same as Aviation Systems 589.)

597 Special Topics in Nuclear Engineering (3) Lecture on selected topics in nuclear engineering. Prereq: 550 or 401. (Same as Mechanical and Aerospace Engineering 597.)

598 Nuclear Engineering Practice (3-9) Experience in solving and reporting on engineering problems. Prereq: Approval of department. May be repeated. Enrollment limited to alternate plan students. S/N only.

600 Doctoral Research and Dissertation (3-15) P/NP only. E

611-12 Selected Topics in Reactor Theory (3,3) Transport theory, control rod theory, stochastic methods. Selected topics from literature. Prereq: 551.

631 Selected Topics in Radiation Protection (3) Prereq: 551, 552. May be repeated with consent of depart- ment.

653 Theory of Information Processing (3) Modern system theoretical methods for evaluating system performance from dynamic measurements. Prereq: 522 or equivalent.

571 Advanced Topics in Applied Artificial Intelli- gence (3) Recent advances in engineering applications of artificial intelligence. Prereq: 577. (Same as Mecha- nical and Aerospace Engineering and Engineering Science 579.)

697 Special Topics in Nuclear Engineering (3) Investi- gation of new developments. Prereq: Consent of in- structor.

Nursing

Nursing (College of Nursing)

MAJOR

DEGREE

Nursing .................................................. M.S.N., Ph.D.

Joan L. Creasia, Dean

Sandra Thomas, Director of Ph.D. Program

Martha Alligood, Director of MSN Program

Professors:

Alligood, Martha R. (Liaison), Ph.D. .... New York

Cresia, Joan L., Ph.D. ...... Maryland

Droppleman, Patricia G., Ph.D. ..... Tennessee

Farr, Glen, Pharm.D. .... Tennessee

Goodfellow, Dale H., Ph.D. ...... Peabody

Mozingo, Johnnie N., Ph.D. ....... Waiden

Pierce, Joan U., Ph.D. ........... Utah

Seavor, Carol, Ed.D. .......... Massachusetts

Thomas, Sandra P., Ph.D. ...... Tennessee

Associate Professors:

Bowen, Sheila, Ph.D. ............... Tennessee

Davis, Mitzi, Ph.D. .............. Tennessee

Dyer, Theresa, Ed.D. ......... Tennessee

Fenske, Mildred M., Ph.D. ...... Vanderbilt

McGuire, Sandra, Ed.D. .... Tennessee

Modrin-Carren, Mary Anne, Ph.D. ...... Tennessee

Smith, Helen, Ph.D. .......... Maryland

Tuck, Inez, Ph.D. .......... North Carolina (Greensboro)

Wallace, Debra C., Ph.D. ...... South Carolina

Assistant Professors:

Brown, Allie J., M.S.N. .......... Alabama (Birmingham)

Conlon, Kathleen P., M.S.N. .... SUNY (Buffalo)

Evans, Ginger W., M.S.N. ...... Tennessee

Evans, Maude M., M.S.N. ..... Tennessee

Fox, Marie X., M.S.N. ........ Tennessee

Heiton, Sally M., M.S.N. .......... Texas Women's

Kollar, Mary, Ph.D. .......... Tennessee

Pierce, Margaret, M.S.N. ...... Tennessee

Pullen, Lisa, Ph.D. .......... Mississippi State

THE MASTER'S PROGRAM

The College of Nursing offers the Master of Science in Nursing degree with concentrations in adult health nursing, family nurse practitioner, mental health nursing, nursing administration, and nursing of women and children. The program is accredited by the National League for Nursing 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 clients' achievement of optimal health in the dynamic health care system. The program prepares advanced practice nurses with role preparation as nurse practitioners, clinical nurse specialists or nursing administrators. Advanced practice nursing involves the delivery of care, management of

577 Nuclear System Design (3) Design and analysis of a nuclear system, interface with non-nuclear aspects of systems design; system reliability and economics; class project. Prereq: 571 or consent of instructor.
Admission Requirements

1. Meet requirements for admission to The Graduate School.
2. Hold a Bachelor's degree in Nursing from a National League for Nursing accredited program or complete the equivalent of an upper division undergraduate major in nursing in addition to meeting all M.S.N. degree requirements.
3. Have an undergraduate GPA of 3.0 or higher or a GPA of 3.3 for courses in the undergraduate major.
4. Submit scores of the general portion of the Graduate Record Examination.
5. Submit Graduate Program Data Form.
6. Submit Graduate School Rating Forms from three individuals familiar with the applicant's current work performance or academic aptitude.
7. 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 B.S.N. graduate may be admitted at the beginning of spring or summer terms in a temporary non-degree status. Applications for fall admission must be received by February 1.

Special Requirements

1. Each student must hold personal professional liability insurance.
2. Registered nurses must be licensed to practice nursing in Tennessee.
3. Each student must present proof of hepatitis B vaccination and rubella and rubella immunization or sufficient titer for immunity; TB status.
4. Each student must present evidence of current 2-person CPR certification.
5. Non-registered nurse students must have completed courses in chemistry, nutrition, microbiology, anatomy, and physiology plus 12 semester hours of behavioral science courses.

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 580 Nursing Project or 582 Supervised Research.

Program Requirements

All students must complete a minimum of 36 semester hours as follows:

- Core (12 credits)
  - 503-04 Advanced Clinical Reasoning I, II 6
  - 510 Theoretical Foundations of Nursing 3
  - 520 Advanced Practice Nursing and Health Delivery Systems 3

- Research (9-12 credits)
  - 501 Nursing Research: Methods, Design & Analysis 3
  - 500 Thesis 3
  - 580 Nursing Project 3
  - 582 Supervised Research 3

- Concentration (12-17 credits) — choose one
  - 550-51 Family Nurse Practitioner I, II, III 17
  - 550-51 Nursing of Women and Children I, II 12
  - 560-61 Mental Health Nursing I, II 12
  - 590-91 Nursing Administration I, II 12

Elective (3 credits)—waived for those who choose the thesis option except the family nurse practitioner concentration who take 505 and 515, and for nursing of women and children concentration who are required to take 505 and recommended to take 515.

Students who enter the program as non-RNs must complete the following undergraduate nursing courses in addition to meeting the requirements listed above:

- 304 Nursing Assessment and Health Promotion 4
- 306 Health Deviation Concepts I 3
- 316 Health Deviation Concepts II 4
- 330 Nursing of Adults 6
- 414 Community/Mental Health Nursing 6
- 415 Family/Community Health Nursing 6
- 431 Nursing of Children 4

A total of 16-18 credits can be obtained by successful completion of the NLN Nursing Mobility Profile Examination. See undergraduate catalog for other challenge options. RNs who are in the process of completing a BSN at UTK with the intent of enrolling in the MSN program follow the same plan with the addition of 313.

Final Examination Requirements

All students must successfully complete a final examination as required by The Graduate School. 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

1. If the clinical performance of any student is unsatisfactory, the student will receive a grade of "F" for the course.

Final Examinations

1. If the clinical performance of any student is unsatisfactory, the student will receive a grade of "F" for the course.
GRADUATE COURSES

500 Thesis (1-15) P/NP only. E

501 Nursing Research: Methods, Design, and Analysis (3) Basic principles of research process in application to clinical questions; critical evaluation of research and health-related research. Prereq: or coreq: 510, graduate level statistics. F,Sp

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. S/NC only. E

503 Advanced Clinical Reasoning I (3) Principles of health promotion, education, and innovative strategies for achievement of wellness: health habits, psychological, and social dimensions of individual as related to health. Prereq: 301 or equivalent or consent of instructor. F

506 Advanced Clinical Pharmacology (3) Pharmacological agents utilized to treat common, recurrent health problems; indications, contraindications, side effects, and interactions of commonly prescribed medications. Prereq: 301 or equivalent or consent of instructor. F


510 Theoretical Foundations of Nursing (3) Historical evolution of nursing science; nursing's metaphysical and selected philosophical, conceptual models and theories as structures which guide critical thinking in analysis, reasoning, and decision making for advanced practice nurses. F

515 Advanced Pathophysiology for Nursing Practice (3) Advanced physiologic and pathophysiologic concepts, principles, and theories applied to deviations of human systems. Sp

520 Advanced Practice Nursing and Health Delivery Systems (3) Nursing's role in dynamic health care system: health policy and organizational, social, ethical, political, economic and technological factors which impact advanced practice nursing and delivery of health care. Prereq: 504, Coreq: First course in concentration. Sp

530 Adult Health Nursing I (6) Advanced nursing practice for health promotion, restoration, and maintenance of young, middle-aged, and older adults. Prereq: 510, Coreq: 520. Didactic (2) and practicum (4). Sp

531 Adult Health Nursing II (6) Continuation of 530. Delivery of care for chronic, disabling, and terminal health care for adults and communities. Prereq: 520. Didactic (2) and practicum (4). F

540 Family Nurse Practitioner I (4) Application of advanced health/physical assessment and diagnostic reasoning in nursing management and primary care and of individuals and their families with actual and potential acute health problems; clinical experience in role of family nurse practitioner in variety of settings. Prereq: 504, 515, Coreq: 520. Didactic (2) and practicum (2). Sp

541 Family Nurse Practitioner II (6) Continuation of 540. Nursing management and primary care of individuals and their families in all developmental life stages; clinical experience in variety of settings. Prereq: 540, Prereq or coreq: 501, Coreq: 520. Didactic (2) and practicum (4). Sp

542 Family Nurse Practitioner III (7) Continuation of 541. Nursing management of chronic health problems of individuals and families in all developmental life stages; role refinement and exploration of major issues in delivery of holistic primary nursing care. Clinical experiences vary depending on student's intent to pursue certification as family or adult nurse practitioner. Prereq: MSN in clinical concentration, 505, or equivalent, and consent of instructor. 3hrs and 6 labs. Su

550 Nursing of Women and Children I (6) Advanced practice nursing for women and children; clinical experience in role of nurse practitioner or clinical specialist in a variety of settings. Prereq: 540, Prereq or coreq: 501, Coreq: 520. Didactic (2) and practicum (4). Sp

551 Nursing of Women and Children II (6) Continuation of 550. Role refinement of nurse practitioner or clinical specialist in health promotion and restoration for women, children, and families. Prereq: 550, Prereq or coreq: 501, Coreq: 520. Didactic (2) and practicum (4). Sp

552 Parent Child Nursing Field Work and Seminar (5) Seminar and intensive clinical practicum designed to facilitate further development of specific knowledge and skills utilized for advanced parent-child nursing practice. Prereq or coreq: 551, 1 hr and 4 labs. Sp

557 Nurse Midwifery Seminar I (1) Exploration of art and science of midwifery, nature and scope of midwifery practice, professional and ethical issues in advanced practice. Prereq or coreq: 551, 510, F

558 Nurse Midwifery Seminar II (1) Exploration of psychological, developmental, and sociocultural theories as related to individual and family patterns of illness and reproduction. Role of nurse-midwife in promoting optimal wellness within clients and community. Prereq: 551, 510, 570. Coreq: 520. Sp

559 Nurse Midwifery Seminar III (1) Exploration of state of science in nurse midwifery, innovative practice options related to rehabilitative problems in nurse-midwifery practice. Prereq: 557, 571, Coreq: 500, 580 or 582. F

560 Mental Health Nursing I (6) Theories of advanced therapeutic interventions for clients experiencing actual and potential mental health problems. Prereq: 504, Prereq or coreq: 501, Coreq: 520. Didactic (2) and practicum (4). Sp

561 Mental Health Nursing II (6) Continuation of 560. Advanced practice nursing in specialty of mental health; clinical practice with clients of various ages in acute care and community settings. Prereq: 504, Prereq or coreq: 501, Coreq: 520. Didactic (2) and practicum (4). Sp

565 Teaching Practicum (1-6) Individually designed teaching experience in collegiate nursing program or nursing practice setting. Objectives to be developed collaboratively by student and faculty. Prereq: Consent of instructor. 504 or equivalent, and consent of instructor. S/NC or letter grade. Sp

566 Educational Principles and Strategies (3) Exploration and analyses of selected education curriculum; teaching-learning, measurement, and evaluation principles; theories applied to instruction of undergraduate nursing students, staff development, and patient education. Prereq: Consent of instructor. Su

577 Special Topics (1-3) Topic is determined by faculty and student interest. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

580 Nursing Project (3) Student-initiated scholarly project with faculty supervision. Review and critical evaluation of literature in specified area of advanced practice nursing, culminating in "state of the practice" paper. Prereq: Consent of instructor, first course in concentration. 504 or equivalent, and consent of instructor. S/NC or letter grade. Sp

582 Supervised Research (3) Supervised research culminating in scholarly paper. Experiential learning of research process. Participation in on-going faculty research project by completion of specified portion of project under faculty guidance. Prereq: Consent of instructor, 501, 510. May be repeated. Maximum 6 hrs. E

583 Directed Clinical Practice (1-9) Additional opportunities for advanced practice nursing. Objectives to be developed collaboratively by student and faculty. Prereq: Enrollment in or completion of graduate level courses in clinical nursing. Maximum 9 hrs. S/NC or letter grade. E

585 Seminar in Gerontology (1) Same as Human Ecology 585, Counselor Education and Counseling Psychology 585, Exercise Science 585, Public Health 585,
Nutrition
(College of Human Ecology)

MAJORS
Nutrition ........................................... M.S.
Human Ecology .................................... Ph.D.
Michael B. Zemel, Head

Professors:
Beauchene, Roy E. (Emeritus), Ph.D. .......... Kansas State
Carruth, Betty Ruth, Ph.D. .......... Missouri
Namey, T. C., M.D. .......... Washington (St. Louis)
Sachan, Dilee S., Ph.D. .......... Illinois
Skinner, Jean D., Ph.D. .......... Oregon State
Smith, John T. (Emeritus), Ph.D. .......... Missouri
Zemel, Michael (Liaison), Ph.D. .......... Wisconsin

Associate Professors:
Alam, Yousri, Ph.D. .......... Tennessee
Bailey, James W., Ph.D. .......... Iowa State
Brooks, M. D. (Memphis), M.S. .......... Alabama
Costello, Carol, Ph.D. .......... Tennessee
Haughton, B., Ed.D. .......... Columbia
Karlstad, Michael, Ph.D. .......... Loyola
Whelan, Jay, Ph.D. .......... Penn State
Zemel, Paula, Ph.D. .......... Wayne State

Assistant Professors:
Bittle, Joyce (Memphis), Ph.D. .......... Tennessee
Chencharick, Judith (Memphis), M.S. .......... Maryland
McGrath, M. (Liaison), Ed.D. .......... University of Kentucky
Moutaibai, Naima, Ph.D. .......... Paris
Young, Katherine A., J.D. .......... California Western School of Law

The Master of Science program is available in Nutrition, with a concentration in nutrition science or public health nutrition.

A graduate degree combined with a Dietetic Internship (D.I.) beyond the baccalaureate degree qualifies the graduate to apply for the Registration Examination to become a Registered Dietitian (R.D.). Students may request more information from the department about the D.I. program. Students may also select an interdisciplinary program.

An M.S. degree program is also offered with a major in Recreation, Tourism and Hospitality Management. Two concentrations in that major are designed for students with primary interest in hotel and restaurant administration; hospitality management and tourism. Students interested in graduate work are referred to these concentrations listed under Health, Leisure and Safety Sciences.

ADMISSION REQUIREMENTS

A final file for review includes the Graduate School application file, completed departmental application form, Graduate Record Examination (GRE) scores for the general section, and three Graduate School Rating Forms completed by individuals who can attest to the applicant's potential for graduate education. Forms may be obtained from the Department Office, 229 Jesse Harris Building, University of Tennessee, Knoxville, 37996-1900.

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, physiolog-ogy, statistics and advanced nutrition. Admission to the Ph.D. program in Human Ecology with a concentration in Nutrition Science requires a master's degree. Applicants to all programs with related experience may be given preference.

THE MASTER'S PROGRAM

Students may choose a thesis or non-thesis option in Nutrition. Attendance at 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. NTR 511, 512, 540, 541 and 3 hours of graduate level statistics are required. Students in public health 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. NTR 511, 512, 540, 541, 2 hours from 542-544 and 3 hours of graduate level statistics are required. Students in public health 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 Human Ecology 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: 1) plan a career in Public Health Nutrition and want to acquire the knowledge and skills of the nutritionist and public health professional; 2) plan a career in nutrition and want to acquire the knowledge and skills and the perspective of the public health professional; or 3) plan a career in public health and want to acquire the knowledge, skills and perspective of the nutritionist.

Admission Requirements

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, Leisure and Safety 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.

Curriculum
A dual degree candidate must satisfy the requirements for both the MS (public health nutrition concentration) and the MPH degree, as well as the requirements for the dual program. All candidates for the dual degree must successfully complete Health and Society (PH 555), two credits of Seminar in Public Health (PH 509), and a minimum of 60 credits. The Department of Nutrition will award a maximum of 9 semester hours of credit toward the MS degree for successful completion of approved graduate level courses offered in the Department of Health, Leisure and Safety Sciences. The Department of Health, Leisure and Safety Sciences will award a maximum of 11 semester hours of credit toward the MPH degree 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 degree 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 (NTR 515) and 1 semester hour of Graduate Seminar in Public Health (NTR 509). MPH courses to be counted toward the MS include Public Health Administration (PH 520), Biostatistics (PH 530), and Intermediate Metabolism (PH 543).

The PhD. Concentration
The nutrition science concentration enables students to study the science of nutrition from the cellular level to the application of nutritional principles by people in a changing environment. The doctoral program emphasizes human nutrition, nutritional epidemiology, experimental nutrition, and intermediary metabolism. Cognate areas may include anthropology, biochemistry, communications, education, food technology, human development, physiology, public health, sociology, statistics, and/or toxicology. Minimum requirements include:

1. Sixteen hours in nutrition including 4 hours at the 600 level (exclusive of dissertation); 2. NTR 511, 512, 541, and 2 hours from either 542-544; 3. Four hours of NTR 540, attendance required every semester; 4. Six hours of statistics; 5. Six hours in a cognate area; 6. Nine hours at the 600 level; 7. Students without college teaching experience are required to take the fall semester teaching seminar for GTAs and NTR 548 comprising a faculty-supervised problem in college teaching.

ACADEMIC COMMON MARKET
An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. program in Nutrition is available to residents of Arkansas or Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records. For the Ph.D., see Human Ecology.

Nutrition

GRADUATE COURSES

414 Nutrient-Drug Interactions (2) Nutrient effects on enzyme activity, protein, lipid, and carbohydrate metabolism. Prereq: Fundamentals of Nutrition or equivalent. Sp, A

500 Thesis (1-15) P/NP only. E

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. S/N only. E


511 Advanced Physiological Chemistry (4) Bioenergetics, fluid shift and hormonal interrelationships. Prereq: Advanced Nutrition or equivalent. F

512 Human Nutrition (3) Advances in carotenoids, lignins, vitamins, minerals, and functions of the body. Prereq: Advanced Nutrition and 511. Sp

513 Community Nutrition I (3) Orientation to community; assessment of nutrition problems; social, cultural, and environmental factors affecting nutrition. Prereq: Advanced Nutrition and 511. F

514 Community Nutrition II (3) Planning, implementation, and evaluation of public health nutrition programs. Prereq: 513 or consent of instructor. Sp

515 Field Study in Community Nutrition (1-12) Planned learning experience approved by the faculty. Prereq: 513, 514, and consent of instructor. S/N only. Sp

516 Maternal and Child Nutrition (3) Nutrition principles related to growth and development during pregnancy, infancy, and childhood to age 6. Prereq: Nutrition in Disease or consent of instructor. F

517 Childhood and Adolescent Nutrition (3) Application of nutrition principles to school age children; effects of diseases on growth and development; nutritional assessment and counseling. Prereq: Advanced Nutrition or consent of instructor. F

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. S

520 Nutritional Ecology (3) Examination of issues in natural, political, social, and environmental interactions that affect availability of food and nutrients in U.S. food supply. S

521 Physiological Basis for Diet and Disease (2) Altered nutrient needs as result of metabolic changes that occur in selected disease states. Prereq: Nutrition in Disease or consent of instructor. Sp

522 Nutrition Counseling (2) Individual eating habits and disorders, evaluation strategies for effectiveness of helping process. Prereq: Nutrition in Disease or consent of instructor. F, A

524 Nutrition Education: Principles, Implementation, and Evaluation (3) Conceptual models, principles, application, and evaluation models in nutrition education research. Prereq: 508 or consent of instructor. S

540 Seminar in Nutrition (1) May be repeated. S/N only. E

541 Research Methods (1) Basic principles of planning, conducting, and interpreting nutrition and foodservice systems administration research. Prereq: 6 graduate hrs. in nutrition and food systems administration and statistics. Sp

542 Advanced Experimental Nutrition (2) Application of research principles to individual project using experimental animals. Prereq or co prereq: 541. Sp

544 Food and Nutrition Survey Methods (2) Project for assessment of food consumption, nutrient intake, nutritional status, and sociocultural economic parameters in populations. Prereq or coreq: 541. Sp

547 Field Experience (3-6) Experience in food-related industry or agency under supervision of faculty member. Prereq: Consent of instructor. S/N only. E

548 Directed Study in Nutrition (1-3) Advanced study in major area of concentration. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

549 Special Topics (1-3) Recent advances in nutrition or food systems administration. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

600 Doctoral Research and Dissertation (3-15) P/NP only. E

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. F

603 Current Trends in Food and Sociocultural Change (2) Critical evaluation of research. Prereq: 508 or consent of instructor. F, A

Hotel and Restaurant Administration

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E

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. S/N only. E

530 Computer-Assisted Foodservice and Lodging Management (3) Application of computer technology to foodservice and lodging industry; inventory, cost accounting, production, nutrition analysis, rooms management, and sales planning and analysis. Prereq: 532 and 533. E

531 Advanced Financial Management (3) Financial planning, operations and evaluation techniques used in foodservice and lodging management; developing budgets, accounting systems and financial reports. Prereq: Food and Lodging Cost Control or consent of instructor. F, A

532 Advanced Human Resource Management (3) Identifying labor needs; development and maintenance of selection procedures; approaches to the process of work force. Prereq: Food and Lodging Cost Control or consent of instructor. F, A

533 Advanced Food Production and Delivery System Management (3) Analysis of food production and delivery systems; application of quantitative methods and decision making. Prereq: Quantity Food Procurement, Production and Service or consent of instructor. F

534 Special Topics in Foodservice and Lodging Administration (1-3) Lecture/discussion format. Con-
Ornamental Horticulture and Landscape Design

Graduate Degrees

The Department of Ornamental Horticulture and Landscape Design offers the Master of Science with concentrations in floricultural science and technology, nursery science and technology, or turfgrass science and technology. Various interests may be emphasized in any of these commodity areas, including micropropagation, innovative production and maintenance systems, computer-aided management systems, and the molecular biology, genetics, history, and stress physiology of ornamentals.

