Table of Contents
Inside front cover - Catalog/Responsibility/Contacts

University Calendar for 1995-96 4
The University Administration 5
The Graduate School Administration 6
The Graduate Council 6

The Graduate School
Introduction 9
Majors and Degree Programs 10

Admission Requirements
Application Procedures 12
Admission Classifications 12
Admission of International Students 13
English Certification 13
Admission of Faculty and Staff Members 13
Readmission 13
Revision of Admission Classification 13

Registration and Enrollment Requirements
Graduate Credit 13
Undergraduate and Professional Students 13
Law Courses 14
Senior or Disabled Citizens 14
Auditors and Audited Courses 14
Short Courses and Workshops 14
Correspondence Study 14
Proficiency Examinations 14
English Proficiency 14
Prerequisites 15
Advisor/Major Professor 15
Departmental Liaison 15
Registration 15
Conditional Registration 15
Registration for Use of Facilities 15
Course Description 15
Change of Registration 15
Course Loads 16
Grade-Point Average and Grades 16
Academic Standards 16
Academic Honesty 16
Appeals Procedure 17

Degree Program Requirements
Definition of Graduate Terms 17
Minors 17
Transfer Credits 17
Theses and Dissertations 17
Master's Degrees 18
Specialist in Education Degree 18
Doctoral Degrees 19
Summary of Procedures for Master's Degrees and Specialist in Education Degree 21
Summary of Procedures for Doctoral Degrees 22

Fees and Financial Assistance
Residency Classification for Tuition Purposes 23
University Fees 23
Financial Assistance 25

Special Federal and State Laws and University Policies
Family Educational Rights and Privacy Act 26

Use of Social Security Number 26
EEO/Title IX/Section 504 Statement 26
Security Information 26
Drug-Free Campus and Workplace 27
Policy for the Administration of Graduate Assistantships 27

Student Services
Black Cultural Center 29
Career Services 29
Center for International Education 30
Child Care 30
Dining Services Facilities 30
Disability Services 30
Graduate Student Association 30
Hearing and Speech Services 31
Housing 31
Minority Student Affairs 31
Ombuds Office 31
Religious Resources 31
Student Counseling Services Center 31
Student Health Service 31
Vehicle Operation and Parking 31
Women's Center 32

Colleges
College of Agricultural Sciences and Natural Resources 35
College of Architecture and Planning 35
College of Arts and Sciences 36
College of Business Administration 36
College of Communications 37
College of Education 37
College of Engineering 38
College of Human Ecology 38
College of Law 38
College of Nursing 39
College of Social Work 39
College of Veterinary Medicine 39

Fields of Instruction
Accounting and Business Law 43
Advertising 44
Agricultural and Extension Education 45
Agricultural Economics and Rural Sociology 46
Agricultural Engineering 47
Agriculture 49
Animal Science 49
Anthropology 50
Architecture 52
Art 54
Audiology and Speech Pathology 56
Aviation Systems 57
Biochemistry 58
Biomedical Sciences 59
Botany 60
Broadcasting 61
Business Administration 62
Chemical Engineering 66
Chemistry 67
Child and Family Studies 68
Civil and Environmental Engineering 70
Classics 73
Communications 73
Comparative and Experimental Medicine 75
Computer Science 76
Counselor Education and Counseling Psychology 77
Cultural Studies in Education 78
Ecology 79
Economics 80
Education 82
Education in the Sciences, Mathematics, Research, and Technology 85
Electrical and Computer Engineering 86
Engineering Science and Mechanics 89
English 92
Entomology and Plant Pathology 94
Exercise Science 95
Finance 96
Food Science and Technology 96
Forestry, Wildlife and Fisheries 97
Geography 99
Geological Sciences 100
Germanic and Slavic Languages 102
Health, Leisure, and Safety Sciences 104
History 106
Holistic Teaching/Learning 108
Human Ecology 110
Human Resource Development 111
Inclusive Early Childhood Education 112
Industrial and Organizational Psychology 113
Industrial Engineering 114
Information Sciences 116
Interdisciplinary Programs 118
Journalism 119
Language, Communication, and Humanities Education 119
Law 120
Leadership Studies 124
Life Sciences 126
Management 126
Management Science 127
Marketing, Logistics and Transportation 129
Materials Science and Engineering 130
Mathematics 131
Mechanical and Aerospace Engineering 134
Microbiology 138
Music 139
Nuclear Engineering 141
Nursing 143
Nutrition 145
Ornamental Horticulture and Landscape Design 147
Philosophy 147
Physics and Astronomy 149
Planning 151
Plant and Soil Science 152
Political Science 153
Psycoducational Studies 156
Psychology 157
Rehabilitation and Deafness 159
Religious Studies 160
Romance and Asian Languages 161
Social Work 164
Sociology 168
Special Programs 168
Speech Communication 168
Sport and Physical Activity 168
Facilities for Research and Service

- Bureau of Educational Research and Service 181
- Center for Business and Economic Research 181
- Center for Information Studies 181
- Centers and Chairs of Excellence 181
- Child Development Laboratories 182
- Communications Research Center 182
- Computing Center 182
- Continuing Education and Public Service 183
- Energy, Environment, and Resources Center 184
- Institute of Agriculture 184
- Learning Research Center 184
- Libraries 185
- Management Development Center 185
- Measurement and Control Engineering Center 186
- Nutrition Institute 186

Index

Map
# University Calendar for 1995-96

## Summer Term 1995

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tr>
<td>June 1 (Thursday)</td>
<td>Classes Begin</td>
</tr>
<tr>
<td>July 4 (Tuesday)</td>
<td>Independence Day</td>
</tr>
<tr>
<td>July 5 (Wednesday)</td>
<td>First Session Ends</td>
</tr>
<tr>
<td>July 6 (Thursday)</td>
<td>Second Session Begins</td>
</tr>
<tr>
<td>August 9 (Wednesday)</td>
<td>Second Session Ends</td>
</tr>
<tr>
<td>August 11 (Friday)</td>
<td>Commencement</td>
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## Fall Semester 1995

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<tr>
<td>August 23 (Wednesday)</td>
<td>Classes Begin</td>
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<tr>
<td>September 4 (Monday)</td>
<td>Labor Day</td>
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<tr>
<td>October 12-13 (Monday-Thursday)</td>
<td>Fall Break</td>
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<tr>
<td>November 23-24 (Monday-Friday)</td>
<td>Thanksgiving</td>
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<td>December 7 (Thursday)</td>
<td>Classes End</td>
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<td>December 8 (Friday)</td>
<td>Study Period</td>
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<td>December 9, 11-14 (Saturday, Monday-Thursday)</td>
<td>Final Exams</td>
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<tr>
<td>December 16 (Saturday)</td>
<td>Commencement</td>
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## Spring Semester 1996