For admission, the student must have a B.S. in ornamental horticulture, landscape architecture, plant science, or a related agricultural or basic science discipline. Undergraduate transcripts must be evaluated by the department for prerequisite requirements, if any. Graduate research assistantships are available on a competitive basis. For further information, contact the department head.

The Master's Program

Thesis Option

1. A thesis is required. A master's committee of no fewer than 3 faculty members will be selected. Prior to research for the thesis, a proposal must be approved by the master's committee. Registration for 6 hours of Thesis 500 is required.
2. In addition to the thesis requirement, a minimum of 24 hours of graduate credit is required. Not more than 10 hours of the minimum 50 hours can be below the 500 level.
3. The academic program must be approved by the master's committee which may require additional course work if the student's progress or background indicates such need.
4. All students are required to include 2 hours of Seminar 590 in their program and are expected to attend this course and participate in discussions each semester enrolled.
5. Twelve hours of coursework in the major must be at the graduate level, exclusive of Thesis 500. Six of these hours may be satisfied by Botany 412, 521, 522, Plant and Soil Science 471, or Animal Science 571.
6. An oral examination covering the thesis and coursework is required.

Non-Thesis Option

1. A master's committee of no fewer than 3 faculty members will be selected.
2. Thirty-four hours of graduate coursework are required of which 22 hours must be at the 500 level or above.
3. All students are required to include 2 hours of Seminar 590 in their program and are expected to attend this course and participate in discussions each semester enrolled.
4. Twelve hours of coursework in the major must be at the graduate level. Six of these hours may be satisfied by Botany 412, 521, 522, Plant and Soil Science 471, or Animal Science 571.
5. An oral examination covering the thesis and coursework is required.

Graduate Courses

410 Nursery Management and Production (3) Modern management methods as they relate to wholesale nurseries and wholesale nurseries and wholesale production. Prereq.: 220, 330, and Plant and Soil Science 210, or consent of instructor. 2 hrs and 1 lab.

420 Advanced Floriculture Science and Technology (3) Physiology and greenhouse production of floriculture crops. Cultural practices: propagation, planting, spacing, fertilization, temperature, and daylength regimes, harvesting, shipping, marketing, and pest control. Prereq.: Greenhouse Production and Management or consent of instructor. 2-3 hrs lab.

440 Advanced Turfgrass Management (4) Principles and critical issue of turfgrass management: adaptation, ecology, physiology, soil fertility, and grass nutrition, climatic influences on grass culture; physiology of clipping and water management; design, construction, and management of golf courses, and physiological influences on pest identification and control measures. Prereq.: 340 or consent of instructor. 3 hrs and 1 lab.

451 Plant Tissue Culture (3) (Same as Botany 451.)

460 Professional Practices in Landscape Construction and Management (2) Professionalism, salesmanship, proposals, bidding, estimating, specification, and contract management in landscape services industry. Interaction with industry representatives through special presentations. Prereq.: 350 or consent of instructor.

480 Advanced Landscape Design (4) Comprehensive application of landscape design skills. Design applications involving site layout, landscape grading, plant selection, design, analysis, programming, design, detailing, estimating, and specifying as well as applying to various landscape projects. Prereq.: 280, 290, 380, or consent of instructor. 1 hr and 2-3 lab.

485 Computer Aided Landscape Design (3) Computer Aided Design (CAD) related to landscape design and construction. Site planning and construction of related landscape plans, view and S-D drawings. Operating systems, use of AutoCAD and LANDCAD software. Prereq.: Fundamentals of Landscape Design, Microcomputer Applications to Problem Solving or consent of instructor. 1 hr and 2 labs.

500 Thesis (1-15) (P/N/Y only. R)

501 Special Topics in Ornamental Horticulture and Landscape Design (1-3) Topics to be assigned. May be repeated. Maximum 6 hrs. Prereq.: Consent of instructor.

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. S/N only.

510 Research Methods in Ornamental Horticulture and Landscape Design (2) Literature retrieval, research proposal writing; use of computers for word processing, data entry, statistical analysis, and graphics production. Required of all students in thesis option. Prereq.: Plant and Soil Science 471 or 471F.

511 Plant Disease Fungal (4) (Same as Entomology and Plant Pathology 510.)

550 Plant Microtechnology (3) Practical light and scanning electron microscopy methods for investigating aspects of plant development, histochemistry and pathology, tissues in ornamental, forest, and crop species. Prereq.: 8 hrs biological/botanical sciences and consent of instructor. 1 hr and 2 labs.

570 Physiology and Development of Ornamental Plants (3) Basic and applied physiology of ornamental plants related to growth and development in production and utilization. Critical review of literature and discussion of processes of growth, flowering, photoperiodism, disease resistance, stress, abscission, dormancy, disease resistance, and pest control. Prereq.: 471 or 471F, 571.

590 Seminar (1) Current literature and developments. May be repeated. Maximum 3 hrs.

Assistant Professor:

Hamilton, Susan, Ed.D. ...................... Tennessee
Menendez, Garry, M.S. ..................... Tennessee
Starman, Terri W., Ph.D. ................... Texas A&M

Mary L. Albrecht, Head

Ornamental Horticulture and Landscape Design
THE DOCTORAL PROGRAM

Students must hold an M.A. with a major in Philosophy or an equivalent degree when entering the Ph.D. program. Twenty-seven hours of coursework beyond the M.A. is required, of which 12 hours will be in courses numbered above 600. See the Philosophy Department Graduate Student Procedures 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 Ph.D. with concentration in medical ethics are also exempted.

CONCENTRATIONS

Medical Ethics

The department has an M.A. and Ph.D. program of graduate study with a concentration in medical ethics. Detailed information concerning the program may be obtained from either the Director of Graduate Studies in Philosophy or the Director of the Medical Ethics Program.

Religious Studies

The department has an M.A. program of graduate study with a concentration in religious studies. Details concerning the program may be obtained from either the Director of Graduate Studies in Philosophy or the Department of Religious Studies.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.A. and Ph.D. programs in Philosophy are available to residents of the states of Alabama or West Virginia; Kentucky or Texas (concentration in medical ethics only); the Ph.D. program to residents of Louisiana or Mississippi, or Virginia (concentration in medical ethics only); and the M.A. program to residents of Oklahoma (concentration in medical ethics only). Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

400 Special Topics (3) May be repeated when topic varies. Maximum 6 hrs.

411 Modern Religious Philosophies (3) (Same as Religious Studies 411.)

412 Classical Indian Systems of Philosophy: The Moksha Tradition (3) (Same as Religious Studies 412.)

420 Topics in History of Philosophy (3) Figures or movements from antiquity through mid-twentieth century. Prereq: 6 hrs of graduate course work or consent of instructor. May be repeated when topic varies. Maximum 9 hrs.

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.

446 Theoretical Issues in Medical Ethics (3) Prereq: 240 or 345 or consent of instructor. (Same as Religious Studies 446.)

473 Philosophy of Mind (3) Problems of mind and body in relation to consciousness and personal identity. Prereq: 6 hrs of philosophy or consent of instructor.

479 Studies in Recent Continental Philosophy (3) Selected thinkers or topics: existentialism, phenomenology, hermeneutics, structuralism, post-structuralism. Prereq: 6 hrs of philosophy or consent of instructor. May be repeated when topic varies. Maximum 9 hrs.

500 Thesis (1-15) P/N only. E

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. S/N only. E

520 Topics in Ancient or Medieval Philosophy (3) Intensive critical work on major philosopher or school. May be repeated. Maximum 9 hrs.

522 Topics in Modern Philosophy (3) Intensive critical work on major philosopher or school. May be repeated. Maximum 9 hrs.

524 Topics in Twentieth-Century Philosophy (3) Intensive critical work on major philosopher or school. May be repeated. Maximum 9 hrs.

538 Topics in Contemporary Philosophy (3) Intensive critical work on themes in late 20th-century philosophy. May be repeated. Maximum 9 hrs.

540 Topics in Ethics or Value Theory (3) May be repeated. Maximum 9 hrs.

542 Topics in History of Ethics (3) Dominant movements in history of ethics. May be repeated. Maximum 9 hrs.

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 hrs.

546 Orientation to Medical Ethics (3) Survey of ethical theories in application to issues in medical ethics.

547 Ethical Issues in Mental Health (3) Values in "mental health" and "mentally ill," informed consent in psychiatry, treatment, patient's rights, involuntary hospitalization and treatment, and behavior control therapy.

548 M.A. 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 UTMC Graduate Education Committee.

553 Philosophical Topics in Literature and the Arts (3) Aesthetics, criticism, art and society. May be repeated. Maximum 9 hrs.

575 Topics in Metaphysics and Epistemology (3) May be repeated. Maximum 9 hrs.

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 hrs.

585 Special Topics (3) May be repeated. Maximum 9 hrs.

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 Ph.D. students concentrating in medical ethics. Prereq: Consent of Medical Ethics Committee.

588 Ph.D. Clinical Practicum (9) Series of clinical rotations at one or more local health care institutions. Open only to Ph.D. students concentrating in medical ethics.
Physics and Astronomy

(Major of Arts and Sciences)

MAJOR DEGREES

Physics ........................................... M.S., Ph.D.

Lee Riedinger, Head

Professors:

Bames, F. E., Ph.D. .................................. California
Bingham, C. R., Ph.D. .................................. Tennessee
Blais, W. E., Ph.D. .................................. Michigan State
Breazeale, M. A. (Emeritus), Ph.D. .......... Michigan State
Breinig, M., Ph.D. .................................. Oregon
Bugg, W. M., Ph.D. .................................. Tennessee
Burgdorfer, J. (Distinguished Prof.), Ph.D. .................................. Freie Universität Berlin
Callcott, T. A., Ph.D. .................................. Purdue
Childers, R. W., Ph.D. .................................. Vanderbilt
Christophorou, L. G., Ph.D. ...................... Manchester
Condor, G. T., Ph.D. .................................. Illinois
Crater, H. W. (UTSI), Ph.D. ................. Yale
Deeds, W. E. (Emeritus), Ph.D. .............. Ohio State
Egliulz, A. G., Ph.D. .................................. Brown
Elston, S. B., Ph.D. .................................. Massachusetts
Fox, K., Ph.D. ........................................... Michigan
Gair, N. M. (Emeritus), Ph.D. .............. Ohio State
Georgioli, S., Ph.D. .................................. Manchester
Guidry, M. W., Ph.D. .................................. Tennessee
Handler, T. H., Ph.D. .................................. Rutgers
Harris, E. G. (Emeritus), Ph.D. ............. Tennessee
Hart, E. L. (Liaison), Ph.D. ................. Cornell
Jacobson, H. C., Ph.D. .................................. Yale
King, D. T. (Emeritus), Ph.D. ................... Bristol
Lewis, J. W. L. (UTSI), Ph.D. .............. Mississippi
Mack, J. (Distinguished Scientist), Ph.D. .................................. Rensselaer

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Mahan, G. D. (Distinguished Scientist),
Ph.D. ........................................... California
Mason, A. A. (UTSI) (Emeritus),
Ph.D. ........................................... Tennessee
McGregor, W. K. (UTSI), Ph.D. .............. Tennessee
Nazarwaez, W., Ph.D. .................................. Warsaw
Obenshain, F. E., Jr., Ph.D. ............... Pittsburgh
Painter, L. R., Ph.D. .................................. Tennessee
Pegg, D. J., Ph.D. .................................. New Hampshire
Plummer, E. W. (Distinguished Scientist),
Ph.D. ........................................... Cornell
Quinn, J. J. (Willis Lincoln Chair of Excellence),
Ph.D. ........................................... Maryland
Riedinger, L. L., Ph.D. .................................. Vanderbilt
Rellini, I. (Distinguished Prof.), Ph.D. .... Chicago
Shih, C. C., Ph.D. .................................. Cornell
Sorensen, S. P., Ph.D. .................................. Copenhagen
Strayer, M. R., Ph.D. .................................. MIT
Thompson, J. R., Ph.D. .................................. Duke
Thompson, M. O. (Emeritus), Ph.D. ......., Illinois
Ward, B. F. L., Ph.D. .................................. Princeton
White, J. W. (Emeritus), Ph.D. ............. Yale

Assistant Professors:

Daunit, S. J., Ph.D. .................................. Queens
Levin, J. C., Ph.D. .................................. Oregon
Menzel, R. (UTSI), Ph.D. .................... Tennessee
Parttger, C., Ph.D. .................................. New Zealand
Phillips, W. (UTSI), Ph.D. ..................... Pennsylvania
Sanders, A. J., Ph.D. .................................. Tufts
Siopsis, G., Ph.D. .................................. Cal Tech
Weltering, H. H., Ph.D. .................................. Groningen (Netherlands)

Research Professors:

Chatterjee, L. D., Ph.D. .................................. Jadavpur
Kamyakow, I., Ph.D. .................................. ITEP (Russia)
Thornard, N., Ph.D. .................................. Kentucky
Zhang, J. Y., Ph.D. .................................. Lanzhou

Research Associate Professors:

McCook, D. L., Ph.D. .................................. Tennessee
Pinnaduwege, L. A., Ph.D. ....................... Pittsburgh

Research Assistant Professors:

Datko, P. E., Ph.D. .................................. Tennessee
Efronmenko, Y. Y., Ph.D. ....................... ITEP (Russia)
Mezzacappa, A., Ph.D. .................................. Texas
Yost, S. A., Ph.D. .................................. Princeton

Graduate programs leading to the Master of Science and Doctor of Philosophy are offered in a number of concentration areas: astrophysics, atomic and low temperature physics, biophysics, chemical physics, condensed matter and surface physics, elementary particle physics, geophysics (Master's only), health physics (Master's only), molecular spectroscopy, nuclear physics, and theoretical physics.

Departmental graduate programs leading to the M.S. and Ph.D. are also available at the University of Tennessee Space Institute, Tullahoma, where opportunities for study and research are available in quantum optics and laser physics, atomic and molecular spectroscopy, fluid physics, and theoretical physics. For additional information, contact the department head.

ADMISSION REQUIREMENTS

A student who enrolls in The Graduate School with the intention of attaining an advanced degree in Physics will have completed an undergraduate major in Physics or its equivalent. Physics 311-12, 321, 361, 431-32, 421, 461, and 411-12 constitute the minimum coursework prerequisite to graduate study.

A student who intends to present Physics as a graduate minor will have completed an undergraduate minor in Physics or its equivalent. Physics 311 and 341-32 constitute the minimum coursework prerequisite to a minor in Physics.

The department offers an M.S. thesis program with a concentration in geophysics. Program requirements are: 12 hours from Physics 531-32, 541-42, 571-72; a minimum of 12 additional hours in geology, geophysics, and/ or physics, as approved by the student's committee; and the presentation of an acceptable thesis, 6 hours of Physics 500, and the passing of an oral examination on course material and thesis.

NON-THESIS OPTION

This program is designated primarily for students intending to teach in colleges or universities on the elementary or intermediate level, or for students specifically intending to work toward a Ph.D. 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 semester hours from Physics 511-12, 521-22, 531-32, 541-42, and 571-72; 6 semester hours in a minor field; and 6 semester 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.

THE DOCTORAL PROGRAM

All students are expected to take Physics 521-22, 531-32, 541-42, 551, 571-72, and 611. Physics 601-02 are normally required of students specializing in atomic physics; Physics 621-22 of students in nuclear physics; Physics 626-27 of students in elementary particle physics (and/or Physics 613-14 for students specializing in theoretical high-energy physics); Physics 671-72 of students in condensed matter and surface physics; and Physics 681-82 of...
students specializing in molecular spectroscopy. Students specializing in chemical physics may substitute Chemistry 572 for Physics 551, and should complete at least 6 semester hours from Chemistry 580, 670. The courses Physics 531-32, 571-72, 521-22, 541-42 constitute the core curriculum. They are the usual basis for the departmental comprehensive examination which is normally taken by a well-prepared student after two years of graduate study.

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.

Astronomy

GRADUATE COURSES

411 Astrophysics (3) Development of analytical physical models of galactic structure of universe, stellar and interstellar matter, cosmology, astrophysical and interdisciplinary, consideration of quasars, pulsars, black holes and current developments in field. Acceptable for major credit in physics. Prereq: Physics 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 hrs.

Physics

GRADUATE COURSES


421 Modern Optics (4) Transmission of light in uniform, isotropic media; reflection and transmission at interfaces, mathematics of wave motion and interference effects. Fundamentals of Fourier optics and introduction to laser physics. Extensive use of computer calculations and design of practical and sophisticated optical systems.

506 Laser Physics (3) Mode analysis, stable and unstable resonators, rate equations and population inversion, saturation, relaxation oscillations, fluctuations and noises, 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.

511-12 Theoretical Physics (3,3) Classical theoretical physics, with limited use of mathematics. Prereq: Physics 312, 422, advanced calculus, differential equations, and vector analysis.


555 Solid State Physics (3) Elementary solid state physics. Crystal structures, reciprocal lattice, bonding in solids, energy bands, semiconductors, phonons, free-electron gas theory of metals, superconductivity, magnetism, and other forms of broken symmetry. Prereq: 522 or consent of instructor.

556 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 or coreq: 531 and 542.


574 Group Theory for Physicists (3) Introduction to abstract group theory, discrete and continuous groups, representation theory of Noether's theorem, symmetries and degeneracies, application of group-theoretical methods to atomic physics, solid-state physics, and particle physics. Prereq: 571-72.

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 hrs. E

595 Special Problem (1-30) E

596 Special Topic (0-30) E

599 Seminars (1-3) E or S/NC

600 Doctoral Research and Dissertation (3-15) E


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 Raman, 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, classical electro-magnetic fields, beam propagation, field quantization and coherence, quantum optics, topics vary according to instructor. Prereq: 522 and 542 or equivalent. Coreq or corereq: 561 or consent of instructor.

611 Advanced Quantum Mechanics & Field Theory (3) Second quantization, quantization of electromagnetic field, emission, absorption, and scattering of light, Bransden's wave creation and annihilation, quantum field theory methods in condensed matter physics and quantum optics. Topics vary according to instructor. Prereq: 522 and 542 or equivalent. Coreq or corereq: 561 or consent of instructor.

612 Advanced Topics in Quantum Field Theory (3) Renormalization, Lambda shift, anomalous magnetic moments, gauge theories, electroweak theory, quantum chromodynamics, grand unified theories, advanced topics in laser physics and quantum optics. Topics vary according to interest of students, instructor and present


574 Group Theory for Physicists (3) Introduction to abstract group theory, discrete and continuous groups, representation theory of Noether's theorem, symmetries and degeneracies, application of group-theoretical methods to atomic physics, solid-state physics, and particle physics. Prereq: 571-72.

596 Special Topic (0-30) E

599 Seminars (1-3) E or S/NC

600 Doctoral Research and Dissertation (3-15) E


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 Raman, 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, classical electro-magnetic fields, beam propagation, field quantization and coherence, quantum optics, topics vary according to instructor. Prereq: 522 and 542 or equivalent. Coreq or corereq: 561 or consent of instructor.

611 Advanced Quantum Mechanics & Field Theory (3) Second quantization, quantization of electromagnetic field, emission, absorption, and scattering of light, Bransden's wave creation and annihilation, quantum field theory methods in condensed matter physics and quantum optics. Topics vary according to instructor. Prereq: 522 and 542 or equivalent. Coreq or corereq: 561 or consent of instructor.

612 Advanced Topics in Quantum Field Theory (3) Renormalization, Lambda shift, anomalous magnetic moments, gauge theories, electroweak theory, quantum chromodynamics, grand unified theories, advanced topics in laser physics and quantum optics. Topics vary according to interest of students, instructor and present
Planning

(Major in Architecture and Planning)

MAJOR

Planning ........................................ M.S.P.

David A. Patterson, Acting Director

Professors:

Johnston, David A., Ph.D. ................. Cornell
Kenney, Kenneth B. (Emeritus), Ph.D. ............... New York University
Lippman, Michael D., Ph.D. ............... Michigan State
Merrill, J. M., Ph.D. ............... University of California, Berkeley
Phare, Laurence E., Ph.D. ............... University of Illinois
Roush, W. H., Ph.D. ............... University of Michigan
Scudder, Richard F., Ph.D. ............... University of Wisconsin
Shouse, Walter L., M.P.A. ............... University of Wisconsin
Spencer, James A. (Liaison), M.C.P., C.P., Ohio State University

Associate Professors:

Browne, George E., M.A. ............... Washington University
Paterson, David, Ph.D. ............... Indiana University

Assistant Professors:

Anderson, Annette, M.P.A. ............... University of Wisconsin
Zanetta, Maria C., Ph.D. ............... Ohio State University

The Graduate School of Planning offers a program of studies leading to the professional degree of Master of Science in Planning. The degree is the normal route for entry into professional positions in urban and regional planning-related positions. 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 Master of Science in Planning program is accredited by the Planning Accreditation Board, a joint undertaking of the American Institute of Certified Planners (AICP), this requirement provides an additional capstone experience as well as preparation for meeting AICP professional certification requirements.

Student academic progress is monitored by the faculty. A student failing to maintain an acceptable grade-point average may be placed on probation or dismissed from the program.

MINOR IN ENVIRONMENTAL POLICY

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

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S.P. program is available to residents of the states of Arkansas, Kentucky, Missouri, and West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

401 The City in the U.S. (3) Development and character of U.S. cities. Contemporary issues and selected case studies. (Same as Urban Studies 401.)


500 Thesis (1-15) P/N only, E
502 Registration for Use of Facilities (3-18) Required for the student who is 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. S/N only. E
510 Fundamentals of Planning (2) History of planning, structure and development of urban areas, operations of contemporary planning, trends and issues.
511 Graphic and Oral Communications in Planning (1)
512 Community Planning Process (1) Planning process, policy process and development field. Recognition and study of community development and development approaches for assessing community.
515 Theory of Planning (2) Analysis of nature and objectives of planning process; role of planner and planning function in public decision-making. Prereq: 510 or consent of instructor.
520 Planning Research Methods (3) Overview, structuring of social science research in planning practice; familiarity with structure of planning literature information sources, systematic retrieval techniques, processes and tools, practice in posing research questions relevant to planning.
521 Information Systems and Networks in Planning (3) Use and impact of computer-based information systems and planning and management. Development of practical skills in design of planning/decision support systems, databases, Internet tools and geographic information systems (GIS). Prereq: Basic experience with computer software and hardware or consent of instructor.
522 Statistics for Planners (3) Application of statistical techniques. Intuitive explanations and practical applications. Computer analysis to explore concepts.
526 Library Research for Planning (1) Survey of publications of interest to planners, resources and research techniques. Use of facilities and collections of library.
529 Policy and Land Use Analysis (4) Basic methods of policy analysis and planning. Concept and framework for land-use planning, population, employment, economic and policy base studies, and forecasting techniques. Coreq: 520 or consent of instructor.
531 Urban and Regional Analysis (3) Past, present and possible future patterns of urban and regional structures drawing on contemporary theories, models, and empirical research.
532 Planning Methods (4) Preparation of comprehensive plans for urban areas or regions. Development of baseline data and forecasts, formulation of alternative plans and strategies, and development of plan implementation programs. Extensive laboratory experience. Prereq: 510, 512, 520, 530 and 531 or consent of instructor.
537 Planning and Transportation (3) Same as Civil Engineering 558.
538 Urban and Site Design (3-6) Principles of design of residential subdivisions and some components of physical community, shopping centers, institutional complexes, central business districts. Problems of reviewing alternative designs against each other or written regulations. Extensive laboratory experience.
539 Planning for Historic Preservation (3) Planning for preservation, restoration, and conservation of historic buildings, areas and sites as related to comprehensive planning process. National, state, and local government role in preservation, designation of sites, legislative needs, financing and administrative organizations.
540 Legal Aspects of Planning (3) Legal basis for planning and guiding community development. Legal tools of planning. Prereq: 510 or consent of instructor.
543 Cultural Resources Planning (3) Cultural characteristics creating identity and spirit of place; role in environmental and land-use planning; use in protection of natural environment and cultural heritage. Cultural components of National Environmental Protection Act and case studies.
545 Planning and Property Development (2) 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. Preq: 510 or consent of instructor.
547 Negotiation (1) Methods, strategies, techniques and skills useful to planners in mediation, negotiation, and dispute resolution concerning urban planning and development.
548 Tourism Planning (3) Planning of tourist resources and programs within a geographic region. Tourism planning models. Relationships among tourists, tourism developments and planning of tourist attractions and services. Application of techniques in selected area.
549 Local Fiscal Planning and Capital Improvements (3) Fiscal planning and capital improvement programs in plan implementation. Tax and expenditure limitations, infrastructure financing, municipal bond market, alternative revenue sources: development fees, excise, intergovernmental aid. Evaluation of fiscal policies.
551 State and Regional Planning (3) Theory and practice of planning at state, sub-state, and metropolitan levels.
552 Development Planning in the Third World (3) Seminar on urban and regional development in Third World nations. Population growth, settlement patterns, economic development, land framework of integrated resource management. (Same as Ecology and Evolutionary Biology 552.)
555 Environmental Planning (3) Role of planners and planning in maintenance of balance between natural and built environment. (Same as Ecology and Evolutionary Biology 555.)
560 Strategic Planning & Policy Development (3) Models of strategic planning and process of policy development in applied decision making. Qualitative approaches, program evaluation and impact assessment.
570 Plan Implementation Process (1) Interactive community and governmental dynamics in plan implementation. Dynamics of conflict, change, resolution and consensus building.
590 Practicum (3) Prereq: Consent of instructor. S/N or letter grade.
591 Special Topics (1-3) Prereq: Consent of instructor.
592 Readings in Planning (1-3) Prereq: Consent of instructor. May be repeated.
593 Problems in Planning (1-3) Prereq: Consent of instructor.
595 Environmental Assessment and Sustainable Development in Third World Countries (3) Same as Ecology and Evolutionary Biology 695 and Botany 695.

Plant and Soil Science

(College of Agricultural Sciences and Natural Resources)

MAJOR DEGREES

Plant and Soil Science ....................... M.S., Ph.D.

Fred L. Allen, Head

Professors:

Allen, Fred L., Ph.D. ....................... Minnesota
Ammons, J. T., Ph.D. ...................... West Virginia

Bell, Frank F. (Emeritus), Ph.D. .... Iowa State
Coffey, D. L., Ph.D. ....................... Purdue
Conger, B. V. (Distinguished Prof.), Ph.D. .... Washington State
Dayton, D. E. (Liaison), Ph.D. ........ NC State
Duck, B. N., Ph.D. ....................... Auburn
Foss, John E., Ph.D. ..................... Minnesota
Fribourg, Henry A., Ph.D. ............. Iowa State
Hayes, R. M., Ph.D. ....................... Illinois
Howard, D. D., Ph.D. ................... Auburn
Josephson, L. M. (Emeritus), Ph.D. .... Wisconsin
Lewis, R. J. (Emeritus), Ph.D. .......... NC State
Miller, R. D., Ph.D. ...................... Kentucky
Mullen, M. D., Ph.D. ...................... NC State
Mullins, C. A., Ph.D. .................... Tennessee
Parks, William L. (Emeritus), Ph.D. .... Purdue
Reynolds, John H., Ph.D. ............... Wisconsin
Sama, C. E., Ph.D. ......................... Michigan State
Skold, L. N. (Emeritus), M.S. ......... Kansas State
Springer, M. E. (Emeritus), Ph.D. ...... California
Swingle, H. D. (Emeritus), Ph.D. ...... Louisiana State
Tyler, D. D., Ph.D. ....................... Kentucky
West, D. R., Ph.D. ....................... Nebraska

The Department of Plant and Soil Science offers graduate programs leading to the Master of Science and the Doctor of Philosophy. Concentrations for the graduate programs are offered in soil science, plant breeding and genetics, and crop physiology and ecology. Further information contact the department head.

THE MASTER'S PROGRAM

Thesis Option

This option requires writing a thesis based on original research. Six hours of 500 Thesis are required. Prior to conducting research, the student must develop a detailed written research plan. In addition to the thesis hours, a minimum of 24 hours of graduate coursework is required, of which at least 14 must be taken in courses numbered 501 and above. The student's advisory committee may require additional coursework if the student's progress or background indicates such need. Each student is required to take 1 hour of 501 and 1 hour of 503, and to present an oral seminar on the thesis research.

The student's advisory committee consists of the major professor, who acts as chairman of the committee, and a minimum of two other faculty members. The advisory committee approves the student's research problem and coursework and conducts the final oral examination integrating the thesis and coursework.

A student having started on the thesis option is not eligible to transfer to the non-thesis option after the end of the first semester of graduate studies or after having received a Graduate Research Assistantship stipend for more than one semester. A student having started on the non-thesis option may transfer to the thesis option upon approval by a potential major professor and the Department Head.
Non-Thesis Option
A student desiring the non-thesis option should decide on this option at the beginning of the first semester of graduate studies, and must declare it before the beginning of the second semester. In lieu of thesis, students are required to complete 3 hours of 593 for satisfactory participation in a single research program for a period of 12 weeks and the writing of an original, creative and well-written report, both to be conducted by the major professor and approved by the advisory committee. In addition to 3 hours of 593, a minimum of 30 hours of graduate coursework is required, of which at least 20 must be taken in courses numbered 501 or above, for a total of 33 hours.

The student's advisory committee may require additional coursework if the student's progress or background indicates such need. Each student is required to take 1 hour of 501 and 2 hours of 503.

The student's advisory committee consists of the major professor, who acts as chairperson of the committee, and a minimum of two other faculty members. The advisory committee approves the student's coursework and the report on participation in a research program for 593. Students are required to take a written comprehensive examination integrating the coursework.

THE DOCTORAL PROGRAM
A minimum of 72 hours beyond the Bachelor's degree, exclusive of credit for Thesis 500, is required. Of this number, 24 hours must be Doctoral Research and Dissertation 600. A minimum of 26 hours must be completed in courses numbered above 500 exclusive of doctoral research and dissertation, of which 6 must be in courses numbered above 600. A minimum of 9 hours of graduate course work taken during the doctoral program must be outside the department in one or more cognate areas.

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 outside the department. The committee must approve all coursework applied toward the degree, certify the student's mastery of the major field and any cognate fields, direct the research and, recommend the dissertation for approval and acceptance by the Graduate School.

GRADUATE COURSES

411 Soil Microbiology (3) Soil microbial populations and role in soil development. Transformation of inorganic and organic compounds, decomposition of residues, dynamics of soil organic matter. Prereq: Intro- duction to Soil Science and Introduction to Organic and Biochemistry or Organic Chemistry or consent of in- structor. 2 hrs and 1 lab. F, A

412 Soil Genesis and Classification (3) Soil genesis and formation; observing and describing morphology of agricultural and natural soils, identification of properties, classification. 3 weekend trips. Prereq: Intro- duction to Plant and Soil Science or consent of instructor. 2 hrs and 1 lab. F

413 Soil Chemistry (3) Principles concerning structure and chemical constitution of soil materials; colloidal trac- tion as related to exchange, chemical equilibrium, soil acidity, oxidation-reduction, weathering, nutrient availa- bility and waste disposal. Prereq: 511 or consent of instructor. F

414 Soil, Land Use, and the Environment (3) Soil as environmental component and soil properties affecting land use. Soil as resource in knowledge of the relationship of nonengineering aspects of site selec- tion for land use, soil survey and resource data in land use, recognition and management of soil pollution. Prereq: 210 or consent of instructor. Sp, A

415 Soil Hydrology (3) Physical relationships among solid, liquid, and gaseous phases of soil system. Relation- ships of soil properties to processes governing trans- port in soil. Prereq: Introduction to Soil Science. 2 hrs and 1 lab. F, A

431 Crop Physiology and Ecology (3) Principles of plant physiology and ecology as applied to crop produc- tion. Effects of environmental factors on physiological processes. Prereq: 230; Botany 321. 2 hrs and 1 lab. F, A

432 Bioinformatics (3) Solar energy budget; interac- tions between global, regional and local climates and biological systems; quantification of macro- and micro- climates; micrometres and their modification; autono- mously weather data collection and analyses; biological responses to climatic stresses; climate vari- ation and change and their effects on biological systems. Prereq: 1 yr physical or biological sciences, junior stand- ing. F, A

433 Agricultural Pesticides (3) Regulation of pesticide development, manufacture, transportation, marketing and use. Structure, use, mode of action, degradation and environmental impact of pesticides. In situ, in vitro, forensic and related areas. Prereq: 1 yr biological sci- ences and 1 semester chemistry. 2 hrs and 1 lab. Sp

434 Postharvest Biology and Technology (3) Prin- ciples, methods, and techniques related to maintenance of quality of horticultural commodities, Preharvest han- dling, harvesting, storage facilities and techniques, qual- ity evaluation and biological and physiological mechani- sms related to maturation, ripening, and senescence. Graduate credit requires a short lab project in addition to regular class assignments. Two Saturday field trips. Prereq: 1 yr biological science, 2 hrs and 1 lab.

435 Principles of Plant Breeding (3) Genetic principles and techniques used in crop improvement. Prereq: Biol- ogy 220 or equivalent. 2 hrs and 1 lab. Sp

471 Statistics for Biological Research (3) Application of statistics to interpretation of biological research. Nota- tion, descriptive statistics, probability, distributions, con- fidence intervals, t and chi-square tests, analysis of variance, mean separation procedures, linear regression and correlation. Prereq: Mathematics 121 or equivalent. F

500 Thesis (1-15) P/NP only. E

501 Seminar Preparation (1) Application of speaking, writing, and organizational abilities in preparation and pres- entation of scientific papers to both scientific and gen- eral audiences. Preparation of abstracts for scientific presentations. Required of all entering graduate stu- dents during their first year of graduate study. F

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. S/NC only. E

503 Seminar (1) Presentations and discussion of cur- rent scientific material. May be repeated. Maximum 3 hrs. F, Sp

511 Advanced Soil Fertility (3) Concepts of soil chem- istry as related to nutrient movement and adsorption by soil particles. Fertilizer efficiency as measured by plant response factors. Prereq: 413. Sp, A

512 Pedology (3) Physical and chemical weathering processes, factors of soil formation, soil forming proc- esses. Prereq: 412 or consent of instructor. 2 hrs and 1 lab. F, A

514 Advanced Soil Physics (3) Theory and mathemati- cal modeling of flow and solute transport in saturated-unsaturated soil; geostatistical analysis of soil heteroge- neity, stochastic properties multi-scale pore processes, anisotropy, hysteresis. Analytical, and numerical solu- tion of flow and transport equations for unsaturated zone. Prereq: Calculus III, 415, or consent of instructor. F, A

530 Integrated Pest Management (3) Same as Ento- mology and Plant Pathology 530.
THE MASTER OF PUBLIC ADMINISTRATION PROGRAM

The M.P.A. 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 semester hours, including a core program, elective specialization and a recommended internship.

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.

The M.P.A. is a non-thesis program requiring 39 hours. Specific requirements include the following:

1. Core Curriculum (24 hours)
   a. General perspectives (9 hours) - 550 Public Administration; 552 Organization Theory
   b. Any one of the following: 559 State and Local Government; 540 Public Law; 548 Law and the Administrative Process; 548 Public Policy Process; 558 The Politics of Administration; or 566 Ethics, Values, and Morality in Public Administration.

2. Specialization (9 hours)
   a. Specialization is designed by the student in consultation with the coordinator of the M.P.A. degree program. Possible specializations include general government, public health, budgeting and finance, planning, natural resources, program evaluation, criminal justice, public relations, personnel, and others.
   b. Management skills (3 hours) - 560 Public Budgeting and Finance; and any one of the following: 562 Public Management; 564 Human Resources Management; 556 Policy Analysis.

3. Recommended Internship (6 hours)
   Internships are arranged in consultation with the coordinator of the M.P.A. degree program.

4. Final Examination
   A written final examination, which may be followed by an oral examination, is required.

DUAL J.D.-M.P.A. PROGRAM

The College of Law and the Department of Political Science collaborative degree program leading to the conferment of both the Doctor of Jurisprudence and Master of Public Administration degrees. In this program, a student may earn the M.P.A. and J.D. degrees 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 J.D.-M.P.A. program must make separate application to, and be independently accepted by, the College of Law for the J.D. degree and the Department of Political Science and The Graduate School for the M.P.A. 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 M.P.A. program. Application may be made either prior to or after matriculation in either the J.D. or the M.P.A. program, but application to the dual program must be made prior to entry into the last 29 semester hours required for the J.D. degree and prior to entry into the last 16 hours required for the M.P.A. degree.

Curriculum

A dual candidate must satisfy the requirements for both the J.D. and the M.P.A. degrees as well as the requirements for the dual program. The College of Law will award a maximum of 9 semester hours of credit toward the J.D. degree for successful completion of approved graduate level courses (500 or 600 level) offered in the Department of Political Science. The M.P.A. program will award a maximum of 9 semester hours of credit toward the M.P.A. 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 J.D.-M.P.A. coordinators in the College of Law and the Department of Political Science. All candidates for the dual degree must successfully complete the required first year of the Law curriculums and one academic year taking courses solely in the M.P.A. program. During the first two years, students may not take courses in the opposite area, although they may take approved cross-listed courses 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 J.D. or the M.P.A. 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 considered to be 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 M.P.A. 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 Registrar of the University shall show the actual
grade assigned by the instructor without conversion.

THE DOCTORAL PROGRAM

The Ph.D. program prepares students for careers in college teaching, as well as careers in other occupations related to service in the public or private sectors. 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.

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 and oral comprehensive examinations in three 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 credit 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:

1. At least 69 hours must be in political science courses.
2. At least 54 hours in political science must be in coursework numbered above 500.
3. Completion of Political Science 510, 511, and 512.
4. Completion of at least three courses or seminars at UTK in each of the three broad subfields in which the student takes examinations.
5. Completion of at least one course or seminar in each of six broad subfields available for graduate instruction in the department.
6. At least 6 hours must be earned in political science courses numbered above 600.
7. A total of 24 hours must be earned by writing the dissertation.

MINOR IN ENVIRONMENTAL POLICY

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

GRADUATE COURSES

430 United States Constitutional Law: Sources of Power and Restraint (3) Examination of judicial review, constitutional power of the President and Congress, federalism, sources of regulatory authority, and constitutional protection of political and economic rights.
431 U.S. Constitutional Law: Civil Rights and Liberties (3) Analysis of current issues in civil rights and liberties including affirmative action, First Amendment freedoms, equal protection, privacy and rights of accused.
442 Administrative Law (3) Legal dimensions of administrative power and procedures, and constitutional controls over administrators.
452 Black African Politics (3) Recent evolution and current political environment of Black African nations. (Same as Afro-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.
455 Latin American Government and Politics II (3) Selected topics on Latin American political dynamics, consideration of leading theoretical explanations. (Same as Latin American 455.)
459 Government and Politics of the Soviet Union (3) Origins and development of Soviet political system, and study of selected policy areas.
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.
470 International Law (3) Nature and development of international law and compliance. Function of international law in context of international conflict.
475 Ancient and Medieval Political Thought (3) Survey of major political thinkers from Sociates to Harlak of Padua.
476 Modern Political Thought (3) Survey of major political thinkers from Machiavelli to Marx.
500 Thesis (1-15) P/NP only. E
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. S/NC only. E
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 subfields. May be repeated with consent of department. Maximum 9 hrs.
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 analysis 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 subfields of constitutional law, judicial process, and judicial behavior. May be repeated with consent of department. Maximum 15 hrs.
546 Law and the Administrative Process (3) Constitutional position; decision processes, regulation and management; limitations on governmental action: questions of structure, role, and administrative choice. May be repeated with consent of department. Maximum 8 hrs.
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.
550 Public Administration (3) Overview of public administration theory and function.
552 Organization Theory (3) Analysis of major theories of organization and their applicability to public sector.
553 Management of Information Systems (3) Theory, design, implementation and evaluation of information systems in public organizations. Database systems, computer applications, and training for management information technology.
556 Policy Analysis (3) Strategies and techniques for identifying and analysis of public problems and policy solutions. May be repeated with consent of department. Maximum 9 hrs.
558 The Politics of Administration (3) Examination of public administration in context of American political system, with political roles of public administrators and agencies. May be repeated with consent of department. Maximum 9 hrs.
560 Public Budgeting and Finance (3) Technical and political aspects of planning, preparing and adopting government budgets. Major issues of revenue collection, debt management, treasury function, accounting, internal auditing, purchasing risk management, post-auditing.
562 Public Management (3) Intergovernmental 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 hrs.
566 Ethics, Values, and Morality in Public Administration (3) Moral-ethical-value dimensions 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 hrs. S/NC only.
570 Comparative Government and Politics (3) Selected topics in modern government. May be repeated with consent of department. Maximum 9 hrs.
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 hrs.
574 Area Seminar in Comparative Government and Politics (3) Selected topics in area studies: African, Asia, Latin America, Middle East, Soviet Union and Eastern Europe or Western Europe. May be repeated with consent of department. Maximum 9 hrs.
580 International Politics (3) Survey of literature and major aspects of international politics. May be repeated with consent of department. Maximum 9 hrs.
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. S/NC only.
595 Readings and Special Problems in Political Science (1-3) Prereq: Consent of instructor. May be repeated. Maximum 15 hrs.
Polymer Engineering

See Materials Science and Engineering
604 Special Topics (1-3) Instructor-initiated courses offered at convenience of unit on topics of interest. May be repeated. Maximum 15 hrs. S/NC or letter grade. E

605 Advanced Seminar in Curriculum and Learning (4) Team-taught interdisciplinary seminar; trends, theories, and issues in curriculum and learning; Reading and research based on significant research and scholarly publications. Prereq: Consent of instructor. E

620 Seminar in Adult Education (3) Issues in adult education, theories and concepts, philosophical positions, research trends and methodologies. Prereq: 520 or equivalent. Sp

621 Advanced Seminar in Program Planning (3) Concepts, principles, and theories related to program planning in adult education. Prereq: 520 or equivalent. Sp

622 Advanced Seminar in Adult Development (3) Adult development research. Designing research for studies of life cycle. Prereq: 522 or equivalent. Sp

626 Adult Problem Solving and Learning (3) Contemporary research and theories in adult problem-solving and learning. Prereq: 520 or equivalent. F, Sp

635 Ethical, Legal, and Professional Issues in Psychology (3) Same as Psychology 635 and Counselor Education and Counseling Psychology 635. F

649 Advanced Internship in School Psychology (1-9) Supervised experience as school psychologist in unit-approved internship site for doctoral level students. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. S/NC only. E

650 Professional Practice in School Psychology (1) Field setting to facilitate academic, social, interpersonal development of children and adults. School and mental health settings for intervention, consultation, prevention, and assessment services. May be repeated. Maximum 9 hrs. S/NC only. E

655 Research in Psychoeducational Studies (1) Data analyses, collection, and interpretation. May be repeated. Maximum 9 hrs. S/NC only. E

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 and Counseling Psychology 625, and two-course sequence in statistical analysis. A

665 Analysis of Research in Instructional Technology (3) Principles, research methods used in human learning, design of learning environments. Analysis of teacher behavior, text development, computer software design and video presentations. A

668 Practicum in Instructional Planning (3) Development and management of course or program of instruction in educational psychology. Prereq: 665, or consent of instructor. E

669 Internship in Educational Psychology (1-6) Supervised employment in unit approved educational psychology internship sites. May be repeated. Maximum 12 hrs. S/NC only. E

685 Educational Leadership: Theory and Practice (3) Theories of leadership applied to variety of educational settings. Prereq: Consent of instructor. E

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. E

693 Independent Study (1-3) May be repeated. S/NC or letter grade. E

605 Practicum in Consultation (3) Application of consultation skills to academic, social, and interpersonal settings. May be repeated. Maximum 6 hrs. S/NC only. F, Sp

546 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 hrs. S/NC only. F, Sp

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. F

545 Seminar in School Psychology (3) Essentials of theory and practice of school psychology as professional specialization. Consideration of history and current issues in school psychology. Sp

541 Psychoeducational Assessment (3) Direct, psychometric and naturalistic assessment methods in learning environments. Prereq: Admission to school psychology program or consent of instructor. May be repeated. Maximum 6 hrs. S/NC only. F, Sp

550 Characteristics of Adult Learners (3) Key characteristics of adult learners, and applications to teaching and learning contexts. F

557 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. E

560 Discipline and Conflict Resolution (3) Application of major models of discipline and conflict resolution strategies in development of constructive atmosphere for classroom learning. E

571 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. E

572 Cognitive Education: Models and Approaches (3) Models and methods of cognitive education: research and theoretical support for various program components, critical variables of organizational learning that affect success of implementation. Sp


593 Independent Study (1-3) May be repeated. S/NC or letter grade. E

600 Doctoral Research and Dissertation (3-15) P/NP only. E

602 Directed Research (1-3) Instructor- or student-initiated group research or empirical and theoretical problems in educational and counseling psychology. May be repeated. Maximum 12 hrs. S/NC only. E

Psychology (College of Arts and Sciences)

MAJOR

DEGREES

Psychology............................................M.A., Ph.D.
531-32 or an equivalent sequence; 565 or 420; six semester hours of Thesis 500; and twelve hours of 500- or 600-level foundation courses. Students must earn a grade of B or better in all courses that are to count toward the 30-hour total. Students must also propose, conduct and successfully defend an original piece of research in the form of a master’s thesis.

THE DOCTORAL PROGRAM

A student with a B.A. or B.S. may apply to the Department of Psychology for admission to the doctoral program with a concentration in experimental psychology or clinical psychology. The doctoral program with a concentration in ethology or physiology is offered through the Life Sciences program. Doctoral study in industrial and organizational psychology is offered through the Intercollegiate program in Industrial and Organizational Psychology, to which application is made through the Department of Management.