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<tr>
<td>January 10 (Wednesday)</td>
<td>Classes Begin</td>
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<tr>
<td>January 15 (Monday)</td>
<td>Martin Luther King Holiday</td>
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<tr>
<td>March 18-23 (Monday-Friday)</td>
<td>Spring Break</td>
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<td>April 5 (Friday)</td>
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<td>April 29 (Monday)</td>
<td>Classes End</td>
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<td>April 30-May 1 (Wednesday)</td>
<td>Study Period</td>
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<tr>
<td>May 2-4, 6-7 (Saturday)</td>
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## Summer Term 1996

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<tr>
<td>July 3 (Wednesday)</td>
<td>First Session Ends</td>
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<td>July 4 (Thursday)</td>
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<td>August 7 (Wednesday)</td>
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<tr>
<td>August 9 (Friday)</td>
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</table>

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

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district  
TERM EXPIRES
First
June 1, 1999
Second
June 1, 1995
Third
June 1, 2000
Fourth
June 1, 1996
Fifth
June 1, 1997
Sixth
June 1, 1999
Seventh
June 1, 2000
Eighth
June 1, 2000
Ninth
June 1, 1996

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July 31, 1995

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Veterinary Medicine Dr. Phil Bochsler July 31, 1997 Dr. Donita Frazier
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
Irene Kaplon, Assistant Director, Graduate Admissions and Records
Rose Ann Trantham, Assistant Director, Graduate Admissions and Records
Jeannette Bouchard, Staff Assistant

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 85 fields and doctoral work in 52. More than 7,500 graduate and professional students are enrolled on and off campus under the tutelage of 1,600 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 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, the Office of Graduate Admissions and Records, administrators of the various graduate programs, and the faculty; and the graduate student body.

The Graduate Council is composed of elected faculty representatives from each college, the Space Institute, and the Graduate Student Association. Ex-officio members include the Dean and Assistant and Associate Deans of The Graduate School, the Chair of the Research Council, the Director of Libraries, the Dean of Continuing Education, and the administrative officer having primary responsibility for 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; the approval of new graduate programs; the 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 the 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 1885 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 7,350 doctoral degrees and 42,400 master's degrees have been awarded to date.

Seven deans have led The Graduate School since 1936: Fred C. Smith, Eugene A. Waters, Dale 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.
## Majors and Degree Programs

<table>
<thead>
<tr>
<th>MAJOR</th>
<th>DEGREE</th>
<th>ADMISSION TEST REQUIRED</th>
<th>LETTERS OR RATING FORMS</th>
<th>DEPT. APPL. &amp; REQUIREMENTS</th>
<th>THESIS REQUIRED</th>
<th>LANGUAGE REQUIRED</th>
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<tr>
<td>Agricultural &amp; Extension Education</td>
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<td>Agricultural Economics</td>
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<td>Agricultural Engineering</td>
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<td>Agricultural Engineering Technology</td>
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<tr>
<td>Animal Science</td>
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<tr>
<td>Ornamental Horticulture &amp; Landscape Design</td>
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<tr>
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*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.
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* International applicants only.
* American applicants only.
* G.S. Rating Form submitted to Department.
* Forms obtained from & returned to Department.
* Foreign or computer language.
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 out of a possible 4.0 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 request and 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 in The Graduate School.

The Office of Graduate Admissions and Records must be notified of any change in academic status. Necessary forms may be obtained from The Graduate School.

Admission to a degree program requires that a person meet the minimum requirements of The Graduate School and 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 additional program requirements (see Admission Requirements).

To earn graduate credit, a student must be admitted by the Dean of The Graduate School and 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.

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 Graduate Catalog).
2. A $15 non-refundable application fee.
3. One official transcript from all colleges and universities attended.
4. Additional departmental/program requirements (reflected in 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 08450
   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 graduate student application procedures, see also Admission of International Students.

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. file a Plan of Study form with the Office of Graduate Admissions and Records 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 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 systems, 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 that established by The Graduate School.

An international student may apply for admission any semester, but normally enters 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 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, the check 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).

Registration and Enrollment Requirements

An international student may not enroll as a non-degree student or 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). The 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. 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 semesters (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.

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 at least a B 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 6 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/N 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 Fields of Instruction for grades acceptable to meet degree requirements.

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

**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 charge 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, (615) 974-5361 or 1-900-676-8857.

**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.

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

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

**Correspondence Study**

No graduate credit is accepted at 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 the approval of 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**

Any person 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 Foreign Students (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. Those 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. Persons 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 Learning Research Center. 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 direct the entering student’s work during the period in which the student is becoming acquainted with the institution and determining the focus of research interests, and in which the department is forming a judgment concerning the student’s promise as a scholar. As early as possible, 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, computer, 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 minimum late fee of $20.00 is assessed to any student who fails to register during priority registration. Additional information can be obtained from Computer Assisted Registration Services Office, (615) 974-2223.

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

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.

Conditional Registration

A person who appears 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. The student who fails 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, both of whom have completed all coursework requirements, must register for course 502.

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 so indicate on the registration material.

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 previously but are not mandatory 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.) 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 Computer Assisted 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. 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,

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

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

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.) 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 Computer Assisted 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. 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 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 9-13 semester hours. A student on a one-half time assistantship who takes six semester hours will be considered full time. Refer to the Policy for the Administration of Graduate Assistantships for the 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 summer term if the student has achieved a cumulative grade-point average of 3.6 or better in at least nine hours of graduate work with no outstanding incompletes. No more than 12 hours are permissible in the summer term without prior approval.

Grade-Point Average and Grades

A cumulative grade-point average of 3.0 is required on all graduate coursework taken at The University of Tennessee, Knoxville to remain in good standing and to receive any graduate degree 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 average until a final grade is assigned. No student may graduate with an I on the record.

S/NC
(carry 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 allowed only where 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
(carry credit hours, but no quality points). P indicates progress toward completion of a thesis or dissertation. NP indicates no progress or inadequate progress.

W
(carry 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 in 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 evaluation 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. A program is determined by consideration of all these elements by the faculty and the head of the academic unit.

The academic records of all graduate students are reviewed at the end of each semester, including the summer term. Graduate students must maintain a cumulative grade-point average (GPA) of at least 3.0 on all graduate courses taken for a letter grade of A-F. Grades of S/NC, P/NP, and I, which have no numerical equivalent, are excluded from this computation.