Experimental Psychology

The Ph.D. 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. A full description of the program is given in the “Handbook for Students in Experimental Psychology,” available from the department. The basic requirements are:

1. Twelve semester hours of statistics and research (504-05 or Statistics 531-32 or equivalent and 6 additional hours of research methods or design).
2. Fifteen semester hours in experimental psychology (565 or equivalent and 4 courses from the following: 510, 511 or 512, 513, 543, 546 or 547, 550, 555, and 570 or 571).
3. Six semester hours of research practice (509).
4. Psychology 528 - preparation for college teaching.
5. Two 600-level graduate seminars.
6. Six semester hours of graduate level courses outside the Psychology Department.
7. Predissertation research project involving the collection of original data or the original analysis of existing data, reported in publishable form and accepted by the student’s advisory committee.
8. An integrative review or theoretical paper, accepted by the student’s advisory committee.
9. Comprehensive examination, determined and evaluated by the student’s doctoral committee.
10. Twenty-four hours of dissertation research (600).
11. An original piece of research in the form of a doctoral dissertation, proposed, conducted, and defended.

Clinical Psychology

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. Clinical program students must complete a predissertation research project by the end of the second year.

After forming the doctoral committee, students must then pass a comprehensive examination administered and evaluated by the committee. This examination is comprised of two papers, one addressing a topic of the student’s choice, and the second addressing an understanding of one individual’s personality and cognitive functions. All doctoral students must complete a minimum of 78 hours of graduate level courses, including courses required by their program; at least 6 hours in courses outside of psychology; and at least 24 hours of dissertation research (Psychology 600). Finally, students must complete an acceptable doctoral dissertation and conduct a satisfactory oral defense of the dissertation. Requirements are as follows:

1. Apprenticeship with one faculty member during the first year of graduate study. Two days each week.
2. Predissertation 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.
3. 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.
4. Satisfactory completion of listed courses (or equivalents) in the following sixteen categories:
   a. Foundations of Psychology: Biological Factors, Perception, Learning, Thinking, Motivation (513); b. Interviewing and Observation (558) and Laboratory (559); c. Research Practice (509) (4 hrs.); d. Life-Span Development (512) or Developmental Psychology (511); e. Personality: Theory and Research I and II (570-71); f. History and Systems of Psychology (565); g. Research Questions and Designs (580); h. Psychological Assessment I and II (594-95) and Laboratory (596); i. Experimental Methods in Psychology (504) and Research Design (505); j. Social Psychology (550); k. Field Placement in Clinical Psychology (585) (18 hrs.); l. Dynamics of Psychopathology (573); m. Psychometrics (555) or Applied Psychological Measurement (557); n. Ethical, Legal, and Professional Issues in Psychology (635); o. Psychodynamic Psychotherapy I and II (670-71) and Laboratory (672) (4 hrs.); p. Doctoral Research and Dissertation (600) 24 hrs.
5. Satisfactory completion of a one-year clinical internship at a site approved by the program.
6. Students who choose a teaching assistantship in the third or fourth year must have satisfactorily completed 528 College Teaching in Psychology.

GRADUATE COURSES

409 Group Facilitation (3) Study of theory and technique through supervised experience in small groups. PreReq: 210 or consent of instructor. May be repeated. Maximum 6 hrs.
415 Psychology of Religion (3) History of psychology of religion: various philosophical and empirical orientations. Psychological function of religion for individuals and society. PreReq: Junior or senior standing.
424 Psychology and the Law (3) Psychological aspects of legal systems. PreReq: 110 or equivalent, upper-division standing and 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 or equivalent, 210, 220. (Same as Women’s Studies 434.)
440 Organizational Psychology (3) Social-psychological analysis of organizations, role-theory and systems theory. PreReq: 360.
450 Comparative Animal Behavior (3) (Same as Ecology and Evolutionary Biology 450.)
458 Comparative Animal Behavior Laboratory (3) Coreq: 450. (Same as 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 equivalent, 210, and 1 yr of biology or zoology introductory sequences or equivalents.
469 Laboratory in Physiological Psychology (3) Laboratory studies of nervous system and physiological correlates of behavior. Coreq: 461.
470 Theories of Personality (3) Survey of major theories of personality and their development. PreReq: 220 and 300 or 330.
475 Adolescent Development (3) Theoretical perspectives and empirical research findings pertinent to adolescent development. PreReq: Child Psychology. Sp
480 Theories of Learning (3) Classical and current approaches to learning and cognition. PreReq: 310.
482 Topics in Psychology (3) Intensive analysis of special topics: Afro-American psychology or evaluation of programs in community. PreReq: Biological Basis of Behavior or Behavior and Experience: Humanistic Psychology and at least 8 hrs in 300-level courses. Recommended prereq: Statistics in Psychology. Methods of
489 Supervised Research (1-9) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

500 Thesis (1-15) P/NP only. E

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 course is completed. May be used toward degree requirements. May be repeated. S/NC only. E


505 Research Design (3) Techniques for planning and conducting research in controlled and natural settings: experiments, quasi-experiments, observational studies, surveys, and program evaluations. Development of questions and hypotheses for study. Design of studies to maximize validity. Prereq: Consent of instructor. Sp

506 Readings and Special Issues in Psychology (1-3) Prereq. Consent of instructor. May be repeated. Maximum 6 hrs. E

509 Research Practicum (1-3) Required of first-year graduate students in psychology. May be repeated. Maximum 9 hrs. S/NC only. E

510 Topics in Psychology (3) Intensive examination of selected issues in psychology. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

511 Developmental Psychology (3) Normal processes of human development; physical, cognitive, and emotional development from conception through infancy, childhood, and adolescence. Prereq. Consent of instructor. May be repeated. Maximum 6 hrs. F

512 Life-Span Development (3) Theories and research concerning normative and nonnormative development throughout life, adulthood, and old age. Prereq: Consent of instructor.

513 Foundations of Psychology: Biological Factors, Perception, Learning, Thinking, Motivation (4) 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 hrs. S/NC only. F, Sp

516 Colloquium in Ethology (1) Current research and theory. May be repeated. Maximum 9 hrs. (Same as Ecology and Evolutionary Biology 516.) S/NC only. E

517-18 Proseminar in Industrial and Organizational Psychology (3,3) (Same as Management 657-658.)

520 Interventions for Behavioral Change (3) Principles and techniques for planning, implementing, and evaluating interventions derived from social learning theory. Interventions by people in community: teachers or supervisors. Token economics and strategies for self-management. Techniques for reducing and presenting data: computerized adaptive testing and other topics. Prereq: Statistics 537 or equivalent. May be repeated. Maximum 6 hrs.

524 Behavioral Neurology (3) Disorders of nervous system, including both peripheral and central nervous system. Prereq: 461, 469, or equivalent. May be repeated. Maximum 9 hrs. S/NC only. E

525 Laboratory Techniques and Instrumentation (3) Basic laboratory techniques and scientific methods, including manipulation of apparatus, data collection, data analysis, and computer database management. Prereq: 461, 469, 491, 492, and 493 combined may apply toward undergraduate major.

530 Ethics (1-15) P/NP only. E


545 Advanced Animal Behavior (3) (Same as Ecology and Evolutionary Biology 545.)

546 Ethological Psychology (3) Basic ethology and comparative psychology. Implications for human behavior. Prereq: Consent of instructor.

547 Conceptual Foundations of Evolution and Behavior (3) Critical evaluation of seminal writings in the field of evolutionary biology. Prereq: Consent of instructor. (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.

555 Psychometrics (3) Basic concepts: factor analysis, scaling, test theories, probability models and their applications, computerized adaptive testing and other topics. Prereq: Statistics 537 or equivalent. May be repeated. Maximum 6 hrs.


558 Interviewing and Observation (3) Sensitizing students to own feelings and beliefs to feelings of interviewee, and analysis of language content, style, and body language. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

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 of research involving human and/or nonhuman animals. Prereq: 400 and consent of instructor. May be repeated. Maximum 9 hrs.

565 History and Systems of Psychology (3) History of philosophy concerning psychology. Major systems of psychology which emerged during 20th century. Prereq: Graduate standing. Sp

570 Personality: Theory and Research I (3) Advanced survey of personality theories and the influence of research on personality, related research. Prereq: Admission to professional 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. Sp

572 Descriptive Psychopathology (2) Diagnostic criteria of the DSM-III. Examples from written case histories and recorded interviews. Prereq: Admission to doctoral program in clinical psychology or consent of instructor.

573 Dynamics of Psychopathology (3) Psychodynamic view of the causes and symptoms of major psychoses, neuroses, and adjustment disorders. Prereq: Admission to doctoral program in clinical psychology or consent of instructor. Sp

575 Psychopharmacology (3) Connections between pharmacology and psychology. Prereq. Consent of instructor.

576 Object Relations (3) European and American conceptions of normal and psychopathological development of object relations. Significance for psychotherapy, psychiatry, 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 hrs. S/NC 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 or consent of instructor. F

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 hrs. S/NC only. Sp

600 Doctoral Research and Dissertation (0-15) P/NP only. E

601 Seminar in Psychology (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

601 Seminar in Applied Psychology (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

601 Seminar in Existential-Phenomenological Psychology (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.


623 Seminar in Methods of Naturalistic Research (3) Prereq: 546 or consent of instructor. May be repeated. Maximum 12 hrs.

625 Seminar in Organizational Psychology (3) (Same as Management 625.)

626 Seminar in Industrial Psychology (3) (Same as Management 626.)

627 Seminar in Applied Industrial Psychology (3) (Same as Management 627.)

635 Ethical, Legal, and Professional Issues in Psychology (3) Research, human services, teaching and public policy. Prereq: Admission to doctoral program in psychology or consent of instructor. (Same as Counselor Education and Counseling Psychology 635 and Psychoeducational Studies 635.) S/NC only.

638 Current Topics in Industrial/Organizational Psychology (3) (Same as Management 638.)

670 Psychodynamic Psychotherapy I (3) Theories and principles. Prereq: Admission to doctoral program in clinical psychology or consent of instructor.

671 Psychodynamic Psychotherapy II (3) Theories and principles. Prereq: Admission to doctoral program in clinical psychology and 670 or consent of instructor.

673 Laboratory in Psychotherapy (2) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. Coreq: 670. May be repeated. Maximum 6 hrs. S/NC only.

681 Seminar in Assessment (3) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. May be repeated. Maximum 12 hrs.

683 Seminar in Behavioral Medicine (3) Current research and theory concerning relationships between behavior and health. Prereq: Consent of instructor. Maximum 12 hrs.

690 Field Work in Industrial and Organizational Psychology (1-12) (Same as Management 690.)

695 Field Placement in Clinical Psychology (3) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. May be repeated. Maximum 24 hrs. S/NC only. E

696 Advanced Psychology Clinical Placement (1-3) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. May be repeated. Maximum 24 hrs. S/NC only. E

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 or consent of instructor. F
Training Center, and the Educational Interpreting program.

**GRADUATE COURSES**

**415 Language Development of Hearing Impaired (3)** Language problems of hearing impaired contrasted with scope and sequence of normal language development. Formal linguistic systems used to describe language development problems.


**419 Speech Development of Hearing Impaired (4)** Theories of speech development, approaches in training perception and production of speech, and aural habilitation. Practical experiences.

**423 American Sign Language I (3)** Expressive and receptive skill development in sign communication. Video text and interactive teaching methods. Class conducted totally in sign. Prereq: Consent of instructor.

**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. Prereq: Consent of instructor.

**425 Introduction to the Psychology and Education of the Hearing Impaired (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.

**426 American Sign Language II (3)** Expressive and receptive skill development in sign communication. Video text and interactive teaching method. Class conducted totally in sign. Must be taken in sequence. Prereq: 423.

**431-32 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: 431 for 432 or consent of instructor.

**482 Speech and Language Services in the Schools (3)** Organization and implementation of speech and language programs in schools. IEP procedures, selection and use of appropriate intervention techniques. Prereq: 426.

**500 Thesis (1-15)** P/NP only. E

**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 is not able to attend degree requirements. May be repeated. S/NC only. E

**503 Problems in lieu of Thesis (2-3)** May be repeated. Maximum 6 hrs. S/NC only. E

**504 Clinical Experience in Teaching an Evaluation of Exceptional Children (3) (Same as Inclusive Early Childhood Education 504)**

**506 Vocational Guidance and Career Planning With Hearing Impaired (3)** Utilization of psychological, educational, vocational and diagnostic materials and resources appropriate for hearing impaired persons to provide guidance in career decisions and individualized rehabilitation plan.

**518 Educational Specialist Research and Thesis (3)** May be repeated. P/NP only. E

**523 Practicum in Hearing Impaired (3)** Receptive and expressive language capabilities of hearing impaired student. Designing, teaching, and post-testing of unit of instruction for remediation of specific language errors.


**529 Teaching Reading to the Hearing Impaired (3)** Specific methods necessary to teach the prelingually hearing impaired student. Practice in preparation of developmentally appropriate reading materials. Methods and strategies for teaching reading to hearing impaired students in regular reading curricula and materials. Prereq: 415.

**530 Orientation to Rehabilitation (3)** History, philosophy, legal and economic bases, current issues, and practices in public and private rehabilitation programs. Qualifications of personnel, operation and scope of services provided, assessment, planning, 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 agencies, and school or private rehabilitation facilities. Analysis of appropriate industrial management models related to rehabilitation programs.

**533 Job Analysis, Development, and Placement (3)** Determination of employment-relevant needs 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.

**535 Vocational Evaluation: Statistical Methods (3)** Process principles and techniques used to determine vocational assets and liabilities of people with disabilities. Functional analysis of biographical and interview data; selection and application of psychometric instruments; integration of statistical data into diagnostic reports; application of computer-generated reporting systems.

**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 jigsaw, and simulated work experiences in vocational evaluation. Clinical interpretation of data from formal and informal reference, 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 Exceptionalities (3)** Psychosocial impact of exceptional status on person and family. Reaction to loss, coping with disability, and social rehabilitation.

**543 Medical Aspects of Disability (3)** Epilepsy and chronic conditions related to disabling conditions served by special education and rehabilitation personnel. Restorative 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 (800 clock hrs. required).

**579 Special Topics (1-3)** Prereq: Admission to graduate program. May be repeated. Maximum 9 hrs. S/NC or letter grade.

**591 Clinical Studies (4)** Relationship between educational theory and application during internship; research project, development of portfolio, and capstone experience.

**592 Assistive Technology in Special Education and Vocational Rehabilitation (3)** Technology as applied to...
needs of school age and post-secondary education 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. S/NC or letter grade. E

600 Doctoral Research and Dissertation (3-15) P/INF only. E

601 Seminar in Educational Theories in Special Education and Rehabilitation (3) Education theories: education, rehabilitation of exceptional persons, theory applications in educational settings. Prereq: Admission to doctoral program or consent of instructor.

602 Seminar in Social Processes in Special Education and Rehabilitation (3) Social phenomena which influence, disability on persons and on significant others. Implications for habilitation. Prereq: Admission to doctoral program or consent of instructor.

603 Seminar in Research in Special Education and Rehabilitation (3) Development and implementation of research. Independent research studies. Research proposals. Prereq: 9 hrs of research core and consent of instructor.

610 Internship in College Teaching and Supervision (3-9) Supervision of college teaching and supervision. Prereq: Admission to doctoral program or consent of instructor. May be repeated. Maximum 9 hrs. S/NC only.


620 Internship in Research in Special Education and Rehabilitation (3-9) Internship placement with professional engaged in theoretically-based research: public school, institutions, agencies or university settings. Prereq: 9 hrs in statistical and research methods. May be repeated. Maximum 9 hrs. S/NC only.

630 Internship in Institutional Leadership in Special Education and Rehabilitation (3-9) Advanced level field experiences under supervision of practicum. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. S/NC only.

679 Special Topics (1-3) Prereq: Admission to doctoral program. May be repeated. Maximum 9 hrs. S/NC or letter grade.

693 Independent Study (1-3) May be repeated. S/NC or letter grade. E

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**Religious Studies**

*(College of Arts and Sciences)*

Charles H. Reynolds, Head

Professors:
- Dungen, David L., Ph.D., Harvard
- Hackett, Rosalind J., Ph.D., Aberdeen
- Humphreys, W. Lee, Ph.D., Union
- Linge, David E. (Liaison), Ph.D., Vanderbilt
- Lubys, F. Stanley (Emeritus), M.Div. Colgate Rochester
- Norman, Ralph V., Ph.D., Yale
- Reynolds, Charles H., Ph.D., Harvard

Associate Professors:
- Fitzgerald, James L., Ph.D., Chicago
- Gwynne, Rosalind W., Ph.D., Washington
- Hodges, John O., Ph.D., Chicago
- Lehring, William L., Ph.D., Harvard
- Schmidt, Gilly G., Ph.D., Pittsburgh

Assistant Professor:
- Hussemer, Mark, Ph.D., Minnesota

A master's degree in Philosophy with a concentration in religious studies is available. (Details of this program are described under Philosophy.) Graduate courses in religious studies provide opportunity for students in a variety of disciplines to pursue work in religious studies as a graduate concentration.

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**GRADUATE COURSES**

411 Modern Religious Philosophies (3) Religious implications of major Western thinkers and movements from the 20th century onward. Prereq: Consent of instructor. May be repeated.

593 Independent Study (1-3) May be repeated. S/NC or letter grade.

600 Doctoral Research and Dissertation (3-15) P/INF only. E

601 Seminar in Educational Theories in Special Education and Rehabilitation (3) Education theories: education, rehabilitation of exceptional persons, theory applications in educational settings. Prereq: Admission to doctoral program or consent of instructor.

602 Seminar in Social Processes in Special Education and Rehabilitation (3) Social phenomena which influence, disability on persons and on significant others. Implications for habilitation. Prereq: Admission to doctoral program or consent of instructor.

603 Seminar in Research in Special Education and Rehabilitation (3) Development and implementation of research. Independent research studies. Research proposals. Prereq: 9 hrs of research core and consent of instructor.

610 Internship in College Teaching and Supervision (3-9) Supervision of college teaching and supervision. Prereq: Admission to doctoral program or consent of instructor. May be repeated. Maximum 9 hrs. S/NC only.

610 Internship in College Teaching and Supervision (3-9) Supervision of college teaching and supervision. Prereq: Admission to doctoral program or consent of instructor. May be repeated. Maximum 9 hrs. S/NC only.

620 Internship in Research in Special Education and Rehabilitation (3-9) Internship placement with professional engaged in theoretically-based research: public school, institutions, agencies or university settings. Prereq: 9 hrs in statistical and research methods. May be repeated. Maximum 9 hrs. S/NC only.

630 Internship in Institutional Leadership in Special Education and Rehabilitation (3-9) Advanced level field experiences under supervision of practicum. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. S/NC only.

679 Special Topics (1-3) Prereq: Admission to doctoral program. May be repeated. Maximum 9 hrs. S/NC or letter grade.

693 Independent Study (1-3) May be repeated. S/NC or letter grade. E

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**Romance and Asian Languages**

*(College of Arts and Sciences)*

**MAJORS**

**DEGREES**

French

- M.A.

Spanish

- M.A.

Modern Foreign Languages

- Ph.D.

John B. Romeiser, Head

Professors:
- Barrette, Paul E., Ph.D., California
- Brady, Patrick (Shumway Chair of Excellence), D.U.P.
- Campion, Edmund J., Ph.D., Yale
- Cobb, Carl W., Ph.D., Tulane
- Elliott, Jacqueline C. (Emeritus), M.A., Illinois

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**DEGREES**

1. Completion of a minimum of 24 semester hours in coursework plus at least 6 hours in course 500 Thesis. In French, 501 is required; in Spanish, 550. A maximum of 6 hours may be taken at the 400 level, the rest at the 500 level, and under certain conditions the student may take 600-level seminars. If the student chooses to have a minor (such as Italian or Portuguese), at least 24 hours (including 6 hours of thesis) must be taken in the major, 6 in the minor.

2. A thesis, with a minimum of 6 semester hours in course 500.

3. A written examination covering the coursework and selected items from a master reading list.

4. A final oral examination covering the thesis.

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**Non-Thesis Option**

1. Completion of at least 30 semester hours, with a maximum of 9 at the 400 level, the rest at the 500 level, including 501 (French) or 550 (Spanish). 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, 6 in the minor.

2. Three term papers that have been accepted by the student’s advisory committee.
3. A written examination covering the coursework and selected items from a master reading list.
4. A final oral examination to discuss the papers (French M.A. only).

THE DOCTORAL PROGRAM

The Ph.D. in Modern Foreign Languages is offered jointly by the Department of Germanic and Slavic Languages and the Department of Romance and Asian Languages and requires advanced training in a major language and either a second language or applied linguistics. Students whose language of first concentration is German should consult the section on Germanic and Slavic Languages.

Admission Requirements

Applicants must have completed a B.A. in either French, German or Spanish to be accepted into this program. Both graduates of institutions in the United States and those with undergraduate degree 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.

Degree Requirements

Candidates with German as a first concentration must complete a minimum of 63 semester hours of coursework beyond the bachelor's degree in addition to 24 hours of doctoral research and dissertation. Two tracks are available:

The coursework for Track I must be distributed as follows: at least 39 hours in the first concentration; at least 18 hours in the second concentration; and at least 6 hours in a cognate field.

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 6 hours in a cognate field.

Courses for 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.

1. 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 must be completed, distributed as follows:
   400 level: A maximum of 6 hours of 400-level classes taken for the M.A. may be applied.
   500 level: A minimum of 21 (Track I) or 27 (Track II) hours must be taken. These must include French 512, 516, 584 or Spanish 512 and 555. 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.
2. Second Concentration: A minimum of 18 (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, 12 of these hours must be at the 500 level or above. For Track II, 3 of these hours must be at the 500 level or above.

French students choosing applied linguistics must take French 421 or 429; 425; 512; and 9 (Track I) or 12 (Track II) hours of appropriate electives in English or French. Spanish students must take Spanish 421 or 428; 426; 512; and 9 (Track I) or 3 (Track II) hours of appropriate electives in English or Spanish. The student's graduate advisor must approve the electives chosen.

3. Cognate Field. Six hours in graduate courses numbered 400 and above in a field outside the department 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.

4. 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).

If a student has not chosen a third language as his or her cognate area, basic competence (determined by a reading examination with translation into English administered by the department concerned) in a third language is required. If the student’s first and second languages are Romance languages, the third language should be chosen from another language family.

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 offering the language.

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 or 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 source of financial support (e.g., Fulbright, McClure, Rotary fellowships); for additional courses, see Germanic and Slavic Languages.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The Ph.D. program in Modern Foreign Languages is available to residents of the state of Alabama. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

Asian Languages

GRADUATE COURSES

431 Readings in Chinese Literature (3) Prereq: Mastery of intermediate-level Chinese or consent of instructor. May be repeated. Maximum 9 hrs.

431 Readings in Japanese Literature (3) Prereq: Mastery of intermediate-level Japanese or consent of instructor. May be repeated. Maximum 9 hrs.