Departments and programs may have requirements for continuation or graduation in addition to the minimum requirements set forth in this Catalog 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 in subsequent semesters if each semester's grade-point average is 3.0 or greater. Upon achieving a cumulative GPA of 3.0, the student will be removed from probationary status.

DISMISSAL

If a student is on academic probation, the degree or non-degree status will be terminated by The Graduate School if the student's semester GPA falls below a 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 a 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 affirning 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 case should one present another person's work as one's own. Extreme caution should be exercised by students involved in collaborative research to avoid questions of plagiarism. If in doubt, students should check with the major professor and The Graduate School about the project. Plagiarism will be investigated when suspected and prosecuted if established.
Appeals Procedure

The student handbook, Hilltopics, published and distributed annually, contains statements of UT Knoxville standards of conduct and of all disciplinary regulations and procedures. Normally, grievances should be handled at the departmental level through the student’s 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, and the Chancellor. Any individual may ultimately appeal to the President of the University. A copy of the Appeals Procedure is available in the Office of Graduate Admissions and Records.

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 listed by college and field 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 one of the various units at UT Knoxville. A 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. Requires a “concentration” within a major 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 matters. 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.

Minors

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

Three interdisciplinary minors are available: in Statistics (Business Administration) and in Gerontology (Human Ecology) at both the master’s and doctoral levels, and in Environmental Policy (Economics) at the master’s level only. See Fields of Instruction for specific requirements and approval provisions.

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

Transfer Credits

Courses taken at another institution may be considered for transfer into a master's or 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 before 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; and
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. The courses transferred must be approved by The Graduate School. Transferred courses 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.

EDS. 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 last 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 attempt to ensure 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 shall 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. 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 the endorsement of the Department Head and the Dean of the College, prior to Admission to Candidacy for the degree sought. The request should include a proposal and justification for the exception. In all cases, one thesis/dissertation abstract must be written in English.

A basic principle in graduate education is that theses and dissertations produced by graduate students will be published and made available to other researchers in the field. When a graduate student is involved in classified or proprietary research, and such research is intended to lead toward a thesis or dissertation, prior approval should be secured from the Department Head and Dean, and from the Associate Vice Chancellor 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 the rejection of a thesis or dissertation manuscript.

Master's Degrees

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, a number of other degrees are offered, including the MBA and the M.S.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 can 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 fulfill all major requirements applicable to the first master's degree, including the thesis, if appropriate. Coursework applied to one master's degree program may not be applied toward a second.

MASTER'S COMMITTEE

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

ADMISSION TO CANDIDACY

Admission to candidacy 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. Admission 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 required 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 contain all courses to be used for the degree, including transfer coursework. The student must submit the Admission to Candidacy form to the Office of Academic 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 of 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 original research project. It must be prepared according to the University's Guide to the Preparation of Theses and Dissertations (8th ed.). Two copies of the thesis must be approved and accepted by The Graduate School. 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 examination. Final examinations not properly scheduled must be repeated. This examination must be held at least two weeks before the final date for acceptance and approval of the thesis by the major professor. The final examination must be scheduled through the Office of Graduate Admissions and Records at least one week prior to the examination. Final examinations not properly scheduled must be repeated. This examination must be held at least two weeks before the final date for acceptance and approval of the thesis by The Graduate School.

FINALEXAMINATION 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 majors in Curriculum and Instruction, Educational Psychology and Guidance, Leadership Studies in Education, Safety Education and Service, and Vocational-Technical 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 departments offering the degree.

COURSE REQUIREMENTS

The student's program involves a minimum of four semesters of study totaling no fewer than 60 semester hours of graduate credit beyond the baccalaureate degree. A minimum of 6 hours is required outside the major department 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 taken for graduate credit and used as coursework in the major. At least one-half of the last 30 semester hours of work, exclusive of thesis courses, must be in 500- or 600-level courses.
EDS 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 department 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 contain all courses to be used for the degree, including transfer coursework. The Admission to Candidacy 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 candidacy if the student lacks a master's degree. This examination may be written and/or oral.

RESEARCH REQUIREMENTS

See the program descriptions of individual departments for listings of thesis, problems in lieu of thesis, and non-thesis options. Some departments 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 and 519) must be earned in preparation of an acceptable paper. The paper must be a meaningful piece of work on a topic in the student's major field. The student must have satisfactorily completed a major field area of study in the field of the paper within the student's major field.

A candidate for a doctoral degree must complete a minimum of 24 hours of graduate coursework beyond the master's degree, which is a prerequisite for entry into a doctoral program. If the student does not complete the master's degree in the professional area of study, the student must complete a minimum of 48 hours of graduate coursework before 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 8 semester hours of graduate coursework in a given area outside the student's major field.

A candidate for a doctoral degree must complete a minimum of 24 hours of graduate coursework beyond the master's degree, which is a prerequisite for entry into a doctoral program. If the student does not complete the master's degree in the professional area of study, the student must complete a minimum of 48 hours of graduate coursework before 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 8 semester hours of the student's coursework must be taken in UT Knoxville courses at the 800 level, exclusive of dissertation.

In addition, a minimum of 24 hours of coursework 500 Doctoral Research and Dissertation is 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. The 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 the provisions of the degree 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 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 test 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 and/or oral qualifying examination may be given near the end of the student's first year in the doctoral program. Qualifying examinations are designed to test the student's knowledge and understanding 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 student has completed all or nearly all prescribed courses. Thus, its successful completion indicates that, in the judgement of the faculty, the 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 substitute 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 332 may be substituted for a language examination.

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

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 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 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.

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 application to candidacy, which lists all courses to be used for the degree, including course 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 or registration for course 600 is begun, whichever comes first, including summer semester and the semester in which the dissertation is approved and accepted by The Graduate School. A minimum total of 24 hours of 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 per semester.

Two copies of the dissertation (prepared according to the regulations in the UT Knoxville Guide to the Preparation of Theses and Dissertations, 6th ed.) must be submitted to and accepted by The Graduate School. Each copy must include an approval sheet, signed by all members of the doctoral committee, which certifies to The Graduate School that they have examined the final copy and found that its form and content demonstrate scholarly excellence. Microfilm Agreement form, Survey of Earned Doctorates, Abstract Form and a thesis card are also submitted at this time. The student should check with the department head concerning additional required copies of the dissertation.
### Summary of Procedures for Master's Degrees and Specialist in Education Degree

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<tr>
<th>PROCEDURES</th>
<th>UNDER DIRECTION OF</th>
<th>DATE</th>
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<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**

| Placement of name on graduation list | Student | Indicate on registration materials |
| Application for diploma | Office of Graduate Admissions and Records | Deadline available at registration* |
| Payment of graduation fee | Bursar's Office | Deadline available at registration* |
| Scheduling of Final Examination | Student 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**

| Placement of name on graduation list | Student | Indicate on registration materials |
| Application for diploma | Office of Graduate Admissions and Records | Deadline available at registration* |
| Payment of graduation fee | Bursar's Office | Deadline available at registration* |
| Submission of thesis/problems to master's/Ed.S. committee | Student | At least two weeks prior to Final Examination |
| Scheduling of Final Examination | Student 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 and thesis card | 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* |

*Deadlines are printed in the Graduate School News each semester.
## Summary of Procedures for Doctoral Degrees

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<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>*Comprehensive Examination</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>
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<td>Submission and approval of application for admission to candidacy</td>
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<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 and Office of Graduate Admissions and Records</td>
<td>Not later than one week prior to Defense of Dissertation Examination***</td>
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<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, doctoral forms, and dissertation card</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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*The order of these items varies with individual programs.
**Not required in some programs.
***Deadlines are printed in the Graduate School News each semester.*
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 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, 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 or she 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 has attained the age of eighteen years, and whose parents have entirely surrendered the right to the care, custody, and earnings of such person and who no longer are under any legal obligation to support or maintain such deemed “emancipated” person.

(5) “Parent” shall mean a person’s father or mother. If there is a non-parental guardian or legal custodian of an emancipated person, “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 upon the status of an in-state student on such an emancipated person.

(6) “Continuous enrollment” shall mean enrollment at a public higher educational institution or institutions of 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 for his or her enrollment to be deemed “continuous.”

Enrollment shall be deemed continuous notwithstanding lapses in enrollment occasioned solely by the scheduling of 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 unemancipated person is that of his or her parent.

(4) The domicile of a married person shall be determined independent of the domicile of the spouse.

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 theretofore 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 is continuous.

(2) An unemancipated person whose parent is not domiciled in this State but is a member of the armed forces and 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, is not required to pay out-of-state tuition if his or her parent thereafter is transferred on military orders.

(3) 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.

(4) 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. This provision shall not apply to military personnel and their spouses who are stationed in this State primarily for educational purposes.

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 seeks to be classified or reclassified in-state, 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 to 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, his 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 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 show their intent to enroll by (1) making payment, (2) payment arrangements, or (3) returning the “Intent to Enroll” form if no fees are due. The schedule will be cancelled if one of the above is not accomplished. This includes graduate assistants, teaching assistants, teaching associates, research assistants, staff, and others whose fees may be billed, prepaid, or waived. Late payment fees are applicable to students who register during Final Registration.

No student is authorized to attend classes who has not obtained a computerized class schedule and satisfied his/her intent to enroll.

The University is authorized by statute to withhold diplomas, grades, transcripts, and
registration privileges on any students until their debts and obligations (other than Student Loan Fund notes which have not matured) owed to the University are satisfied.

The general fees for graduate students in effect at the time of publication are as follows:

APPLICATION FEE ................................... $15

Each graduate application for admission must be accompanied by a non-refundable fee of $15 before it will be processed (fee not required if: (1) former UT Knoxville graduate student; or (2) paid to UT Knoxville Graduate School within the previous 12 months).

If a student applies but does not enter graduate school within five months after date of requested admission, the file will be destroyed and it will be necessary to resubmit the $15 application fee and a new application. This fee is not refundable.

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Building. Failure to attend class does not automatically withdraw or drop a student from college 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 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 Withdrawal Office promptly when withdrawing could result in a larger fee assessment. Withdrawal does not cancel fees and charges already incurred.

The drop/add procedure cannot be used to withdraw from school for the semester. For a regular academic semester, withdrawal within 5 business days beginning with the first day following registration check-in permits a 90 percent fee refund. Withdrawal between 6 and 10 business days following registration check-in permits an 80 percent fee refund. Withdrawal between 11 and 15 business days following registration check-in permits a 60 percent fee refund. Withdrawal between 16 and 20 business days following registration check-in permits a 40 percent fee refund. The above withdrawal refund policy does not apply to the off-campus Graduate Centers. Refunds, in accordance with the withdrawal refund policy, will be made after the drop deadline. If financial aid has been received for the term, the refund will be applied to financial aid repayment before the student receives any refund.

Refunds
Refunds are defined as the portion of maintenance and/or tuition and University housing charges due as rebate when a student withdraws or is expelled from the University. The amount of a refund is determined by the Refund/Charge stated above.

First-time students who withdraw during the 60% point in time for which the student was charged and who received Title IV funds will have the refund calculated by the pro-rata refund policy published in the "1993-94 Federal Student Financial Aid Handbook."

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 expelled. The amount of repayment is determined by the Refund/Charge stated above.

Refunds and repAYments to the Title IV programs are determined according to the formula published in the "1993-94 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.

REFUND OF FEES FOR DROPPED COURSES
Port-time students pay fees computed at the appropriate semester-hour rate as indicated above. No charge is made for courses dropped during the first 8 business days following registration check-in. A 20 percent charge is made for courses dropped between 9 and 10 business days following registration check-in. A 40 percent charge is made for courses dropped between 11 and 15 business days. A 60 percent 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 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 on a drop/add terminal. Any refund due for dropped courses will be made after the drop deadline.

Refund/Charge stated above.

The amount of a refund is determined by the Refund/Charge stated above.

WAIVER OF FEES
Graduate assistants, teaching assistants and associates, research assistants, staff, and others whose fees are billed, prepaid, waived, or partially waived must show their intent to enroll by making payment, payment arrangements or returning the "Intent to Enroll" portion of the VolXpress statement. 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 not otherwise covered are urged to avail themselves of this or comparable insurance, since paying for hospital care is the student's responsibility. Information about the insurance is mailed by the company to the student's home, and participation is solicited. Enrollment in the plan or alternative coverage is mandatory for international students. Students may obtain applications from the Student Health Service 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 at 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 vendor machines, computers, laundry machines, check cashing, sporting events, cultural attractions, residence halls access, library, recreational facilities and equipment, University Bookstore, and much more. Many students have established debit or charge accounts which are accessed through 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 Scholarships. 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 include master's 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
ACADEMIC COMMON MARKET

The Academic Common Market is an agreement among Southern states for sharing unique programs. Participating states can make arrangements for their residents who are fully admitted to specific programs at 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. Twenty doctoral, one Specialist in Education, and twenty-eight master’s programs at UT Knoxville are approved by the Academic Common Market for residents of these states to enroll at 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 a later than the first day of classes for the effective semester.

Residents of member states who seek further information should contact the Admissions Specialist in the Office of Graduate Admissions and Records, 974-3251, or the Southern Regional Educational Board, 592 Tenth Street, N.W., Atlanta, GA 30318-5790, tel. (404) 875-9211, FAX (404) 872-1477.