471 Selected Topics in Asian Studies (3) Content varies. May be repeated. Maximum 9 hrs.

French

GRADUATE COURSES


411 French Literature of the 16th Century (3) Highights 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.


418 Survey of Francophone Literature (3) Examination of French literature outside metropolitan France; particularly Africa and Caribbean. 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.

421 Phonetics (3) Foundation in science of phonetics. Practical exercises and individual performance. Laboratory training highly recommended. Graduate credit not allowed for departmental majors. Prereq: Intermediate Composition and Conversation or equivalent.

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: Intermediate Composition and Conversation or French for Business.

423-24 Advanced Conversation (1,1) Informal conversation with native speakers on contemporary topics. Stresses in-class contact rather than outside preparation. Prereq: Intermediate Composition and Conversation or French for Business. 2 hrs weekly.

425 Introduction to Descriptive Linguistics (3) Theory and practice of techniques of linguistic analysis in subfields 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) (Same as German 426, Russian 426, Spanish 426 and Linguistics 426.)
429 Romance Linguistics (3) Development of Classical Latin through Vulgar Latin into major Romance languages. (Same as Spanish 429 and Linguistics 429.)


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) French contemporary civilization and culture since World War II. Problems, trends, and organization of French society today. Prereq: 300-level literature course.

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 related to business transactions. Comparative approach to explore differences 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: French for Business or consent of instructor.

500 Thesis (1-15) P/NP only. E

501 Techniques in Literary Analysis (3) Required for M.A. program. Intensive course in interpretation of texts, a close stylistic analysis of texts representative of different eras and of different genres.

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: S/NC only. E

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 M.A. and Ph.D. students holding Graduate Teaching Assistantships, except those whose previous training or experience warrants their being excused by department.

516 Bibliography and Methods of Research (2) Critical research tools and scholarly contributions in French literature and language. Practical exercises on compiling scholarly data using computer-based and non-computer sources.


531 French Literature of the 16th Century I (3) Literature of first half of 16th century, Rabelais and other prose writers, humanists, and poetry of Marot, Lyonnais group, and young Pliéide poets.

532 French Literature of the 16th Century II (3) Literature of second half of 16th century, mature works of Pliéide writers and such poets, as D'Urfé and Sponde; Montaigne; writers of scientific works and moralists; drama.

541 French Literature of the 17th Century I (3) French poems and prose works of 17th century.

542 French Literature of the 17th Century II (3) Classical French theatre of 17th century.

551-52 French Literature of the 18th Century (3,3) Reading and interpreting works of Marivaux, Voltaire, Diderot, Rousseau, Beaumarchais, and others.

561 Lyric Poetry of the 19th Century (3) Reading and interpreting great French romantic poets, "Tartuffe" movement, Parnassians, Charles Baudelaire and Symbolists.

561-62 French Literature of the 19th Century (3) Reading and interpreting works of Hugo, Vigny, Stendhal, Balzac, Baudelaire, Flaubert, Zola, Verlaine, and others. 562-Reading and interpreting works of pre-Romantic and post-Romantic periods.

571-72 Trends in Modern French Literature (3,3) In-depth study of some of most revolutionary, challenging poets, novelists, dramatists of 20th century.

581-82 The French Novel (3,3) French Novel from 17th through 20th centuries.

583 Problems in Stylistics (3) Survey of comparative English-French stylistics. Development and improvement of one's written French.

584 Modern Theory and Criticism (3) Survey of twentieth 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.

Italian

GRADUATE COURSES

401 Dante and Medieval Culture (3) Introduction to signification of this great Italian writer. Prereq: 212 or consent of instructor.

402 Petrarch and Boccaccio (3) 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.

405 Modern Italian Poetry (3) From Pascali to Montale. Prereq: Italian 212 or consent of instructor.

410 Italian Theatre (3) Survey of Italian theatre from Renaissance to present. Prereq: Intermediate Italian or consent of instructor.

421 Phonetics (3) Prereq: Intermediate Conversation and Composition or consent of instructor.

422 Advanced Grammar (3) Finer points of grammatical structure. Required of all majors. Available to non-native speakers only. Prereq: Intermediate Conversation and Composition or consent of instructor.

423 Advanced Conversation (3) Develops speaking skills to advanced level through wide range of activities. Available to non-native speakers only. Prereq: Intermediate Conversation and Composition or consent of instructor.

424 Advanced Composition (3) Develops writing skills to advanced level through numerous compositions on assigned topics. Available to non-native speakers only. Prereq: 422 or consent of instructor.

425 Introduction to Descriptive Linguistics (3) (Same as French 425, German 425, Russian 425, and Linguistics 425.)

426 Methods of Historical Linguistics (3) (Same as German 426, French 426, Russian 426, and Linguistics 426.)

429 Romance Linguistics (3) (Same as French 429 and Linguistics 429.)

430 History of Spanish Language (3) Evolution of Spanish language from its origins to present: major differences between Hispanic-American and Iberian Spanish. Prereq: Intermediate Composition and Grammar.

431 Spanish Civilization (3) Major social, political, and cultural achievements of Spanish and Spanish-American people from origins of their civilization until today. Prereq: Aspects of Spanish and Spanish-American Language or equivalent.

435-36 Survey of Spanish Literature (3,3) 435—Spanish literature through Golden Age. 436—Spanish literature since 1700. Prereq: Aspects of Spanish and Spanish-American Language or equivalent. May be repeated with consent of department. Maximum 6 hrs.

450 Hispanic Drama (3) Close reading and analysis of representative works by selected dramatists of each period, either Spanish or Spanish-American. Topics vary. Prereq: Aspects of Spanish and Spanish-American Language or consent of instructor. May be repeated with consent of department. Maximum 6 hrs.

451 Hispanic Prose (3) Close reading and analysis of representative works by selected novelists, essayists or short story writers of Spain or Spanish America. Topics vary. Prereq: Aspects of Spanish and Spanish-American Language or equivalent. May be repeated with consent of department. Maximum 6 hrs.

452 Hispanic Poetry (3) Major poets of each period, either Spanish or Spanish-American. Topics vary. Prereq: Aspects of Spanish and Spanish-American Language or equivalent.

Spanish

GRADUATE COURSES

421 Phonetics (3) Prereq: Intermediate Conversation and Composition or consent of instructor.

422 Advanced Grammar (3) Finer points of grammatical structure. Required of all majors. Available to non-native speakers only. Prereq: Intermediate Conversation and Composition or consent of instructor.

423 Advanced Conversation (3) Develops speaking skills to advanced level through wide range of activities. Available to non-native speakers only. Prereq: Intermediate Conversation and Composition or consent of instructor.

424 Advanced Composition (3) Develops writing skills to advanced level through numerous compositions on assigned topics. Available to non-native speakers only. Prereq: 422 or consent of instructor.

425 Introduction to Descriptive Linguistics (3) (Same as French 425, German 425, Russian 425, and Linguistics 425.)

426 Methods of Historical Linguistics (3) (Same as German 426, French 426, Russian 426, and Linguistics 426.)

429 Romance Linguistics (3) (Same as French 429 and Linguistics 429.)

430 History of Spanish Language (3) Evolution of Spanish language from its origins to present: major differences between Hispanic-American and Iberian Spanish. Prereq: Intermediate Composition and Grammar.

431 Spanish Civilization (3) Major social, political, and cultural achievements of Spanish and Spanish-American people from origins of their civilization until today. Prereq: Aspects of Spanish and Spanish-American Language or equivalent.

435-36 Survey of Spanish Literature (3,3) 435—Spanish literature through Golden Age. 436—Spanish literature since 1700. Prereq: Aspects of Spanish and Spanish-American Language or equivalent. May be repeated with consent of department. Maximum 6 hrs.

450 Hispanic Drama (3) Close reading and analysis of representative works by selected dramatists of each period, either Spanish or Spanish-American. Topics vary. Prereq: Aspects of Spanish and Spanish-American Language or consent of instructor. May be repeated with consent of department. Maximum 6 hrs.

451 Hispanic Prose (3) Close reading and analysis of representative works by selected novelists, essayists or short story writers of Spain or Spanish America. Topics vary. Prereq: Aspects of Spanish and Spanish-American Language or equivalent. May be repeated with consent of department. Maximum 6 hrs.

452 Hispanic Poetry (3) Major poets of each period, either Spanish or Spanish-American. Topics vary. Prereq: Aspects of Spanish and Spanish-American Language or equivalent.
t or equivalent. May be repeated with consent of department. Maximum 6 hrs.

459 Capstone Colloquium in Spanish (3) Integrative experience. Broad range of issues and topics that affect much of Spanish-speaking world and also involve those who specialize in Hispanic studies. Prereq: Aspects of Spanish and Spanish American Literature or equivalent.

461 Special Topics (3) Aspect of Hispanic literature, culture, linguistics, or foreign language pedagogy. Topics vary. May be repeated with consent of department. Maximum 6 hrs.

471 Latin American Civilization (3) Latin America's diverse heritage and major social and political institutions. Prereq: Aspects of Spanish and Spanish American Literature or equivalent.

473-74 Survey of Spanish American Literature (3,3) 473 — Historical survey from Conquest to late 19th century. 474 — Major literary movements, writers and works of 20th century. Prereq: Aspects of Spanish and Spanish American Literature or equivalent.

479 Social Protest Literature of Latin America (3) Analysis of literature as means of unmasking social evils that have traditionally beset Latin America. Indigenismo, Black literature, women writers, role of writer in Latin American society. Prereq: Aspects of Spanish and Spanish American Literature or equivalent.

500 Thesis (1-15) P/NP only. E

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 completed. May not be used toward degree requirements. May be repeated. S/NP only. E

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 M.A. and Ph.D. students holding Graduate Teaching Assistantships, except those whose previous training or experience warrant their being excused by department.

522 Advanced Communication Skills for Teachers and Other Professionals (3) Advancement of oral and written proficiency in Spanish through extensive use of authentic contemporary materials; class lectures and discussions; oral reports; presentations and reports. Especially recommended for graduate students, teachers and other professionals seeking to maintain or enhance high level communicative competency.

531 Old Spanish (3) Evolution of Spanish language from its origins through 12th century.

532 Medieval Spanish Literature (3) Spanish literature through 15th century.

533 Golden Age Prose (3) Wide range of prose fiction in Spain during 16th and 17th centuries. Moorish, picturesque, sentimental, pastoral and exemplary novels, and dialogues.

534 Don Quijote (3)

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.

540 Eighteenth- and Nineteenth-Century Spanish Literature (3) Major works from 18th- and 19th-century Spain. Content varies with regard to theme, genre or literary movement.


543 The 20th-Century Spanish Novel (3) Baroja, Azorín, Valle-Inclán, Pérez de Ayala, Cela, Delbos, Goytisolo, Mateu, and at least one present-day novelist.

545 Modern Spanish Poetry (3) From Bécquer, Unamuno, A. Machado, Jiménez, Lorca, Guillén, Alejandrin, and a contemporary, Celaya.

547 Modern Spanish Drama (3) Major playwrights of 20th-century Spain.

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 Spanish or Spanish American Literature (3) May be repeated. Maximum 6 hrs.

552 Directed Readings (3)

553 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.

554 Nineteenth-Century Spanish American Literature (3) From early nineteenth century to 1880. Content varies with regard to genre, theme, literary movements, or other aspects contributing toward definition of Spanish American literature.


559 The Spanish American Novel: Chile and the River Plate Nations (3) Novels from Chile, Argentina, Uruguay and Paraguay. Modern world.


564 Contemporary Spanish American Poetry (3) Major poets in Spanish America from post-modernismo to present day.

565 Spanish American Drama (3) Major playwrights of 20th-century Spanish America.


567 The Spanish American Short Story (3) Short story by major writers in Spanish America from Romanticism to present day, theory and criticism of genre.

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 grade or S/NP.

600 Doctoral Research and Dissertation (3-15) P/NP only. E

621-22 Seminar in Spanish Literature (3,3) Topics vary in field of Peninsular literature. May be repeated with consent of department. Maximum 9 hrs.

631-32 Seminar in Spanish American Literature (3,3) Topics vary. May be repeated with consent of department. Maximum 9 hrs.

640 Russian

See Germanic and Slavic Languages

Russian

Small Animal Clinical Sciences

See College of Veterinary Medicine and Comparative and Experimental Medicine

Small Animal Clinical Sciences

See College of Veterinary Medicine and Comparative and Experimental Medicine

Social Work

MAJOR

DEGREES

Social Work ........................................ M.S.S.W., Ph.D.

Charles Glisson, Acting Dean

Professors:

Bicho, M. H. (Emeritus), M.S. .............. Ohio State
Cetingok, M., Ph.D. ......................... Washington (St. Louis)
Fayer, C., Ph.D. ............................... Michigan
Fryer, Gideon W. (Emeritus), Ed.D.. ....... Columbia
Glisson, C. A., Ph.D. ........................... Washington (St. Louis)
Granger, Ben P. (Emeritus), Ph.D. ........... Brandeis
Hirayama, H., D.S.W ....................... Pennsylvania
McLarnan, G. (Emeritus), M.S.S.W. ......... Pennsylvania
Mullins, M. Kate (Emeritus), Ph.D. ......... Chicago
Nance, Ren M., D.S.W. ..................... Tulane
Orten, J. D. (Emeritus), D.S.W. ............. Alabama
Rubenstein, H., Ph.D. ............................ Chicago
Shatz, Eunice (Emeritus), Ph.D. ............... Brandeis

Associate Professors:

Bell, W. J., D.S.W. ............... Tulane
Combs-Orme, Terri, Ph.D. ................. Washington (St. Louis)
Cruthirds, C. Thomas, D.S.W. ............ Tulane
Fiene, Judith, Ph.D. ......................... Tennessee
Jennings, J., Ph.D. ............................. Michigan
Nugent, W., Ph.D. ............................. Florida State
Orms, J., Ph.D. ................................. Maryland
Spicuzza, Frank, M.S.S.W. ................. Tennessee
Thompson, J., Ph.D. .......................... Rutgers
Vaughn, H. H., Ed.D. ........................... Memphis State

Assistant Professors:

Campbell, P. M., D.S.W. ................. Alabama
Collier, J. C., M.S.W. ....................... Tulane
Crawford, S., M.S.W. ....................... Texas
Davey, Timothy L., Ph.D. ................. Florida State
Denby, Ramona, Ph.D. ...................... Ohio State
Egan, Marcia, Ph.D. ......................... Maryland
Jones, J., Ph.D. .............................. Bryn Mawr
Marley, Marsha, D.S.W. .................... Tulane
Page, Timmy F., M.S.W. .................... Western Michigan
Patterson, D., Ph.D. .......................... Utah
Rocha, Cynthia, Ph.D. ...................... Washington (St. Louis)
Rogge, Mary, M.S.W. ...................... Washington (St. Louis)
Spaulding, E., Ph.D. ......................... Smith
Vickerstaff, Susan, Ph.D. ................. Alabama

Field Practice Coordinators:

Betz, Phyllis (Knowville), M.S.S.W. ........ Tennessee
Balles, Mellinda (Nashville), M.S.S.W. ......... Texas (Arlington)
Alien, Sandra (Memphis), M.S.S.W. ......... Tennessee

THE MASTER'S PROGRAM

The Master of Science in Social Work program prepares social workers to provide professional leadership in: 1) clinical social work practice and 2) 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 management and community practice.
Admission Requirements

Admission to the master's program is based on the following requirements:

1. 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 at least one course in each of the following: economics, government or political science, human biology, sociology or anthropology, psychology, philosophy or the arts, or literature, or history. Applicants with other academic backgrounds may request consultation to discuss ways that they can meet the requirements.

2. 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 the Graduate School.

3. Personal qualifications acceptable for entrance into the professional practice of social work.

4. 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: (1) a B.S.W. from an accredited program, (2) an overall undergraduate GPA of 3.0 or greater, and (3) personal qualifications acceptable for entrance into the professional practice of social work. Students admitted into advanced standing are required to complete a minimum of 42 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.

Specific information about the advanced standing program is available from the college. 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 branches of the college. Admission requirements are the same as for full-time study. Coursework can be completed over a three-year period. One year of the student's period of study must be on a full-time basis.

Financial Aid

Students may apply directly to the University's Financial Aid Office for assistance such as the National Direct Student Loan or the Work-Study Program. Other stipends may be obtained from the Office of Social Work.

General Requirements

1. A minimum of 60 semester hours including completion of foundation courses and field practice (30 hours), at least five courses (15 hours) and two semesters of field practice (12 hours) in the clinical concentration, or at least five courses (15 hours) in the management and community practice concentration; and one elective (3 hours).

2. Students may select a thesis or non-thesis option. Students pursing the thesis option receive six credit hours for successful completion.

3. Successful completion of a comprehensive exam or thesis defense.

4. An overall GPA of 3.0 or better on all graded courses and satisfactory performance in field.

The Professional Foundation Curriculum

The foundation curriculum consists of 30 semester hours in five basic knowledge and skill areas required of all students before entering either of the concentrations. As the initial phase of the educational program, the foundation curriculum contributes to the process of professional identification and presents a comprehensive and broad base of theory, knowledge, and skills from which to operate in the future as practitioners, supervisors, managers, planners, and program developers.

Upon completion of the foundation curriculum (at the end of the second semester), students select a concentration in either clinical social work practice or social work management and community practice.

Clinical Social Work Practice: The clinical social work practice concentration focuses on students' developing expertise in providing services to individuals, couples, families, and small groups who are experiencing, or who are likely to experience, serious threats to their personal and social well-being. The concentration emphasizes students' developing theoretical and empirical knowledge and practice skills in differential assessment and intervention directed towards the prevention and amelioration of complex personal, interpersonal, and environmental problems; understanding of, and ability to practice ethically and effectively with, socially and culturally diverse populations; and understanding of, and skills in influencing, the organizational context of practice towards the development of new services that may be needed and improvement in the provision of existing services.

Management and Community Practice: The 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 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.

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, meeting 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 in 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.

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 School 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 (earned on an S/N/C system) for the field practicum is also accepted. In addition, transfer courses must be part of an otherwise satisfactory graduate program (B average) and be approved by the dean. This coursework must be completed within the six-year period prior to the receipt of the degree.

A maximum of 6 semester credits 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 School 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 School statement describing the procedure for applying for examination.
THE DOCTORAL PROGRAM

The College of Social Work offers the Doctor of Philosophy with a major in Social Work. The stated goal of the 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 methods 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 Nashville. Students and their committees can develop a plan for completing their research in Nashville and Memphis based on the availability of dissertation resources.

Admission Requirements

The Ph.D. 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 the Ph.D. program for further information regarding admissions criteria.

General Requirements

1. A minimum of 63 hours beyond the master's degree including: a) completion of 24 hours of required coursework, b) completion of 15 credits of advanced electives, at least 12 of which are taken outside the department, and 9 of those 12 related to the dissertation, and c) completion of at least 24 credit hours of dissertation research.

2. Successful completion of qualifying and comprehensive examinations.

3. Completion and defense of the dissertation.

Curriculum

The curriculum of the Ph.D. program consists of foundation coursework, electives, and dissertation research. The foundation curriculum consists of 24 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 professional development. 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 foundation curriculum is completed and elective coursework begins during the first year of study, the elective requirement is 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 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 doctoral 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.

Financial Aid

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 Ph.D. program.

MINOR IN GERONTOLOGY

Graduate students in the College of Social Work 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 Human Ecology for specific requirements.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S.S.W. and Ph.D. programs in Social Work are available to residents of the state of Arkansas; the Ph.D. to residents of Kentucky, Oklahoma, or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

NOTE: 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, E
501 Foundations of Social Work Practice I (3) Survey of history, mission, and identity of profession. Basic theory, values, and methods generic to social work practice at various systems levels. Assessment, planning, implementation, evaluation, and intervention skills. Prereq: Admission to College or consent of instructor. F
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when assigned or enrolled in University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only, E
504 Foundations of Social Work Practice III (3) Basic theory, methods, problems, and strategies in implementing change with individuals, families, and groups. Social work practice at various levels: social systems; task groups; human service organizations, and community systems. Various practice roles: planner, program developer, supervisor, administrator, advocate and task group leader. Prereq: Completion of first semester of foundation or consent of instructor. Sp
507 Research in Social Work Research (3-6) Supervised practice in application of research methods to social work. Prereq: 506 and consent of faculty conducting investigation. May be repeated. Maximum 6 hrs. S/NC only, E
509 Graduate Seminar in Public Health (1) (Same as Public Health 509, Exercise Science 509, Nutrition 509, and Nursing 509.)
514 Human Behavior in the Social Environment I (3) Theories pertaining to individual, family, and group development while emphasizing relationships among biological, social psychological, and cultural systems. Dynamics of behavior in context of social structures; race, ethnicity, social class, gender roles. Prereq: Admission to College or consent of instructor. F
515 Human Behavior and Social Environment II (3) Patterns of adaptive and maladaptive behavior, reorganization of current theories, and their application to situations among individuals, families, organizations, communities in maladaptive behavior: mental illness and abusive behavior. Prereq: 514 or consent of instructor. Sp
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 affected and through which aggregate social welfare services are proposed, authorized, financed, and programmed. Theories of complex organizations applied to social service delivery settings. Prereq: Admission to College or consent of instructor. F
518 Social Work and Oppression (3) Sources, dynamics, and impact of oppression in U.S. society as manifested in social ecological structures and processes and personal experiences. Connections among various forms of oppression: racism, sexism, classism, and heterosexism. Forces which perpetuate such conditions. Prereq: Admission to College or consent of instructor. F
521 Clinical Social Work Practice with Individuals (3) Theories, knowledge, and skills for clinical practice with individuals from ecological perspective. Theoretical process and treatment strategies, incorporating content from psychodynamic and cognitive practice models. Specific client problems. Prereq: Completion of foundation or consent of instructor. F
523 Clinical Social Work Practice with Families (3) Concepts related to understanding and analyzing family dynamics and interactional patterns from perspective of major family therapy models. Techniques of treatment in terms of application to families with varied systems and individual problems and to families from varied social and cultural backgrounds. Prereq: Completion of foundation or consent of instructor. F
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 learning experiences. Prereq: Completion of foundation or consent of instructor. F
526 Research for Assessment of Social Work Treatment (3) History and philosophies, conceptual ap-
530 Seminar in Clinical Social Work (3) Topics in theory and practice of clinical social work practice. Prereq: Completion of foundation or consent of instructor. F,Sp

532 Short-Term Treatment (3) Theory and practice of planned short-term treatment, emergency treatment, and crisis intervention. Prereq: Foundation or consent of instructor.

533 Social Work Treatment with Couples (3) Theories regarding contemporary marriage styles, problem areas in relationships, and application of treatment methods and skills for problem resolution. Prereq: Foundation or consent of instructor.

534 Social Work Treatment with Children and Adolescents (3) Examination of various treatment modalities for assessing and treating children and adolescents. Prereq: Foundation or consent of instructor.

535 School Social Work (3) Place of school as community institution and resource. Methods, processes, and techniques employed in school social work. Prereq: Foundation or consent of instructor.