EMPLOYMENT

Three sources of student employment are coordinated by the Financial Aid Office: (1) The Federal Work Study Program provides part-time on-campus jobs for U.S. citizens or permanent residents who have demonstrated financial need by completing the Free Application for Federal Student Aid; (2) Perkins Loan, formerly National Direct Student Loan (Student Aid Report, SAR, must be on file); 2) subsidized Federal Stafford Loan, formerly Guaranteed Student 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 to another. Interested students should contact the Financial Aid Office for more information.

Students must apply through the Financial Aid Office for all loan programs. Loans are limited to U.S. citizens and certain permanent residents. Additional paperwork is required on subsidized/unsubsidized Stafford and FPLUS loans.

Students who have attended any post-secondary institution other than UT Knoxville must provide a Financial Aid Transcript to the Financial Aid Office even if no financial aid was received from the previous institution.

All students receiving financial aid are expected to maintain financial aid progress standards to remain eligible to receive aid. In addition, all students receiving federal financial aid must have a social security number. Information on these standards, applications, and additional information are available from the Financial Aid Office, 115 Student Services Building.

VETERANS BENEFITS

Veterans, and widows or children of certain deceased or disabled veterans, who have been admitted to a degree program, may apply for benefits by contacting the Veterans Affairs Office. Maximum benefits are paid by the Veterans Administration for course loads of 9 or more graduate hours each semester.

Special Federal and State Laws and University Policies

Family Educational Rights and Privacy Act

The Family Educational Rights and Privacy Act provides for confidentiality of student records. However, it also provides for basic identification of persons at 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, handicap, or veteran status in provision of educational opportunities or employment opportunities and benefits.

UT Knoxville does not discriminate on the basis of sex or handicap in its educational programs and activities, pursuant to requirements of Title IX of the Education Amendments of 1972, Public Law 92-318, and 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 IX, Section 504, and the Americans with Disabilities Act of 1990 should be directed to the Office of Affirmative Action; 1818 Lake Avenue; The University of Tennessee, Knoxville; Knoxville, TN 37996-3650; or telephone (615) 974-2498. Charges of violation of the above policy should also be directed to the Office of Affirmative Action.

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 June 21, 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:

- 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

Drugs and alcohol may be harmful to your health. Some of the health risks associated with such use/abuse are described below:

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

Policy for the Administration of Graduate Assistantships

PREAMBLE

Programs of graduate study are designed to transform the individual from student to [knowledgeable practitioner or] professional scholar. When a graduate assistantship is well conceived and executed, it should serve as an ideal instrument to help facilitate the desired transformation. The primary goal of an assistantship, then, is to facilitate progress toward the graduate degree. Rather than interfere or conflict with the student's educational objective, the assistantship is to aid in the prompt and successful completion of the degree program. 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

TYPES OF ASSISTANTSHIPS

It is imperative that each department adhere to the UTK Faculty Handbook's established four categories of assistantships. All departmental guidelines should reflect the descriptions provided in the Handbook (1987, p.40):

Graduate Teaching Assistant

Graduate Teaching Assistants work under the direct supervision of a regular faculty member in activities such as helping to prepare lectures, teaching discussion sections, conducting laboratory exercises, grading papers and keeping class records. In consultation with the supervisor, the Teaching Assistant works to gain teaching skills and an increased understanding of the discipline. 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, the Graduate Teaching Assistant is entitled to a waiver of fees for the period of appointment in accordance with university policy.

Graduate Teaching Associate

Exceptionally experienced graduate students may be assigned primary responsibility for teaching undergraduate courses, including the assignment of final grades. The Teaching Associate usually comes one-fourth to one-half of a normal teaching load. The annual stipend is payable in either nine or twelve monthly installments. [In addition to the stipend, the Graduate Teaching Associate is entitled to a waiver of fees for the period of appointment in accordance with university policy.]

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.] The annual stipend is payable in either nine or twelve monthly installments. [In addition to the stipend, the Graduate Assistant is entitled to a waiver of fees for the period of appointment in accordance with university policy.]

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

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 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 is provided below.

SACS Requirement

The 18-hour requirement enacted by SACS specifies that graduate students who have primary responsibility for teaching a course (Graduate Teaching Associates) must have earned at least 18 graduate semester hours in their teaching fields.

Regulations specifically addressing the 18-hour requirement are excerpted from Section 4.4.10 and 4.4.2 of the SACS publication, Criteria for Accreditation. (Atlanta, December 1984, p.25 and p.18) 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 4.4.2 [which relate to exceptions] must be under the direct supervision of a faculty member experienced in the teaching field, receive regular evaluation, and be regularly evaluated. They must also have at least 18 graduate semester hours in their teaching field.

The above requirements do not apply to graduate teaching assistants who are engaged in assignments such as laboratory assistance, teaching physical education activities, attending or helping prepare lectures, grading papers, keeping class records, and conducting discussion groups. [Exceptions are also discussed.]

In certain exceptional cases, unique experience and competence may substitute for advanced academic preparation (e.g., various fields of the visual and performing arts). Such exceptions must be justified by the institution on an individual basis. It is the responsibility of the institution to document and maintain records of work experience, certifications and other qualifications if these are to substitute for or supplement formal academic preparation.

Implementation of the SACS 18-hour Requirement at UTK

The appropriate Department Head has responsibility for certifying that the 18-hour requirement is met either through coursework or by documentation that the graduate assistant meets the requirement as an exception (e.g., experience in a 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 Personnel Office. 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 comprehensibility for classroom teaching by taking the SPEAK Test administered by the Learning Research Center. The Test of Spoken English (TSE) may be taken in lieu of the SPEAK Test. The results of this test will be communicated to the Learning Research Center to the appropriate department to be used in determining the nature and extent of instructional or other duties assigned.

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 excused from the requirement of taking the SPEAK test.

Validation of competence in communicating with students in English is required for all who are responsible for working with students. Deans, Department Heads, and Directors are responsible for validating such competence using the appropriate university form (APR FORM 1-89).

RIGHTS/RESPONSIBILITIES OF GRADUATE ASSISTANTS

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

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, work conditions, etc.), they have a right to pursue all established channels to resolve the conflict. In the order that follows, the student should speak to his/her immediate supervisor, the appropriate Department Head, the appeals committees in the home unit or College, and the Dean of the College/School involved. If the student feels that a resolution should be sought beyond the Department/College level, the Graduate School should be contacted. The Graduate School will follow established procedures outlined in the Graduate Council Appeals Procedure and/or Hiltopics.

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 statutorily required payments which include Workers’ Compensation” (Section 100 105-Pr3).

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 month or other.” Students on academic year appointments for the Fall and Spring terms receive 12 equal monthly payments for 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 or 6 equal payments for the February-July period. In both cases a fee waiver is provided for Spring and Summer terms. Graduate students on “academic year” appointments have no assistantship responsibilities in the Summer term. Students appointed “to 12 month or other” appointments receive equal monthly payments for the months 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 itself). 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 writing. In most cases, this notice must be given no later than one month prior to the end of the appointment.
ment. Specific reasons for not renewing the contract should be given (e.g., discontinuation of the program or grant, significant neglect of duty, unsatisfactory academic performance or progress toward a degree, non-compliance with university policies). In cases where an assistantship is for one year only, the student should be told this at the time of appointment. In some circumstances, graduate assistants may be given a conditional appointment such as an appointment in which funding of a grant is pending.

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 Hilltopics. Additional rights and responsibilities of graduate students are found on the student's copy of the admission status form.

EVALUATION/SUPERVISION OF GRADUATE ASSISTANTS

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

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

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

The chain of command within each department should be clearly indicated to graduate assistants. Thus, each graduate assistant should know that the immediate supervisor is the person to whom first contact is to be made in job related questions/directives; followed in turn by a general departmental/school/collage 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 Learning Research Center provides, for example, training and support services for Graduate Teaching Assistants and Graduate Teaching Associates who will be teaching at the University of Tennessee, Knoxville. Presented in several formats, this training 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. Evaluation and consultation services are also available through the Learning Research Center. A Handbook for New Instructors and a newsletter are available to all GTAs. Supervisors of GTAs are responsible for notifying them about these services and about departmental and college policies on attendance at these programs and the use of these services.

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 Administration 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.

\[1\] Brackets refer to the Assistantship Committee's additions and changes to quoted material.

University fees include a maintenance fee (required of all students), tuition (additional for out-of-state students) and an activity fee. The waiver of fees for assistantships applies to maintenance and tuition fees only; it does not include the activity fee.

\[2\] The waiver of fees for Graduate Research Assistants applies to maintenance and tuition fees only; it does not include the activity fee. The maintenance fee is paid by the granting agency. The maintenance fee is in addition to the stipend paid.

\[3\] In this document when graduate assistant is not capitalized (except in headings), reference is to all four types of assistantships available at The University of Tennessee, Knoxville.

\[4\] Discussed elsewhere in this document.

Student Services

Black Cultural Center

The Center is the focal point of the University's effort to retain African-American students and to provide 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 materials, and a computer center. Typically, its cross-campus work is sponsorship of Black History Month activities, the Martin Luther King Jr. Celebration and the Harambee Festival which promotes 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 UTK; 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.

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 AllStar account debit plan where students make a minimum deposit of $300, receive a bonus, and can make purchases at any Dining Services location. (2) The AllStar Plus Debit Account requires a minimum deposit of only $10.00. There is no bonus with this plan regardless of the size of the deposit. AllStar Plus can be used at all campus dining facilities PLUS laundries, UT Bookstore, and selected vending areas as well as 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, (615) 974-4111.

Disability Services

Disability Services provides counseling and academic support services to ensure that disabled students have access to educational opportunities provided at The University of Tennessee. Any student having a disability which restricts participation in academic life is eligible for services. Services include personal and career counseling, interpreters, reader referral, and other services designed to meet the student's individual needs. Assistance is available for making arrangements for special in-class assistance. Information regarding transportation and housing is provided. The office serves in a liaison capacity with the Tennessee Division of Vocational Rehabilitation. Registration and other forms of administrative assistance and academic support are provided through the Office of the Dean of Admissions and Records.

Participation in the services program is on a voluntary basis; confidentiality is maintained. Students desiring any services are encouraged to contact the Office of Disability Services so that necessary arrangements can be made. The office is located at 414 Student Services Building.

Services related to academic programs for students with physical disabilities, whether permanent or temporary (due to illness or accident), are coordinated by the Office of the Dean of Admissions and Records, 305 Student Services Building.

These services include assistance during registration (preregistration, collection of class schedules, payment of fees, drop and add) and adjustment of schedules to assure classroom accessibility. The Physical Plant Office coordinates efforts to eliminate physical barriers to the extent possible, with priority given to access and facilities for academic buildings.

Graduate Student Association

As one of the three branches of the Student Government Association, the Graduate Student Association provides a vehicle for responsible and effective student participation in the organization of graduate study at UT Knoxville. Each spring term, general campus elections are conducted to elect members of the GSA. The Graduate Student Association officers are elected from the graduate programs. Offices of the GSA are located in room 341 University Center.

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 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. The office furnishes information about educational, employment, and financial assistance opportunities, and offers tutorial services, workshops, and career development programs. The Office is located at 812 Volunteer Boulevard.

Ombuds Office

Personnel of the Ombudsman Office in the University Center assist students in the resolution of problems encountered with any aspect of the University. The office is open during regular working days and students are welcome to drop in at their convenience. The office supplements existing appeals channels and actively seeks better ways for the University to serve students.

Religious Resources

The University, established by a government that recognized no distinction among religious beliefs, seeks to promote no creed nor to exclude any. However, it will always be diligent in promoting the spiritual life of its students in part through its work with the Campus Ministers Council.

Student Counseling Services Center

The Student Counseling Services Center provides services designed to help students with educational, vocational, personal, and social problems. Professional counselors work with the student in a setting that allows confidential discussion of the student's concerns. In addition, various groups are employed to meet the developmental needs of the student. Group settings provide the opportunity to share and learn from others and/or improve specific skills. Psychological tests may be used for self-evaluation.

The Center also works with the faculty and student personnel to develop educational programs and projects to meet the needs of various groups at the University. An initial session is available on a walk-in basis, daily from 10:00-11:30 and 1:00-3:30. Emergencies will be seen anytime during the regular hours of 6:00 a.m. to 5:00 p.m., Monday through Friday. The Counseling Center is located at 900 Volunteer Blvd., 974-2196.

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 out-patient services are available continuously throughout every term. The Health Service has a regular staff of primary physicians, nurses, laboratory and x-ray technicians of Tennessee licensure. Out-patient 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, 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 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 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 Manned 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 p.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 Center is located in 301 University Center. If you need more information or are interested in volunteering, please call 974-1029.
COLLEGES
College of Agricultural Sciences and Natural Resources

Glen Hall, Dean

Departments
Agricultural and Extension Education
Agricultural Economics and Rural Sociology
Agricultural 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 it 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 student must demonstrate the ability to plan, conduct, analyze, and report original research. Emphasis is given to intellectual growth and the development of scholarly habits of study, reasoning and analysis so that the graduate will continue to grow and develop professionally throughout his/her career.