541 Leadership and Management in Human Services (3) Management skills required in development and management of human services delivery systems. Issues regarding human resources management, recruitment, selection, retention, and change processes. Prereq: Completion of foundation or consent of instructor. F

543 Fiscal Management and Resource Development (3) Administrative decision-making related to financial planning and resource allocation in human service organizations. Issues in budgeting, allocating, expenditure control, fundraising, grant writing, marketing, and evaluation. Prereq: Foundation or consent of instructor. F

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 services. Prereq: Foundation or consent of instructor. F

550 Seminar in Management and Community Practice (2-3) Topics in theory and practice of management and community practice. Prereq: Foundation or consent of instructor. May be repeated. Maximum 6 hrs.

551 Seminar in Social Welfare Policy (3) Advanced study of social welfare legislative and administrative policies and programs, including strengths and limitations of various strategies. Prereq: Foundation or consent of instructor. May be repeated. Maximum 6 hrs.

552 Community Organization (3) Local community development, social planning, and social action as practice models for development of resources to meet human needs. Prereq: Foundation or consent of instructor.

556 Supervision and Consultation in Social Work (3) Roles, techniques, and practices of social work supervision and consultation. Prereq: Foundation or consent of instructor.

563 Social Aspects of Illness (3) Social, economic, and emotional problems arising from illness or disability and their implications for social work. Prereq: Foundation or consent of instructor.

564 Substance Abuse (3) Survey and analysis of social, cultural, medical, and psychological factors underlying alcoholism and drug abuse and addiction. Recent research and treatment innovations. Prereq: Foundation or consent of instructor. Sp

566 Social Gerontology (3) Physical, psychological, and social aspects of aging. Major social policies and programs. Prereq: Foundation or consent of instructor.

580 Field Practice (3) Instruction and supervision in social work practice. Prereq or coreq: 501. S/N only.

581 Field Practice (3) Instruction and supervision in clinical social work practice. Prereq or coreq: 580. S/N only.

582 Field Practice (6) Instruction and supervision in clinical social work practice or management and community practice. Prereq: Completion of foundation. S/N only.

583 Field Practice (8) Instruction and supervision in clinical social work practice or management and community practice. Prereq: 582. S/N only.

584 Field Practice (2-6) Instruction and supervision in social work practice. Prereq or coreq: 512. May be repeated. S/N only.

585 Seminar in Gerontology (1) (Same as Human Ecology 585, Counseling Education and Counseling Psychology 585, Exercise Science 585, Nursing 585, Public Health 585, Psychosocial Education of Older Adults in Society. S/NC only)

593 Independent Study (1-6) Individualized study; student selects, designs, and completes examination of special issue or problem. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. F,Sp

600 Doctoral Research and Dissertation (1-15) Prereq: 512, 513, 514.

601 Research for Social Work Practice (3) Epistemological and methodological considerations for both quantitative and qualitative research for social work practice. F

602 Research for Social Work Practice II (3) Epistemological and methodological considerations for both quantitative and qualitative research for social work practice. Sp

604 Research in Social Service Settings (3) Advanced study, under faculty supervision, of research issues in community agencies. Prereq: First year required. Ph.D. courses or consent of instructor. May be repeated. Maximum 9 hrs. F,Sp

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. Evaluation of processes and outcomes of social work practice. F


613 Social Work Practice and Its Social Context II (3) Critical analysis of knowledge bases of major practice in administration and planning. Sp

640 History of American Social Work (3) Social, cultural, economic and political contexts for development of social work profession, development of education for professionals, and modern welfare system. F

650 Programs and Legislation for Children and Families (3) Background, purposes, and current issues surrounding major social welfare and health services serving disadvantaged children and their families: Social Security Act (Title IV), Child Welfare and AFDC, Title XIX, the Maternal and Child Health Block Grant; Title XIX, Medicaid, Head Start, WIC and other nutrition programs, and Healthy Start. Current issues and controversial legislative changes. F


693 Directed Study in Social Work Research (3) Advanced independent study, under faculty guidance, of social work research issues. Prereq: First year required. Ph.D. courses or consent of instructor. May be repeated. Maximum 9 hrs. F,Sp

699 Internship (1-12) May be repeated. Maximum 12 hrs. S/NC only.
the student's committee. A student's plan of study should follow one of the following approaches: Plan 1, 6 hours in one of the department's concentrations and 6 hours in a second area, including areas outside the department, subject to the approval of the student's committee. Plan 2, 12 hours in a special area of study approved by the student's committee and the department's Graduate Program 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. Plan 2 may be repeated based on those experiences that demonstrate 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.

THE DOCTORAL PROGRAM

Coursework
Twenty-four hours of coursework beyond the master's degree are required (exclusive of S/NC 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 M.A. degree (521, 531, Statistics 531) or their equivalents must take them as remedial work which does not apply to their residency. Students must complete Sociology 622, 534, 563, 633, or 636; and Statistics 532 or another advanced course in statistics. Completion of 9 hours in each of two concentrations is encouraged. A student who cannot achieve his/her educational goals within the department's concentrations may construct an individualized course of study subject to the approval of the student's doctoral committee and the Graduate Program Committee. Sociology courses at the 400 level may not be taken without the consent of the student's advisor and the Graduate Program Committee. Six hours may be taken in related fields without petitioning the Graduate Program Committee 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 (generalist, specialist, and collateralist) may be obtained from the department.

Dissertation and Final Examination
A dissertation based on original research must be completed (24 hours). The candidate must pass an oral defense of the dissertation, including the theory and methodology related to the research, in accordance with the deadlines specified by The Graduate School.

MINOR IN ENVIRONMENTAL POLICY

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

MINOR IN GERONTOLOGY

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 American society with his/her major concentration. Please refer to human Ecology for specific requirements.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.A. program in Sociology is available to residents of the state of Virginia (concentration in criminology only); the Ph.D. to residents of West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

405 Sociology of Sport (3) Social meaning, organization, and process of sport. Prereq: 291 or consent of instructor.
414 Sociology of Health Care (3) Organization of health care facilities, patient-physician relationships, demographic characteristics, and prevalence of disease.
415 Sociology of Aging (3) How roles and statuses change with age in relation to major social institutions; impact that rapidly increasing number of older people has on society, effect of society on older people.
446 The Modern World System (3) Critical examination of capitalist world-system as social system, its coherence, boundaries, regions, member groups, cleavages, and pattern of conflict. Analysis of who gets what, why, and how in global political economy.
455 Sociology and Law (3) How laws and legal processes are affected by social change, social impact of legal sanctions, relations between law and social justice.
459 Organizational and Corporate Crime (3) Analysis of crimes and deviance committed by organizations. Case studies of corporate and organizational crime, organizational dynamics of crime, theories of corporate crime, and organized responses to this type of crime by governmental regulatory agencies.
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.)
471 Sociolinguistics (3) (Same as English 471 and Linguistics 471.)
480 Diffusion of Agricultural Technology (3) (Same as Rural Sociology 480.)
500 Thesis (1-15) P/NP only. E
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. S/NC only. E
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. Prereq: 350 or equivalent.
507 Foundations of Social Psychology (3) Current and classical theoretical perspectives in social psychology.
510 Teaching Sociology (3) Art and craft of teaching sociology from curricular considerations through teaching techniques. May be repeated. Maximum 6 hrs.
521 Sociological Theory I (3) Assessment of what sociological theory is, its major figures and their approaches to understanding society.
531 Research Methods in Sociology (3) Research design, measurement, sampling, quantitative and qualitative data collection techniques, data, reduction, and analysis.
534 Advanced Sociological Analysis (3) Underlying assumptions and logical procedures used by sociologists in formulating explanations, foundations of sociological research strategies and techniques.
540 Occupations (3) Occupations in relation to individuals and society, technology, economic stratification, and social organizations.
541 Collective Behavior, Social Movements, Social Change (3) Basic theory and research on conditions of social unrest in human communities and efforts of collectives to change existing society.
542 Sociological Aspects of Sport (3) (Same as Sport Studies 542.)
543 Sociology of Development (3) Sociological theories and studies of development; modernization, colonialism, dependency, comparative impact of various development paths upon selected aspects of social structure and change.
551 Delinquency and the Social Structure (3) How study of delinquency and juvenile justice is affected by changing structures of childhood and adolescence, changing demographic and institutional influences, and changing views about responsibility and punishment.
560 Environmental Sociology (3) Systematic treatment of current research in environmental sociology. Social impact analysis and conflicts over environmental issues.
563 Demographic Techniques (3) Standard rates and measures of demographic variables, life table analysis, increment-decrement models, and survey techniques of population analysis.
580 Advanced Rural Sociology (3) (Same as Rural Sociology 580.)
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 Social Theories of Sport (3) (Same as Physical Education 515.)
595 Special Topics in Rural Sociology (1-3) (Same as Rural Sociology 595.)
599 Readings (3) Selected topics. May be repeated. Maximum 6 hrs.
600 Doctoral Research and Dissertation (3-15) P/NP only. E
622 Sociological Theory II (3) Distinct schools of sociological theory and contributions of their principal exponents. Prereq: 521 or consent of instructor.
629 Supplementary Readings in Sociological Theory (3) Individual guidance. Preparation for comprehensive examination. Prereq: Consent of instructor. S/NC only.
Speech Communication

College of Arts and Sciences

John Haas, Head

Professors:
Julian, Faye D. (Liaison), Ph.D. ............ Tennessee
Lester, Lorayne W., Ed.D. ............... Tennessee
Yeomans, G. Allan (Emeritus), Ph.D. ......... Louisiana State

Associate Professors:
Ambrester, M. L., Ph.D. .................. Ohio
Buckley, J. E., Ph.D. .................... Northwestern
Cook, N. C., M.A. ....................... Alabama
Glenn, Robert W., Ph.D. ............... Northwestern
Haas, John W., Ph.D. ................. Kentucky

Assistant Professors:
Amoler, R. S., Ph.D. .................. Ohio State
Arnold, Christa L., Ph.D. ................. Florida

Graduate courses in Speech Communication provide opportunities for students in a variety of disciplines to investigate how oral language can effect changes in the knowledge, the understanding, the ideas, the attitudes, or the behavior of other human beings.

GRADUATE COURSES

420 Communication and Conflict (3) Communication as significant factor in development, management, and resolution of conflict at interpersonal, small group, organizational, or societal levels.

425 Interpersonal Health Communication (3) Interpersonal communication in health care settings: provider-client interactions, social support groups, stigma and disease, and contemporary models explaining use of health-related information.

440 Organizational Communication (3) Organizational setting and variables of communication process that affect quality of human interaction both within and outside organization.

465 Studies in Rhetorical History and Criticism (3) May be repeated. Maximum 6 hrs.

466 Rhetoric of the Woman's Rights Movement to 1930 (3) Historical and critical study of public address in campaign for women's rights in United States from 1830's through 1920's. (Same as Women's Studies 468.)

476 Rhetoric of the Contemporary Feminist Movement (3) Historical and critical study of rhetoric in movement for women's rights in United States from 1940's to present. (Same as Women's Studies 476.)

570 Legal and Ethical Issues of Communication (3) Communication rights and responsibilities. Prereq: Consent of instructor.

590 Directed Reading and Research (3) May be repeated. Maximum 6 hrs.

591 Foreign Study (1-15) See College of Arts and Sciences

592 Off-Campus Study (1-15) See College of Arts and Sciences

663 Independent Study (1-15) See College of Arts and Sciences.

Spanish

See Romance and Asian Languages

Special Programs

College of Arts and Sciences

GRADUATE COURSES

510 Humanities Perspectives in the Arts and Sciences (2) Seminar on nature of inquiry in humanities. Emphasis on nature and special forms of human experience and its interpretation through study of formative texts and critical figures.

520 Natural Science Perspectives in the Arts and Sciences (2) Seminar on nature of inquiry in physical and biological sciences drawing on history of science, critical figures in shaping of scientific thought, and methodology for observation and experimentation in natural sciences.

530 Social Science Perspectives in the Arts and Sciences (2) Seminar on nature of inquiry in social sciences. Emphasis on methodology for observation and research in study of human beings, their social environments and their behavior.

Sport and Physical Activity

College of Education

MAJORS

Human Performance and Sport Studies ..... M.S.

D. Kelley, Leader

Professors:
Beitel, Patricia A., Ed.D. ............ North Carolina (Greensboro)
Lay, Nancy E. (Emeritus), Ph.D. ......... Florida State
Watson, Helen B. (Emeritus), Ph.D. ......... Michigan

Associate Professor:
Jones, Ralph E., Ph.D. ............... Toledo
Kelley, Dennis R., Ph.D. .......... Georgia State

Assistant Professors:
Borovik, Patricia C., M.S. .......... Tennessee
McCutchin, M., Ed.D. ........ North Carolina (Greensboro)

The Sport and Physical Activity unit participates in graduate programs leading to degrees, majors, and concentrations in:

Master of Science

Human Performance and Sport Studies

Sport administration

See Education under Fields of Instruction for full description of all degree requirements. Elective courses are offered in dance. These courses are appropriate for students interested in management of dance studios, teaching dance, or dance performance.

The purpose of the unit is twofold: 1) to provide the opportunity for students to attain knowledge and to develop the essential skills to be successful sport administrators, and 2) to coordinate and provide instruction in many physical activities designed to improve physical fitness and encourage future participation in physical activities.

ADMISSION REQUIREMENTS

Applicants are required to complete the unit application which will be sent to all persons upon their initial inquiry about the program. Preference will be given to students with an overall undergraduate GPA of 3.0 or higher. Students with a GPA between 2.7 and 2.99 are encouraged to submit GRE scores. The following retention policy applies to all graduate students seeking a degree in this unit:

1. Graduate students are required to maintain an overall 3.0 GPA.

2. Any student who falls below this standard will be advised in writing by the unit leader of the need to discuss the matter with his/her advisor.

3. If a student's overall GPA remains below 3.0 for a second semester, the student will have his/her degree status revoked.

GRADUATE ASSISTANTSHIPS

A limited number of graduate assistantships are available for qualified women and men who are graduates of accredited colleges or universities. These assistantships are open to students in the master's program. Students
interested in these opportunities should file their applications before February. Letters should be addressed to Graduate Assistantships Coordinator, Sport and Physical Activity unit, The University of Tennessee, Knoxville, TN 37996-2700.

Sport Management

GRADUATE COURSES

415 Development and Maintenance of Leisure, Sport, Tourism Services (3) (Same as Recreation and Tourism Management 415.)

500 Thesis (1-15) P/NP only. E

501 Special Project (3) Culminating experience for nonthesis major. Research study suitable for publication, or practicum requiring special written work. Prereq: 532.

502 Registration for Use of Facilities (3-15) Required for 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. S/NC 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. Sp

532 Research Techniques in Sport (3) Evaluate, compare, and contrast research techniques in sport with consideration for and experiences in appropriate review, design, and analysis procedures, and proposal development. F,Su

535 Ethics in Sport Administration (3) Development of analytical skills and knowledge desirable of middle and upper level managers in administration of sport business/organization. Social issues and ethics in sport administration. Sp

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. Sp

553 Case Studies in Sport Administration (3) Current issues and problems in sport administration at all levels of amateur and professional sport. F

554 Readings in Sport Administration (3) Survey of pertinent literature in refereed and applied journals and texts. Su

555 Assessment of Sport Programming Needs (3) Development and assessment of approaches and/or instruments for purpose of evaluation, research, feasibility studies, and needs assessment in sport administration: qualitative and quantitative techniques. Prereq: 532. Sp

570 Event Management (1-3) Review of current research related to theory and practice in event management and involvement in event management capacity with one or more special events. Su

580 Special Topics (1-3) Advanced study in selected disciplinary or professional areas of physical education and/or sport. May be repeated.

590 Practicum (1-3) Intern experience in areas of major interest. May be repeated. S/NC only.

593 Independent Study (1-3) May be repeated. S/NC or letter grade. E

Statistics

GRADUATE COURSES

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.

460 Dance Through the 19th Century (3) Dance of various societies and culture from pre-history through 19th century.

495 Dance Pedagogy (3) Principles and methods of teaching dance with practical application in mini-teaching experience. Prereq: Upperclass or graduate standing and consent of instructor.

595 Internship (3) Full-time application of previous theoretical and applied knowledge and skills in inappropriate sport setting. S/NC only. E

Dance

GRADUATE COURSES

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.

460 Dance Through the 19th Century (3) Dance of various societies and culture from pre-history through 19th century.

495 Dance Pedagogy (3) Principles and methods of teaching dance with practical application in mini-teaching experience. Prereq: Upperclass or graduate standing and consent of instructor.

THE MASTER'S PROGRAM

The M.S. program 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 Institute for Productivity Through Quality and related programs, department faculty participate in a variety of consulting and research projects in industry. Students may supplement their classroom study with an industrial internship and participation in research projects dealing with industrial problems. Department faculty also collaborate with researchers from many academic disciplines and hold joint appointments with the College of Agriculture, the Computing Center and the Medical Center. 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, Stokely Management Center, University of Tennessee, Knoxville, TN 37996-0532 or mme@utk.edu or http://funnelweb.utc.utk.edu/~stat/programs.htm.

Admission Requirements

General admission requirements for The Graduate School are stated beginning on page 12. 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).

Curriculum

A minimum of 33 credit hours must be completed for the master's degree. Required of all students are 6 hours in statistical methods, 6 hours in statistical theory, 1 hour in statistical computing, and 3 hours in either supervised consulting or internship. Students must complete a minimum of 21 hours in approved statistics courses, exclusive of consulting, internship, independent study, or thesis.

Thesis or Independent Study

The thesis option for the master's degree requires the student to complete 6 hours for the thesis. Alternatively, the non-thesis option requires a minimum of 3 hours for an independent study project.
Comprehensive Examination

Students must pass a two-part written comprehensive examination covering 1) theory and 2) 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 academic program established to enable students to earn either a minor in Statistics or a M.S. in Statistics simultaneously with a master's or doctoral degree in another department. Approved coursework taken to meet the requirements in the student's home department may also be credited toward the M.S. 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 program, with the exception of certain M.S. joint major programs. 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.

Degree Program

<table>
<thead>
<tr>
<th>Hours in Approved IGSP Courses</th>
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<tbody>
<tr>
<td>Master's in home department, minor in Statistics</td>
</tr>
<tr>
<td>Master's in home department, M.S. in Statistics</td>
</tr>
<tr>
<td>Doctorate in home department, minor in Statistics</td>
</tr>
<tr>
<td>Doctorate in home department, M.S. in Statistics</td>
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</tbody>
</table>

The M.S. in Statistics requires 33 hours of coursework.

Course offerings vary by department. For complete listing of MBA program requirements, see Business Administration.

Statistics

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. Students with a grade-point average of 2.5 or higher at the end of the probationary period may continue in the program.

For complete listing of MBA program requirements, see Business Administration.

MBA Comprehensive Examination

The MBA Comprehensive Examination is offered each semester in Statistics. Minimum course requirements are 571, 566, and 572 with prerequisites of 563 or Mathematics 425. Ph.D. Concentration: Statistics

This degree 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 methodologies; all of which takes place while students are exposed to coursework in the basic functional areas of business.

Minimum course requirements are: 673, 666, 681, and 592.

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. Students with a grade-point average of 2.5 or higher at the end of the probationary period may continue in the program.

Graduate Courses

411 Introduction to Statistical Computing (3) Use of computer operating system commands and packaged programs for statistical analysis and file management. Not available for credit for Statistics majors. Prereq: 201 or 251.


500 Thesis (1-15) P/N only.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when university facilities and/or faculty time before degree completion is used. May not be used toward degree requirements. May be repeated. Prereq: 501.


531 Survey of Statistical Methods I (3) Univariate and bivariate data collection and organization, statistical estimation and hypothesis testing, analysis of relationships among categorical and numerical data, including Chi-square tests and simple and multiple regression. Use of computing facilities required. Credit not given for both 531 and 537. Prereq: 1 year of college mathematics. Same as Biomedical Sciences 530.

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 consideration 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 college mathematics 1 and 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 (3) 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 for data management 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.


572 Applied Linear Models (3) Simple and multiple linear regression using matrix algebra and general linear model; polynomial regression; weighted least squares regression, variable selection techniques, multicollinearity, regression diagnostics. Use of standard computer packages. Prereq: 571 and matrix algebra.

573 Design of Experiments (3) One-way ANOVA, multiple range tests, equal and unequal variances, trans-
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 consent of instructor.

679 Multivariate Statistical Modeling (3) Modern information-based techniques and model selection in multivariate analysis, information tests of significance with multivariate data, multivariate analysis of variance, multivariate regression and variable selection, multivariate cluster analysis, common principal component model, 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.

681 Special Topics in Probability (1-3) Presentation of specialized topics in probability and stochastic processes. May be repeated. Maximum 6 hrs.

683 Special Topics in Statistics (1-3) Presentation of specialized topics in statistics. May be repeated. Maximum 6 hrs.

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. S/N or letter grade.

Textile, Retail, and Consumer Sciences

(College of Human Ecology)

MAJORS

Textiles, Retailing and Consumer Sciences M.S. Human Ecology Ph.D.

Nancy B. Fair, Head

Professors:

Drake, Mary Fran, Ph.D. Penn State

Dopert, Kermit E., Ph.D. Tennessee

Wadsworth, Larry C., Ph.D. NC State

Associate Professors:

Bhat, Gajanan, Ph.D. Georgia Tech

Breese, Randall R. (Liaison), Ph.D. Florida State

Dyer, C. L. (Liaison), Ph.D. North Carolina

Fair, Nancy B., Ph.D. NC State

Fairhurst, Ann E., Ph.D. Oklahoma State

Assistant Professors:

Lee, Jinkook, Ph.D. Ohio State

Reardon, James, Ph.D. North Texas

The Department of Textile, Retail, and Consumer Sciences offers the master's degree with a major in Textiles, Retailing and Consumer Sciences, concentrations in textile science and in retail and consumer sciences. An interdisciplinary/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. The program in Textiles, Retailing and Consumer Sciences prepares students for careers in industry, business, public and private agencies, and educational institutions. Master's level work enables students to conduct research in retail management and merchandising and in the consumer areas related to retail decision making. Students in textile science are expected to have a solid foundation in mathematics, as well as a formal background in a physical science or engineering.

ADMISSION REQUIREMENTS

A complete file for review includes the Graduate School application file, Department of Textiles, Retailing, and Interior Design application, Graduate Record Examination (GRE) scores for the general section, and three Graduate School Rating Forms completed by individuals who can attest to the potential for graduate education. Forms may be obtained from the Dean's Office, College of Human Ecology.

In addition to specified entrance requirements stipulated by The Graduate School, admission to the master's degree program with a major in Textiles, Retailing and Consumer Sciences is dependent on completion of undergraduate courses that give the necessary background for success in the graduate program. For the concentration in retail and consumer science, students should have an adequate background in retailing and/or consumer science supported by coursework in economics, marketing, mathematics, and statistics. For the concentration in textile science, students should have a basic technical background in textile science or materials science supported by mathematics through differential equations, organic chemistry, and general physics.