MASTER OF SCIENCE PROGRAMS

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

Both majors and minors are available in Agricultural Economics, Agricultural Engineering, Agricultural and Extension Education, Agricultural Engineering Technology, Animal Science, 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 Animal Science, Agricultural Economics, Agricultural 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

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 217 B Art and Architecture Center for Research, Service and Inquiry.

The offices of the dean and other college staff are located at 217 B Art and Architecture Center for Research, Service and Inquiry.

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 members 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
David A. Hake, Director, Center for Business and Economic Research
John E. Riblett, Director, Management Development Center
Scott Buechler, 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 is 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 1956 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 irrefutable 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 graduate and 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 intercollegiate program in Industrial and Organizational Psychology leading to the Master of Science and Doctor of Philosophy degrees in Industrial and Organizational Psychology. Also, the Department of Management Science coordinates an intercollegiate 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 department 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 obtainedin any of the appropriate (GMAT or GRE) admission test.

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

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 1968 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 a broader 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.

Richard Wisniewski, Dean
C. Glennon Rowell, Associate Dean for Administrative Services
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
Psychoeducational Studies
Rehabilitation for the Blind and Visually Impaired
Sport and Physical Activity

Facilities for Research and Service
Bureau of Educational Research and Service

College of Education

Richard Wisniewski, Dean
C. Glennon Rowell, Associate Dean for Administrative Services
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
Psychoeducational Studies
Rehabilitation for the Blind and Visually Impaired
Sport and Physical Activity

Facilities for Research and Service
Bureau of Educational Research and Service

College of Education

College of Communications

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

Departments and Schools

Advertising
Broadcasting
Journalism

Facility for Research and Service
Communications Research Center (CRC)

College of Education

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 1975.

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 doctoral level are fully accredited by the National Council for Accreditation of Teacher Education, the Southern Association of Colleges and Schools, and the Tennessee State Department of Education.

MASTER OF SCIENCE PROGRAMS

On the master's level, professional study may be planned (1) in one of the areas listed on the Majors and Degree Programs chart, (2) in appropriate combinations of these areas, or (3) in combinations of one or more of these areas with appropriate subjects or areas in other colleges.

Students in the College of Education's Track 2 master's programs (i.e., five-year teacher preparatory programs) must gain admission to The Graduate School before enrolling in internships.
Degree program requirements are described under Education, Fields of Instruction.

**SPECIALIST IN EDUCATION PROGRAMS**

This degree may be earned with a major in Educational Administration and Supervision, Educational Psychology and Guidance, and Curriculum and Instruction. Degree program requirements are described under Education, Fields of Instruction.

**DOCTORAL PROGRAMS**

The College of Education offers programs of advanced study leading to the Doctor of Education in the major areas listed on the Majors and Degree Programs chart and to the Ph.D. with a major in Education. Degree program requirements are described under Education, Fields of Instruction.

**TEACHER LICENSURE**

Applicants for initial teacher licensure must gain admission to the college's Teacher Education Program. A complete explanation of the admission process appears in the Undergraduate Catalog.

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**College of Engineering**

Jerry E. Stoneking, Dean
Donald R. Pitts, Associate Dean, Administration
Fred D. Tompkins, Associate Dean, Academic Services

**Departments**

- Chemical Engineering
- Civil and Environmental Engineering
- Electrical and Computer Engineering
- Engineering Science and Mechanics
- Industrial Engineering
- Materials Science and Engineering
- Mechanical and Aerospace Engineering
- Nuclear Engineering

**Facilities for Research and Service**

Measurement and Control Engineering Center
Center of Excellence for Materials Processing

The College of Engineering offers programs of advanced study leading to the Doctor of Philosophy degrees. Graduate-level courses are offered in engineering fields such as aerospace, chemical, electrical and computer, engineering science and mechanics, industrial, mechanical, 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.

**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 102 Estabrook Hall, 974-0816.

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**College of Human Ecology**

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

**Departments**

- Child and Family Studies
- Health, Leisure, and Safety Sciences
- Human Resource Development
- Nutrition
- Textiles, Retailing and Interior Design

**Facilities for Research and Service**

Center of Excellence for Materials Processing
Child Development Laboratories
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 1985 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 management positions in government, business, and industry.

The Master of Science degree is offered with majors in Child and Family Studies, Foodservice and Lodging Administration, Health Promotion and Health Education, Human Ecology, Human Resource Development, Interior Design, Nutrition (including public health nutrition), Recreation and Leisure Studies, Safety Education and Service, and Textiles, Retailing and Consumer Sciences; the Master of Public Health degree is offered with a major in Public Health; the Educational Specialist degree is offered with majors in Safety Education and Service and Vocational-Technical Education; the Doctor of Philosophy degree is offered with a major in Human Ecology and concentrations in child development, family studies, health education, human resource development, nutrition science, textile science and consumer environments; and the Doctor of Education degree is offered with majors in Health Education and Human Resource Development.

For additional information, contact the Associate Dean of Graduate Studies, College of Human Ecology, The University of Tennessee, Knoxville, TN 37996-1900, (615) 974-5224.

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**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 for 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.

Refer to the section on Facilities for Research and Service for additional information.

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**College of Law**

Richard S. Wirtz, Dean
R. Lawrence Dessern, Associate Dean
Mary Jo Hoover, Associate Dean

The University of Tennessee College of Law commenced operation in 1890 and has continuously sought to provide high-quality legal education in a university community.

While the principal objective of the college is to prepare students for the private practice of law, its total mission is more broadly conceived. The college exposes students to the legal issues of our society enabling them to develop analytical skills with respect to decisional law and statutes, the ability to communicate effectively their knowledge of the law, an awareness of the historical growth of the law, a knowledgeable appreciation of the interrelationship of law and society, and the ability to use
law as an implement of 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 Uhl, Dean
Midred M. Fenske, Associate Dean for Academic Programs
Inez Tuck, 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 1988. 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, (865) 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 clinical specialists, 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, parent-child nursing, mental health nursing, primary care nursing (family nurse practitioner), or nursing administration.