Admitted and superior students deficient in one or more of the above requirements, may be admitted at the discretion of the department's graduate faculty.

THE MASTER'S PROGRAM

The major in Textiles, Retailing and Consumer Sciences has concentrations in retail and consumer sciences and in textile science. Requirements are listed below.

Retail and Consumer Sciences (Thesis)

Major (Required RCS courses): 510, 511, 541, 550, 562, 590

Cognate Area 12

Statistics 6

Total 30

Retail and Consumer Sciences (Non-Thesis)

Major (Required RCS courses): 510, 511, 541, 550, 562

Cognate Area 6

Statistics 6

Electives 3

Total 24

Textile Science

RCS 552 3

Research Methods 3

T3 590 3

Textile Science courses 12

Cognate Area 6

Statistics 6

Total 36

*Must include RCS 582 or equivalent; or 3 hours of laboratory techniques in materials analysis and characterization.
THE PH.D. CONCENTRATIONS

Retail and Consumer Sciences

Students enrolled in the Ph.D. program with a concentration in retail and consumer sciences are provided with a foundation in management and retail and consumer sciences to further theory and application in advanced study and research. Requirements are either 81 or 90 hours, depending upon whether students select a minor in statistics. Requirements include:

- Major (RCS Required Courses): 614, 615, 625, 641, 651, 653, 654, 655, 656, 679, 695
- Research Methods: 590, 516
- Statistics: 12-15
- Cognate Area: 3
- Human Ecology 630
- Electives: 21
- Dissertation: 24
- Total: 83-89

Note: (1) Statistics hours must include Statistics 537, 538, 579. (2) Cognate hours must include at least 3 hours at the 600 level. (3) Students choosing to take a minor in statistics will take a minimum of 15 hours of prescribed statistics courses and are not required to take a cognate area.

Textile Science

Students enrolled in the Ph.D. program in Human Ecology with a concentration in textile science take one common course which provides students with a foundation for the integration of textiles and apparel in the context of the near environment. A required departmental research seminar exposes students to research being conducted in all areas of study in the department.

1. RCS 552 (3 hours);
2. Research Methods which must include 6 hours of laboratory techniques in materials science and characterization;
3. TS 590 (2 hours). Attendance at seminar is required for all full-time students;
4. Six hours in statistics at the 500-600 level;
5. Eighteen hours in textile science courses;
6. Nine hours in a cognate area;
7. Fourteen hours of other courses which may include up to 6 hours of dissertation; and

Note: Students must take a minimum of 9 hours at the 600-level in the College of Human Ecology, exclusive of dissertation. Transfer students with a master's degree from another institution are required to complete at least 42 hours (including dissertation hours) from UT Knoxville.

ACADEMIC STANDARDS

1. 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 departmental research capability.
2. If progress or performance is deemed insufficient, the faculty may recommend probation with specific goals set for a specified time or termination.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. program in Textiles, Retailing and Consumer Sciences is available to residents of the state of Mississippi. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records. For the Ph.D., see Human Ecology.

Retail and Consumer Sciences

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when the student uses University facilities and for the duration of time or to termination.
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. Sp
541 Retail Consumer Analysis (3) How consumers make decisions and how retailers attempt to influence decisions by offering better environment and selection in stores. Prereq: Calculus III or equivalent. F
550 Consumer Economics and Market Choices (3) Economic framework for evaluating consumer behavior and consumer choice within market systems. Theory of consumer preferences, and decision making; consumption and demand models for individuals and households. International consumer economics, issues and policies. Prereq: Textile Apparel Economics, Mathematics 503 or equivalent. F/A
552 Economics of Textile Complex (3) Economics of textile complex. Quantitative approaches to industry structure, production, distribution and institutions within local, national, and global settings. Current and future international issues and implications. Prereq: Calculus III or equivalent. Microeconomics. F/A
562 Research Methods (3) Fundamentals of scientific method, advanced techniques of science, methodology, and method of research. Issues and concepts of basic and applied research. Prereq: Statistics 531 or equivalent. Sp
590 Research Seminar (1) Research topics in retail and consumer sciences. May be repeated. S/N/C only. F/Sp
593 Directed Study (1-3) Individual problems in retailing and consumer sciences. Prereq: 9 hrs retailing and consumer sciences graduate coursework. May be repeated. Maximum 9 hrs.
595 Special Topics in Retail and Consumer Sciences (1-3) Lecture, group discussions, and literature study. Specialized topical areas of advanced study in retailing and consumer sciences. Prereq: 9 hrs graduate coursework. May be repeated. Maximum 9 hrs.
600 Dissertation (3-15) P/NP only. E
615 Retail and Consumer Sciences Literature and Thought (3) Evaluation of retail and consumer sciences literature with emphasis upon recent developments of scholarly thought, and identification of potential areas of further study. Prereq: 562. Marketing 501, Economics 501. F/A
616 Research Methods, Models and Measurement in Retail and Consumer Sciences (3) Quantitative methods and analytical concepts in research process. Mathematical and statistical formulation of retail and consumer sciences phenomena, utilizing models, model building and measurement constructs. Prereq: 562, Statistics 538. Sp/A
625 Strategic Managerial Retailing (3) Decision-making orientation that integrates strategic framework components with preparation and analysis of specific retail case situations. Prereq: 510.
641 Retail Consumer Behavior (3) Theories and concepts from social science and in relation to ultimate consumer’s behavior. Prereq: 6 hrs of sociology and/or psychology or consent of instructor.
651 The Consumer and Public Policy (3) Public policy issues within consumer environments. Analysis of past and present policies within economic, social, legal and business frameworks. Implications of consumer issues and policy alternatives. Literature and research focus. Prereq: 550 or consent of instructor.
655 Advanced Topics in Retail and Consumer Sciences/Textiles (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 hrs.

Textile Science

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when the student uses University facilities and for the duration of time or to termination.
510 Fiber Science (3) Physical properties, chemical properties, and structure of polymer fibers; relation to end-use properties. Prereq: Organic Chemistry and Thermal Physics or equivalent.
520 Optical Microscopy (4) Basic compound and polarizing microscopy for imaging. Optical property measurement and structure elucidation. Prereq: fundamentals of optics. F
521 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.
524 Advanced Textile Dyeing and Finishing (4) Chemistry, processing, and fastness of chemical finishes and various classes of dyes on different fibers. Prereq: 510 or consent of instructor. 2 hrs and 4 labs. Sp
526 Nonwovens Science and Technology II (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: 521 or equivalent.
590 Research Seminar (1) Research topics in textile science. Prereq: 590. S/N/C only. F/Sp
593 Directed Study (1-3) Individual problems in textile science. Prereq: 9 hrs graduate coursework. May be repeated. Maximum 9 hrs.
595 Advanced Topics in Textile Science (1-3) Lecture, group discussion on specialized topics. Prereq: 9 hrs graduate coursework or consent of instructor. May be repeated. Maximum 9 hrs.
600 Dissertation (3-15) P/NP only. E
for the degree of Master of Fine Arts with a

THE MASTER OF FINE ARTS PROGRAM

of residence. Theatre 510 and 512 are also required of all students. Students in the M.F.A. degree program are evaluated annually by juried performance or portfolio submission. Consultation in the program is with the approval of the faculty committee for the M.F.A. 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/Technical Production

Required courses are at least 12 hours of Theatre 580, Design Technical Production Seminar, and at least 6 hours in the projects courses. Theatre 401, Principles of Design is required in the first year of residence.

Acting

Theatre 520-21-22-23-24-25 Master Class are required, along with one course in directing and two hours each in voice and dance.

REQUIREMENTS FOR 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 The Graduate School.

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 (5 years) established for completion of the MFA degree.

GRADUATE COURSES

401 Principles of Theatrical Design (3) Fundamental principles of design: visual and structural relationships. Projects assigned to develop understanding and perception.

409 Stage Make-up (3) Study and problems in make-up design and application: character analysis. Prereq: Introduction to Theatre.

420 Special Studies in Acting (3) Content varies. Exercises in selected concentrated areas such as style, techniques, approaches, e.g., Shakespeare, movement, humor. Prereq: Advanced Acting and consent of instructor. May be repeated. Maximum 6 hrs.

423 Period Movement and Dance (2) Movement styles and dances from Renaissance to 20th century. Prereq: Stage Movement or consent of instructor.

424 Theatre Dance II (2) Advanced dance technique incorporating elements of musical theatre. Prereq: Theatre Dance or consent of instructor. May be repeated. Maximum 6 hrs.

425 Selected Musical Theatre Techniques (2) Study and practice of musical theatre material: dance and vocal work. Prereq: Theatre Dance or consent of instructor. May be repeated. Maximum 4 hrs.

426 Applied Phonetics (3) Development of skills in transcription and reproducion of principal varieties of English Language in North America and Great Britain and selected foreign dialects in North America. Prereq: Consent of instructor.


445 Advanced Costume Construction (3) Advanced study of construction technique, tailoring, vacuum forming, plastic molding, and cobbling. Prereq: 345 or consent of instructor.

446 Costume Pattern Making (3) Draping patterns for period costumes. Consety and study of historical patterns 1500-1900. Prereq: 345 or consent of instructor.

450 Advanced Scenery Technology I (3) Study and practice of theatre woodworking; production participation required. Prereq: 250. Graduate credit to theatre M.F.A. students only.

451 Advanced Scenery Technology II (3) Study and practice of metalworking and plastics for theatrical productions; production participation required. Prereq: 250. Graduate credit to theatre M.F.A. students only.

452 Advanced Scenery Technology III (3) Study and practice of stage rigging for theatrical productions; production participation required. Prereq: 250. Graduate credit to theatre M.F.A. students only.

454 Scenery Painting (2) Introduction to materials, selected topics, and principles of craft. Gaining skill and understanding through studio experience. Prereq: Consent of instructor.


456 Rendering (3) Techniques in monochrome and full color illustration of space and form. Prereq: Acquaintance with basic mechanical perspective and freehand sketching.

462 Advanced Lighting Design (3) Advanced problems in lighting design and theory. Lighting musical theatre, opera, and dance. Prereq: 352 or consent of instructor.

464 Computer Assisted Design for Stage Lighting (3) Advanced techniques in computer-assisted design for stage lighting. Working with CAD and other stage-lighting software for preparation of lighting plots and associated paperwork. Prereq: Introduction to Lighting Design or consent of instructor.

470-71 Playwriting (3,3) 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 (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 be not used toward degree requirements. May be repeated. S/N only. E.

510 Studies in Theatre History (3) Intensive study of selected topics in theatre history. May be repeated. Maximum 9 hrs.

512 Dramatic Literature Analysis (3) Dramaturgical strategies of major playwrights, using a variety of analytical approaches from Aristotelian to Structuralist.

520-21-22-23-24-25 Master Classes in Acting (6,6,6,6,6,6) Master classes in acting techniques, voice, and movement. Theatre MFA students only.

536 Projects in Play Directing (3) Practical work in play direction involving various lengths and kinds of scripts. May be repeated. Maximum 9 hrs.

542 The Social History of Costume (3) Study and analysis of costume as related to society’s manners and morals, architecture and furniture.


544 Millinery for the Stage (2) Pattern making and construction techniques for hats from antiquity to present. Prereq: Consent of instructor.
Transportation

See Marketing, Logistics and Transportation

Vernetary Medicine

(College of Veterinary Medicine)

MAJOR DEGREE
Veterinary Medicine ............... D.V.M.
Comparative and Experimental Medicine .......... M.S., Ph.D.

THE PROFESSIONAL PROGRAM

Admission Requirements

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 by any accredited college or university that offers courses equivalent to those at The University of Tennessee. Knowledge of veterinary curricular requirements must be completed by the end of spring term of the year in which the student intends to enroll. Biochemistry requirements must have been satisfactorily completed within five years of the time the student wishes to enter the program.

Subject Area Semester Hours
English 6
Humanities and Social Sciences* 18
Physics 8
General Chemistry 8
Organic Chemistry 3
Biochemistry** 4
General Biology 8
Genetics 3
Cell Biology*** 3
TOTAL 66

*May include, for example, courses in English literature, speech, music, art, philosophy, religion, language, history, economics, anthropology, political science, psychology, sociology and geography.

**Exclusive of laboratory.

***It is expected that this requirement will be fulfilled by a course in molecular or cellular biology.

Admission Procedures

Application 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 beginning July 1, 1997 from the Office of the Associate Dean, The University of Tennessee, College of Veterinary Medicine, P.O. Box 1071, Knoxville, TN 37901-1071.

Note: The deadline for receipt of the completed application materials by VMCAS 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.

D.V.M. Curriculum

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 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 one calendar year.

The first year consists mostly of the preclinical subjects of anatomy, physiology, histology, and microbiology. Also included in the first year are clinical subjects of physical diagnosis and anesthesia. 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 rotate through a series of clinical blocks.

An innovative feature of this curriculum is the designation of semester six in which the individual student may select his or her courses of study. This allows students who have specific educational goals (such as advanced or dual degree programs) to enroll in all, some, or none of the regularly scheduled courses during that semester. Students enrolled in the D.V.M. program are required to complete at least 18 credit hours in the sixth semester and may register for up to 10 credit hours of graduate courses without enrolling in The Graduate School and these hours will be credited toward the D.V.M. degree. This semester of elective study offers a unique educational alternative for select 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 152 semester credits.

THE GRADUATE PROGRAM

The College also administers a graduate program involving all departments which leads to the Master of Science and the Doctor of Philosophy degrees. Because of the interdisciplinary departmental administration of the College of Veterinary Medicine, the faculty have opportunities in the graduate programs of other instructional units, including Animal Science (nutrition, physiology, genetics and animal management), Microbiology (molecular biology, virology and immunology), Ecology and Evolutionary Biology (environmental toxicology), Public Health, and Comparative and Experimental Medicine. (Refer to other sections of this catalog for a full description of these programs.)

The majority of the graduate students and graduate faculty of the College of Veterinary Medicine are involved in the Comparative and Experimental Medicine program. This program provides a wide spectrum of interdisciplinary training that prepares graduates for teaching and/or research careers in the health sciences.

PROFESSIONAL COURSES

811 Bacteriology and Mycology (4) Fundamental aspects of microbiology and cell biology related to pathogenesis of bacterial and fungal diseases of animals:
FACILITIES FOR RESEARCH AND SERVICE
Facilities for Research and Service
Facilities for Research and Service

Bureau of Educational Research and Service
(College of Education)
Carol E. Kasworm, Director
Housed in the Associate Dean's Office for Research and Technology, the Bureau is responsible for the coordination of research activities and for the development of college research and service activities based in external funding. In addition, it may be called upon to provide brokering services to connect faculty expertise with needs for consultant services, technical assistance, and possible professional development activities. The Bureau directly coordinates select development of research proposals, as well as college grant and contract review, administration, and fiscal processes. The Bureau also provides the administrative home for the Interdisciplinary Center for Literacy Studies.

Center for Business and Economic Research
(College of Business Administration)
William Fox, Director
In its economic research endeavors, CBER today has the same basic mission determined at its inception 58 years ago at the request of the Tennessee Legislature—to produce and disseminate new information in the field of economic research and in the specific areas of regional economic development and fiscal policy. The mission has also expanded to include influencing decision quality in the public and private sectors and integrating departmental research through cooperative ventures in the international arena. In addition to the annual Economic Report to the Governor, the Survey of Business and the Tennessee Statistical Abstract, the Center publishes research on a wide range of socioeconomic and policy issues, including taxes, banking, telecommunications, environmental concerns, and employment prospects.

Center for Information Studies
(School of Information Sciences)
W. David Penniman, Director
The Center for Information Studies (CIS) was established in June 1989 to be a focal point for research related to information systems and services. The Center, located at 304 Temple Court, has performed research for the federal government, state and local governments, and business and industry. Projects have ranged from strategic planning efforts to information system and service evaluations, to modeling of scientific and technical communication. Staff of the Center have been actively involved in proposal development and project performance with faculty and staff in other centers and departments at the University. Areas of interest to the Center include information systems design, information organization and retrieval in very large databases, directories and locator tools in a networked environment, design of regional library and information system networks, new technology applications, information system support for educational reform, modeling of information processes, development of measures and methods for evaluating information system performance and effectiveness.

Center for Literacy Studies
(College of Education)
The Center for Literacy Studies was founded in 1988. The Center's purpose is to bridge theory and practice in the field of adult learning and literacy. To achieve its purpose, the Center collaborates with practitioners, policy makers, and other research organizations on projects that address three common themes: building the capacity for an interrelated literacy delivery systems that can meet the needs of a changing society; forming partnerships with practitioners who are working to make changes in their practice of adult education; and developing innovative approaches to adult learning and literacy and disseminating results to the field.

Center for Physical Activity and Health
(College of Education)
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 service oriented organization designed to educate the UTK 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. The Center focuses its efforts in four main areas: training future leaders in exercise promotion, providing exercise opportunities for members of the UTK community, promoting exercise within the UTK and Knoxville communities, and providing exercise testing and assessment.

For additional information about services, contact Dixie L. Thompson at (423) 974-1271 or via e-mail at dixielee@utk.edu.
**Center of Excellence for Materials Processing**

The Center for Materials Processing is one of the "Centers of Excellence" created by the State of Tennessee. It has an inter-disciplinary program designed to bring together individuals with appropriate expertise to solve important materials processing problems. It emphasizes (1) the development of desirable materials properties through the control of composition, molecular structure and microstructure, (2) measurement of process variables, and (3) control of those variables to ensure proper processing. The Center conducts basic research and teaching in materials processing and carries out research to improve existing processing technologies and transfer of research results to private industry. A major aspect of the Center is student participation in industry-sponsored research programs.

The Center is located in 100 Estabrook Hall, Knoxville, T.N 37996, 974-0816.

**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 new 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 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:

- Bernadette E. Schmidt Chair of Excellence of History
- Bernard 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 Waste Management and Environmental Engineering
- Hodges Chair of Excellence of English

J. Fred Holly Chair of Excellence in Public Economy
Nancy Gore Hunger Chair of Excellence in Environmental Studies
Pilot Chair of Excellence in Management
Rachelle Chair of Excellence of Ornamental Horticulture
Rachelle Chair of Excellence in Materials Science and Engineering
Shumway Chair of Excellence in Romance Languages
Willis Lincoln Chair of Excellence in Physics

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 UT, contact:

- Center for Livestock Diseases and Human Health
  Dr. G. M. H. Shires, Director
  College of Veterinary Medicine
  UT Knoxville
  Knoxville, TN 37996
  (423) 974-7282

- Center for Materials Processing
  Dr. Carl McHargue, Director
  UT Knoxville
  121 Perkins Hall
  Knoxville, TN 37996
  (423) 974-7908

- Science Alliance
  Dr. Thomas A. Callcott, Director
  UT Knoxville
  101 South College
  Knoxville, TN 37996
  (423) 974-6785

- Waste Management Research and Education Institute
  Dr. Gary Sayer, Acting Director
  Dr. Jack N. Barkenbus, Director of Operations
  UT Conference Center, Suite 311
  600 Henley St.
  Knoxville, TN 37996-0710
  (423) 974-4251

**Child Development Laboratories**

*College of Human Ecology*

Anne Miller Stott, Staff Director

The Child Development Laboratories, operated by the Child and Family Studies department within the College of Human Ecology since 1927, currently offer child care programs for children of the student body and others interested in improving the quality of human communications.

**Communications Research Center**

(246 Communications Bldg.) is an adjunct to the communications graduate program. Objectives of the Center are: (1) to conduct original research in mass and public communication; (2) to disseminate research-generated information; and (3) to provide research services to faculty and students, professional communicators, and others interested in improving the quality of human communications.

**Division of Information Systems**

Dr. Susan Mettlen, Vice Chancellor

Computing and technology are important to a graduate program and the departments within the Division of Information Infrastructure (DII) provide access to that technology. The Division Web page at http://www.admin.utk.edu/vci1 as well as the departmental Web pages listed below can provide more information about the facilities and services provided.

**COMPUTING AND ADMINISTRATIVE SYSTEMS**

Faye Moly, Acting Director

Computing and Administrative Systems (CAS) provides computing facilities and services for the university's teaching, research, public service, and administrative activities. Assistance with computer-related questions is available by calling the DII Student Support Line at 974-9900 or accessing our home page on the World Wide Web at http://www.cas.utk.edu.

The Center Access for Education (CAFE) program provides UT Knoxville students, faculty and staff the opportunity for computing experience through an individual computer account. This account, provided at no charge, can be used for electronic mail, course work and research. Another account or additional space can be requested for a charge.
Free, non-credit courses on basic computer skills are taught throughout the year. Topics include Internet access, electronic mail, statistical programs, and word processing. CAS also maintains online and printed documents describing the availability and use of system hardware and software.

CAS is an affiliate of the following National Science Foundation Supercomputing centers: Pittsburgh Supercomputing Center, the National Center for Supercomputing Applications at the University of Illinois, and the Cornell National Supercomputer Facility.

Computer labs are available across campus with a variety of hardware and software and some of these labs are open 24-hours a day. CAS also provides users access to some public domain software for microcomputers and is the administrator for a number of site licenses for workstation and microcomputer software.

Software available on the computers at CAS includes most of the commonly used compilers and interpreters and a large number of programs for statistical, mathematical, engineering, operations research and graphics applications. CAS is the administrator for a number of site licenses for workstation and microcomputer software and participates in educational programs sponsored by DEC, IBM, Lotus, SGI and Sun that provide software packages at reduced or no cost to the University of Tennessee.

TELECOMMUNICATIONS AND NETWORK SERVICES
Ed Mahon, Director
Telecommunications and Network Services (TNS) provides network connectivity throughout the UTK campus, data communications between the UT campuses and connectivity to the Internet. The UTK network consists of over 6,000 nodes and is growing at 20% every year. Network connectivity is being extended to the dorms and should be widely available in the near future. TNS also provides dial-up access to the campus network via a modem dial-up pool. This pool supports Enhanced Remote Access that allows users to connect to the Internet as well as file servers on campus. In addition to the analog modem pool, TNS provides high-speed digital connections via ISDN. For further information on Telecommunications and Network Services, please consult our web page at http://www.tns.utk.edu or call (423) 974-6816.

STATISTICAL CONSULTING CENTER
Jim Schmidhammer, Director
The goal of the Statistical Consulting Center (SCC) is to help students, faculty and staff enhance the quality of their research by working together to effectively apply statistical and computing techniques.

Services offered are research planning and design; sample size determination; data entry and management; access to outside data sources such as census, stock market, ICFPR; analysis and interpretation; statistical graphics; review of journal articles, grant proposals, theses or dissertations; computer programming (as time permits); and training in the use of statistical and computing techniques.

The Center works with beginners through advanced researchers. Regardless of the level of assistance needed, at least a brief meeting with one of the consultants is strongly recommended as early in the project as possible. Seemingly minor changes in the planning stage can have a major impact on the kinds of research problems that can be solved later. The Technology Fee covers the cost of services to students for up to two hours per month. For the initial meeting, contact CAS at 974-6555 to make an appointment with a statistician. Bring all relevant materials available including proposals, data collection forms, surveys and relevant journal articles.

Consultants' offices are located at 200 Stokely Management Center.

Energy, Environment, and Resources Center
(Office of Vice Chancellor for Research)
Jack N. Barkenbus, 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 solid and hazardous waste management, information systems, environmental education, global environmental problems, and pollution prevention. The Center operates the Waste Management Research and Education Institute, the Center for Clean Products and Clean Technologies, the Water Resource Research Center, and the Center for Geography and Environmental Education. Current projects are approximately nine million dollars per year.

English Language Institute
Dale A. Myers, Director
The English Language Institute (ELI) is a non-credit language-study program of The University of Tennessee, Knoxville. It is designed to assist students in their pursuit of career goals or educational objectives in the U.S. The ELI offers intensive courses for the improvement of student skills in the English language. International students, visitors, and professionals have successfully learned English through study in the ELI.

The courses emphasize the development of communicative ability in listening, speaking, reading, and writing. Students are trained in teaching English to speakers of other languages with differing national backgrounds and varying proficiency in English.

Classes also assist students in pronunciation, test-taking strategies, U.S. culture orientation, and university study skills.

Additional information may be obtained at 907 Mountcastle St., (423) 974-3404; FAX (423)974-6833.

Institute for Tourism and Leisure Industries
(Office of the Division of Human Ecology)
Ken Krick, Director
The mission of the Institute is to serve as a catalyst for enhancing economic development in East Tennessee by supporting existing, as well as encouraging the creation of new, sustainable tourism and leisure industries. The Institute serves as a center of expertise for providing technical assistance, for conducting feasibility studies and other research, for structuring and delivering training programs, and for providing the critical linkage between human and capital resources necessary for developing new businesses.

The Institute actively collaborates with and actively supports the efforts of many special interest groups throughout East Tennessee. As such, the Institute is in a position to interface groups primarily interested in tourism with groups representing leisure industries and the economy as a whole. Hence, the Institute attempts to build a win-win philosophy among the major components of the leisure economy in East Tennessee.

The Institute draws upon the academic and support resources at UTK as well as the resources of a number of public, private, state, and federal entities. The Institute is unique in that it has the capacity to form project teams with the expertise to professionally address almost any issue, concern, problem or task. The vast diversity of human resources that comprise the Institute is in itself an invaluable asset.

Institute of Agriculture
D. M. (Pete) Gossett, Vice President
The Institute of Agriculture traces its history to 1869 when the University was designated as Tennessee’s Federal Land-Grant Institution. Under terms of the Federal Land-Grant Act, the University was enabled to offer instruction in agriculture and the mechanic arts for the first time. Since 1869, agricultural programs at the University have been expanded to include research for the development of new knowledge and extension for dissemination of such knowledge to rural people. Thus the Institute of Agriculture has come to include the work of four main divisions: Agricultural Experiment Station, Agricultural Extension Service, College of Agricultural Sciences and Natural Resources, and College of Veterinary Medicine.

Agricultural Experiment Station
Don O. Richardson, Dean
John I. Sewell, Associate Dean
Thomas H. Klinker, Associate Dean
The Agricultural Experiment Station was established by The University’s Board of Trustees on June 8, 1882, five years before the passage of the Hatch Experiment Station Act by the U.S. Congress. The Institute is one of the first five institutions in the U.S. to establish an Agricultural Experiment Station. Since its beginning, the Station has given first attention to investigations of concern to the agriculture of Tennessee.
The objectives of the Tennessee Agricultural Experiment Station are the creation and utilization of new knowledge through research. Fundamental research is directed toward: (a) understanding the basic science of the processes of plant and animal production through conventional and applicable research and services; (b) understanding the resource and market forces which affect the production, transfer, processing, and utilization of agricultural commodities and the resulting impact on the economic well-being of the agricultural sector, rural areas, and the State of Tennessee; (c) understanding the interaction of agricultural production and land uses on natural resources and the environment as they relate to long-term productivity and affect the quality of rural life; (d) understanding the impact of food and fiber resources and the chemicals used in their production on people’s well-being and the quality of life. Applied research utilizes these understandings to formulate effective production and marketing systems and to foster the development of a physical and economic environment that provides for the needs of rural, farm, and urban citizens.

The investigations of the Station follow a systematic method of gaining and applying knowledge efficiently to the biological, physical, and economic phases of producing, processing, and distributing farm and forest products; to the social and economic aspects of rural living, and to consumer health and nutrition. Both farm and urban populations gain from the accomplishments of the Agricultural Experiment Station. Examples of some of these accomplishments are new and improved varieties of crops, new and better methods of controlling crop and livestock pests, more efficient production of crops and pasture through improved fertilization and mechanization, and more efficient feeding and management of livestock.

The program is designed and administered through ten subject matter departments located at Knoxville. A majority of the faculty have teaching responsibilities in addition to their research. To assist in the research program, the Station supports over 100 graduate students. To serve Tennessee’s diverse agriculture, branch stations are operated at Crossville, Grand Junction, Greeneville, Jackson, Knoxville, Lewisburg, Manchester, Milan, Oak Ridge (forestry), Springfield, and Soddy-Daisy. Professional and technical staff are in residence at these locations.

Agricultural Extension Service

Billy G. Hicks, Dean
Mildred F. Clarke, Associate Dean
D. Ray Humber, Assistant Dean

The Agricultural Extension Service was established in 1914. Its purpose is to extend through various educational means agricultural and home economics information to farm families and others in the state who do not have the opportunity to enroll in resident courses of instruction at colleges.

The educational 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, community resource development, home economics, and education of young people through 4-H Clubs. County Extension staff members working directly with local people are supported in the various information fields by a specialist staff, members of which are stationed either in Knoxville, Nashville, or Jackson.

The Agricultural Extension Service operates administratively as one of four units of the Institute of Agriculture. For administration, the state is divided into five districts with supervisory locations in the districts. District headquarters are maintained in Knoxville, Chattanooga, Cookeville, Nashville, and Jackson.

The Agricultural Extension Service operates as a three-way partnership among county, state, and federal governments. The University of Tennessee represents state and federal government and a County Agricultural Extension Committee represents county government in this partnership.

Libraries, The University of Tennessee, Knoxville

Paula T. Kaufman, Dean
Aubrey H. Mitchell, Associate Dean

Professors:
Bayne, Pauline S., M.S.L.S. North Carolina
Felder-Hoehne, Felicia H., M.S.L.S. Atlanta
Grady, Agnes M., M.L.S. Washington
Kaufman, Paula T., M.S. Columbia
Lloyd, James B., Ph.D. Mississippi
Phillips, Linda L., M.S. Rutgers
Rader, Joe C., M.S.L.S. Tennessee
Webster, Judith D., M.S.L.S. Tennessee

Associate Professors:
Baker, Gayle D., M.L.S. Alabama
Bridges, Anne E., M.S.L.S. Rhode Island
Britton, William A., M.S.L.S. Clarion
Clement, Russell T., M.L.S. Brigham Young
Courtols, Martin, M.A.L.S. Wisconsin
Crowther, Karmen N., M.L.S. Emory
Dixon, Lana, M.S.L.S. Tennessee
Goetch, Lon, M.L.S. Rosary
Harwood, Richard M., M.L.S. North Texas
Kealy, Jillian M., M.S.L.S. Tennessee
Kim, Soon-Hyun, M.A.L.S. Indiana
Leach, Sandra S., M.L.S. Emory
Miller, Tamara J., M.S.L.S. Kentucky
Minton, James O., M.S.L.S. Tennessee
Mitchell, Aubrey H., M.S.L.S. Tennessee
Ponnappa, Biddanda P., M.S.L.S. Tennessee
Row, Jane S., M.S.L.S. Tennessee
Sammataro, Linda M., M.S.L.S. Southern Connecticut

Associate Professors:
Smith, Rita H., M.L.S. Illinois
Thompson-Wise, Deborah A., M.L.S. South Carolina
Wallace, Alan M., M.L.S. Washington

Assistant Professors:
Ellis, Kathryn D., M.S.L.S. North Carolina
Garrett, Marie A., M.S.L.S. Vanderbilt
Hammons, James W., M.S.L.S. Indiana
Johnson, Kay G., M.S.L.S. Pittsburgh
Lahmon, JoAnn, Ph.D. Florida State
Mack, Thura, M.S.L.S. Tennessee
Prescod, Janet, M.S.L.S. Tennessee
Roberts, Michelle, M.S.L.S. North Carolina
Shrode, Flora G., M.L.S. Texas
Thomas, Deborah L., M.S.L.S. George Peabody
Thomas, Steve, M.S.L.S. Tennessee

The University of Tennessee, Knoxville Libraries* own approximately 2 million volumes, more than 3.5 million manuscripts, 3 million microforms, 30,000 audio and video recordings, plus United States and United Nations documents. The UT, Knoxville Libraries currently subscribe to more than 10,000 periodicals and other serial titles. The Libraries’ membership in the Association of Research Libraries reflects the University’s emphasis on graduate instruction and research and the support of large, comprehensive collections of library materials on a permanent basis.

The UT, Knoxville Libraries consists of the main library (the John C. Hodges Library), four branches on the Knoxville campus (the Agriculture-Veterinary Medicine Library, the Cartographic Information Center, the Music Library, and University Archives & Special Collections), and the Social Work Library in Nashville.

The John C. Hodges Main Library (1015 Volunteer Blvd.) is a 350,000 square-foot facility housing collections in all subject areas. The Hodges Library has approximately 300 graduate student carrels, 200 faculty studies, and comfortable study space for more than 2,000 people.

The Hodges Library’s research holdings are augmented by Reference Services and by Interlibrary Services. Reference Services provides research assistance and access to commercially available databases, Self-searching of selected databases is available within the libraries and remotely, through the World Wide Web. Interlibrary Services borrows monographs and obtains copies of other materials from libraries around the world, usually at no charge.

Library holdings are accessible via a sophisticated online catalog which can be searched in the Hodges Library, the branch libraries, and from home and office computers. The Online Library Information System (OLIS) also provides access to a wide range of information resources available over the Internet.

The services and facilities of the University Libraries are accessible to person Kurzweil Personal Reader and TDD are available at the Hodges Library.

The Agriculture-Veterinary Medicine Library (Room A-113, Veterinary Teaching Hospital) has a strong collection in agriculture, veterinary, comparative and human medicine, and related biological sciences. Most of the publications of the U.S. Department of Agriculture and the State Agricultural Experiment Stations and Extension Services are collected.

The Cartographic Information Center (Room 15, basement of the Hoskins Library, Cumberland Ave. & 15th St.) maintains and develops a collection of atlases, journals, and books related to cartography.

The Music Library (301 Music Bldg.) has a comprehensive collection of music and music literature, including books, scores, audio and video recordings, current periodicals, and microfilm. All materials in the Library of Congress "M" classification are located here.
Maintenance and Reliability Center
(University of Tennessee)

The Maintenance and Reliability Center (MRC), located in 212 Pasqua Hall, was created in 1996 to provide an international center for research, development and application of advanced maintenance and reliability engineering. MRC's primary goal is to provide productivity improvements to industry by advances in failure prevention technology. Associated with this effort is the establishment of maintenance and reliability engineering as an interdisciplinary activity with application across a broad spectrum of industrial activities. In addition, MRC stresses the development of management techniques that will provide decision makers with the means to assess the availability, costs and benefits of failure prevention techniques.

MRC is an association consisting of industrial members and the University of Tennessee College of Engineering. Interested and qualified students may affiliate with the MRC program while pursuing a degree in an engineering department. Maintenance engineering courses are available as electives for these students. Research opportunities and graduate assistantships are also available for qualified students.

Center sponsored research projects are focused on life prediction technology, information processing technology; sensors, measurement systems and automation; and maintenance design engineering. Other research focus areas will be developed as the needs of industrial members are identified and matched with areas of university expertise.

Nutrition Institute
(College of Human Ecology)

Michael Zemmel, 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 Human Ecology as well as in several departments in the colleges of Agricultural Sciences and Natural Resources, Arts and Sciences, Medicine, and Veterinary Medicine. The Institute provides a communication link 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 may be pooled to strengthen nutrition-related instruction in these units.

The Institute publishes an on-line magazine Nutrition Uncovered which addresses current issues and controversies in the field. It may be found on the Web at http://nutrition.uitk.edu/.

Off-Campus Graduate Centers

KINGSPORT GRADUATE PROGRAM

UT Knoxville offers at Kingsport graduate programs in engineering and Human Resource Development at the master's level. Students who enroll in these programs must be admitted to The Graduate School of UT Knoxville. Information and application forms may be obtained from the ETSU/UT at Kingsport, 1501 University Boulevard, Kingsport, Tennessee 37660.

OAK RIDGE GRADUATE PROGRAM

UT Knoxville offers graduate programs at Oak Ridge leading to master's and doctoral degrees in engineering and supporting areas. Courses are given in the evenings with research facilities provided by and used in cooperation with the Oak Ridge Associated Universities (ORAU). Students can earn a master's degree in Environmental Engineering, Nuclear Engineering (radiological concentration), Industrial Engineering (engineering management concentration), Chemical Engineering, or Electrical Engineering. Additional upper division and graduate courses are offered in mathematics, statistics, safety, physics, human resource development, and other engineering areas.

This program is supported under a sub-contract with ORAU with principal support coming from the Lockheed Martin Corporation. UT is one of the sixty-two colleges and universities which sponsor ORAU, a nonprofit education and research management corporation.
Students who enroll in these programs must be admitted to The Graduate School at UT Knoxville. Information and application forms may be obtained from the UT-Oak Ridge Graduate Program, Post Office Box 117, Tom S. L. Road, Oak Ridge, Tennessee 37831-0117.

CHATTANOOGA EDUCATION PROGRAM

UT Knoxville offers a graduate program in education leading to the Doctor of Education degree with a major in Education, interdisciplin ary concentrations in leadership for teaching and learning.

Students who enroll in this program must be admitted to The Graduate School of UT Knoxville. Information and application forms may be obtained from the UT/UTC Graduate Center, UTC, 120 Race Hall, Chattanooga, Tennessee 37403.

THE UNIVERSITY OF TENNESSEE-OAK RIDGE GRADUATE SCHOOL OF BIOMEDICAL SCIENCES

UT Knoxville offers a program leading to the M.S. and Ph.D. degrees in a major in Biomedical Sciences. Graduate students have the opportunity to study and do research in conjunction with the Biology Division of the Oak Ridge National Laboratory.

For complete information concerning the program, see Biomedical Sciences under Fields of Instruction.

COLLEGE OF SOCIAL WORK

UT Knoxville offers a fully accredited two-year program leading to the Master of Science in Social Work through the College of Social Work, with programs in Knoxville, Nashville, and Memphis.

The UT Knoxville College of Social Work also offers a Doctor of Philosophy with a major in Social Work.

For complete information concerning the programs, see Social Work under Fields of Instruction.

Psychological Clinic

(College of Liberal Arts)

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 Consortiums

The University of Tennessee is a member of three not-for-profit research consortiums: Oak Ridge Associated Universities (ORAU); Southeastern Universities Research Association (SURA); and Université Research Association, Inc. (URA).

1. ORAU is a nonprofit consortium of colleges and universities and a management operating contractor for the U.S. Department of Energy (DOE) located in Oak Ridge, Tennessee. ORAU manages, operates, and maintains Oak Ridge, postgraduate research programs, as well as faculty access to opportunities for fellowships, scholarship, and research appointments; and to organize professional associations among its members.

Through the Oak Ridge Institute for Science and Education (ORISE), the DOE facility that ORAU manages, graduate students and postgraduates, as well as faculty enjoy access to a variety of opportunities for study and research. Students can participate in programs covering a wide variety of disciplines, including business, earth sciences, epidemiology, engineering, physics, pharmacology, ocean science, biomedical science, nuclear chemistry, and mathematics. Appointment and program length range from one year to four years. Many of these programs are especially designed to increase the number of underrepresented minority students pursuing degrees in science and engineering-related disciplines. A comprehensive list of these programs and other opportunities, their disciplines, and details on locations and benefits can be found in the Resource Guide, which is available by calling the contacts below.

ORAU's Office of Higher Education Initiatives (HEI) seeks opportunities for collaborative research and development alliances among its members, private industry, and major federal facilities. HEI sponsors the Visiting Industrial Scholars program and the Junior Faculty Enhancement Awards.

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 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-ORNL 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, accelerators physics, and associated scientific and engineering fields).

3. URA, Inc., is a nonprofit corporation consisting of 66 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 conferences 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, contact Dr. Michael D. Devine, Vice Chancellor for Research and ORAU Council member at 423-974-3466 or mdevine@utk.edu; or contact Monnie E. Champion, ORAU Corporate Secretary at 423-577-3306. Additional information may also be found on World Wide Web sites at http://gorau.gov and http://cebaf.gov/orusa.

Textiles and Nonwovens Development Center

(College of Human Ecology)

Larry C. Wadsworth, Director of Marketing and Technology

The Textiles and Nonwovens Development Center (TANDEC) was officially dedicated in October 1990. TANDEC is managed through a grant from Exxon Chemical Company. The products and processes offered by TANDEC are designed to increase the numbers of underrepresented minority students pursuing degrees in science and engineering-related disciplines. A comprehensive list of these programs and other opportunities, their disciplines, and details on locations and benefits can be found in the Resource Guide, which is available by calling the contacts below.

The TANDEC program is designed to accomplish the following:

- Offer fellowship, scholarship, and research appointments to its members.
- Offer outstanding training opportunities for the next generation of scientists and engineers.
- Promote collaborations between individual university investigators and ORNL researchers.
- Establish centers of excellence in nonwoven material science and engineering.
- Foster excellence in scientific research.
- Strengthen the scientific and technical capabilities of the nation and the Southeast.
- Provide outstanding opportunities for the next generation of scientists and engineers.
- Offer graduate study programs in science.
- Be active in particle physics and astrophysics.

For complete information concerning the program, see Biomedical Sciences under Fields of Instruction.

Transportation Center

(Office of Vice Chancellor for Research)

Stephen H. Richards, Director

The Transportation Center was created in 1970 to foster and facilitate interdisciplinary research and public service in the field of transportation at The University of Tennessee. It began operating full-time in 1972 and since then has contributed greatly to the overall research program of The University.

The Center, 600 Henley St., Suite 308, is a University-level organization administratively positioned within the Office of the Vice Chancellor for Research at UT Knoxville. The Center's multidisciplinary staff includes over 100 full-time researchers and technicians augmented with numerous faculty and students.

The Center is presently organized into four major divisions: Logistics and Systems Analysis; Infrastructure and Environment; Safety and Traffic Operations; and Mobility Services and Policy.

The Center has three goals. The first is to conduct a program of research in transportation that is recognized for its excellence, comprehensiveness, innovation, productivity, and national leadership. The second is to develop
and sustain the technical expertise for high quality transportation research by the faculty and students within the various departments and colleges of UT. The third goal is to serve the transportation research, service, and training needs of state and local government, business, and industry in Tennessee, the southeast region, and the nation.

University Evening School
(Office of Vice Chancellor for Academic Affairs)

Dr. John Muldowny, Associate Dean of Undergraduate Academic Affairs and Director of Summer, Evening and Special Programs

The University Evening School, in conjunction with academic colleges and departments, administers credit programs for those students attending classes on and off campus in a variety of nontraditional formats. Support services are provided to assist students in their educational pursuits.

ON CAMPUS EVENING PROGRAM

Classes are offered during late afternoon and evening hours for those students who work or have other commitments during the day. The College of Communications offers the M.S. degree program in the evening. The School of Information Sciences offers the M.S. degree program which can be completed by attending evenings and summer session. The College of Arts and Sciences offers the Master's program in Public Administration. The College of Human Ecology offers the M.S. degree program in Retail and Consumer Sciences. Some departments within the Colleges of Agricultural Sciences and Natural Resources, Business Administration, Education, and Engineering offer courses required for an advanced degree during the evening. For a specific major, consult the appropriate department.

MINI-TERM

The University Evening School offers a Mini-Term during May. Students may enroll in one concentrated credit course during the Mini-Term period.

Courses and instructors listed for the Mini-Term are carefully selected to reflect a broad academic base of individualized offerings suited to an intensive program of study. Courses cover material and information included in regular semester offerings.

OFF CAMPUS PROGRAMS

The Evening School makes arrangements for departments to conduct undergraduate and graduate courses in many locations away from the Knoxville campus. The courses are scheduled in response to requests and identifiable needs of adult part-time students who live some distance from the UT Knoxville location. All course offerings and instructors are approved by the appropriate academic departments, and the credit awarded is resident credit.

The following graduate programs are available: Master of Science with a major in Human Resource Management; Master of Science with a major in Speech Pathology in Chattanooga and Tullahoma (State Department of Education contract program). The Evening School administers an off-campus center at Oak Ridge where courses leading to advanced degrees in science and engineering are offered (see listing under Off-Campus Graduate Centers).

WORKSHOPS

Credit workshops are coordinated through various academic departments of the University and give students the opportunity to participate in short periods of intensive study. Workshops offer flexibility of timing, location, and content. Summer workshops are particularly popular with teachers and school administrators. Although most workshops are held on the UT Knoxville campus, geography is not a limiting factor.

STUDENT SERVICES

A comprehensive program of services including academic advising and financial aid information is provided by the University Evening School for both on and off campus students.

REGISTRATION

Registration by touchtone phone, mail, FAX, or regular phone is regarded as a convenience to former Evening School students. Final registration at both on and off campus locations is also available.

For information, contact the UT Evening School, 451 Communications Bldg, University of Tennessee, Knoxville, TN 37996-5341, or telephone (423) 974-5361 or 1-800-676-8657, FAX (423) 974-2027; email: uteveningschool@gateway.uc.utk.edu.

University of Tennessee Space Institute

T. Dwayne McCay, Vice President

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, mathematics, and computer science. The accredited academic programs and educational policies of the Space Institute have their origins in appropriate departments of The University of Tennessee, Knoxville. The more than 40 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 M.S. and Ph.D. 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 in Aerospace Engineering, Aviation Systems, Chemical Engineering, Computer Science, Electrical Engineering, Engineering Science, Industrial Engineering (engineering management concentration), Mathematics, Mechanical Engineering, Metallurgical 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, propulsion systems, superconducting materials, 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 nonlinear optics.

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 The Graduate School, The University of Tennessee, Knoxville. Graduate Research Assistantships are available for qualified students. Further information may be obtained from the Dean for Academic Affairs, The University of Tennessee Space Institute, Tullahoma, Tennessee 37388.

Water Resources Research Center
(Office of Vice Chancellor for Research)

Timothy R. Gangaware, Associate Director

The Water Resources Research Center, 600 Henley Street, Suite 311, is a federally designated institute for sponsoring and coordinating water research for the state. The purposes of the Center are: (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; (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 which includes numerous water resources-related databases on CD-ROM.
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