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

Eunice Shatz, 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
Charles Glisson, Chair, Ph.D. Program

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 1988 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 benefits 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

Accounting and Business Law
(College of Business Administration)

MAJORS

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

Keith G. Stanga, Head

Professors:
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., 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:
Anderson, Kenneth E., CPA, Ph.D. ................................. Indiana
Izard, C. Douglass, CPA, Ph.D. ...... Mississippi
Massingale, Cheryl S., J.D. ............ Tennessee
Posey, Imogene A., CPA, M.S. ...... Tennessee
Slagle, Warren L. (Emeritus), CPA, M.S. .......................................... Tennessee
Townsend, Richard L., CPA, Ph.D. ........ Texas

Assistant Professors:
Behn, Bruce K., CPA, Ph.D. ............. Arizona State
Carcillo, Joseph V., CPA, Ph.D. ....... Georgia State
Gatian, Amy W., Ph.D. .......................... VPI
Hethcox, Kathleen B., Ph.D. .......... Oklahoma
Letsinger, M. Clyde (Emeritus), CPA, M.S. ...................................... Tennessee
Murphy, Daniel, CPA, Ph.D. ......... North Carolina

Distinguished Lecturer:
Wolfe, Singleton B. (Emeritus), B.S. .......... VPI

Lecturers:
Hendrick, Lee W., CPA, J.D. ............ VPI
Hughes, Harry N., B.S. ............... Tennessee

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 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 business, industry, and government.

An applicant who completed an accredited baccalaureate degree program in another major may earn the M.Acc. degree by fulfilling the prerequisites in accounting and by taking courses in other business and related disciplines. Students must take at least three courses from the same concentration and one of the course numbers must end with 9.

Accounting Concentration (9 hours):

Three concentrations are available:

1. Financial/Auditing: 512, 514, 518, 519.
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 Concentration (9 hours):

Three concentrations are available:

1. Financial/Auditing: 512, 514, 518, 519.
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.

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 (6 hours): 511, 513, Business Law 511.

Accounting Concentration (9 hours):

Three concentrations are available:

1. Financial/Auditing: 512, 514, 518, 519.
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.

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

Accounting Concentration (9 hours):

Three concentrations are available:

1. Financial/Auditing: 512, 514, 518, 519.
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 414, 411, 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 problems. The student must provide evidence of proficiency in accounting by passing a comprehensive written examination. This examination is included in the capstone courses in each concentration as follows: 513, Research in Financial Accounting and Auditing; 539, Tax Policy and Special Topics; and 549, Systems Policy.

BUSINESS ADMINISTRATION CONCENTRATIONS

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.

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

ACADEMIC STANDARDS

A graduate student in the College of Business Administration whose grade-point average falls below 3.0 will be placed on probation. If the student does not improve his/her cumulative grade-point average to 3.0 or higher at the end of the probationary period, the student will be placed on academic suspension until a satisfactory improvement has been made.

Graduate School may be credited toward degree requirements. May not be used toward degree requirements. May be repeated. Maximum 6 hrs.

611-12 Doctoral Seminar in Accounting (3) Topics vary. Prereq: Admission to M.Acc program or consent of instructor. May be repeated. Maximum 6 hrs.

593 Individual Research in Accounting (3) Directed research. Prereq or coreq: based on petition. Prereq or coreq: based on petition. May be repeated. Maximum 6 hrs.


502 Registration for Use of Facilities (3-15) Required for the student who is not otherwise registered during any semester when student uses University facilities or study area. May not be used toward degree requirements. May be repeated. S/N only.

511 Seminar in Accounting Theory (3) Analysis of advanced conceptual frameworks; general-purpose external financial reporting by business enterprises. Prereq: Admission to M.Acc program or consent of instructor.

512 Seminar in Governmental and Nonprofit Accounting (3) Contemporary issues in theory and practice of governmental accounting principles and alternative principles. Prereq: Advanced Accounting and admission to M.Acc program or consent of instructor.

513 Seminar in Advanced Auditing (3) Theory and concepts underlying application of philosophy of auditing to current auditing issues. Prereq: Auditing and admission to M.Acc program or consent of instructor.

514 Auditing Practice (3) Design and performance of audits in competitive environments. Relationships among design of internal control, internal control effectiveness, and assessment of control risk. Problems in variety of auditing contexts, highly automated situations. Prereq: 513 and admission to M.Acc program.

515 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.

516 Seminar in Accounting and Auditing Policy (3) Contemporary issues in theory and practice of governmental accounting principles and alternative principles. Prereq: Admission to M.Acc program or consent of instructor.

518 Seminar in Advanced Auditing (3) Theory and concepts underlying application of auditing to current auditing issues. Prereq: Auditing and admission to M.Acc program or consent of instructor.

519 Seminar in Accounting and Auditing Policy (3) Contemporary issues in theory and practice of governmental accounting principles and alternative principles. Prereq: Admission to M.Acc program or consent of instructor.

521 Seminar in Advanced Managerial Cost Accounting (3) Analysis of current issues concerning impact on development and practice of managerial and cost accounting. Approaches to management accounting, operating 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, discretion, and decision process centers, profit centers, 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 and other available information. Advanced study of tax accounting methods, procedures, and practice, 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: 531.

533 Taxation of Partnerships and S Corporations (3) Formation, operation, termination, and other 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: 531.

534 Family Tax Planning (3) Review and analysis of laws pertaining to intermediate and post-mortem property transfers and taxation of estates. Financial planning techniques and strategies used to accomplish family tax planning objectives. Prereq or coreq: 531.


541 Database Systems (3) Design, implementation, and use of database systems for problem solving, organization, and distribution of economic information about organization. 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.

549 Systems Issues and Policies (3) Seminar in emerging topics in management systems and knowledge-based. Prereq: 541 and admission to a graduate program or consent of instructor. May be repeated. Maximum 6 hrs.

594 Graduate Seminar in Accounting (3) Topics vary. Prereq: Admission to M.Acc program or consent of instructor. May be repeated. Maximum 6 hrs.

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

611-12 Doctoral Seminar in Accounting (3) Analysis of issues reflected in accounting literature. Prereq: Consent of Ph.D. program advisor.

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. 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 negotiation, commercial transactions, real property, trusts, estates and professional responsibilities. Prereq: Legal Environment of Business and admission to M.Acc program or consent of instructor. Not available for students with credit for 401.
Aerospace Engineering
See Mechanical and Aerospace Engineering

Agricultural and Extension Education

(College of Agricultural Sciences and Natural Resources)

MAJOR
Agricultural and Extension Education ........ M.S.

Roy R. Lessly, Head

Professors:
Carter, Cecil E., Jr., Ph.D. .................. Ohio State
Dickson, Lewis H. (Emeritus), Ed.D. ...... Cornell
Lessly, Roy R. (Liaison), Ed.D. .......... Oklahoma State
Todd, 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 Education (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/NC only. E

451 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 change of effective programs. Prereq: 411 or consent of instructor. Sp

522 Extension Teaching Methods (2) Teaching methods and techniques applicable to extension work, internships, and relative effectiveness. Results demonstrations, methods, meetings, tourists, audio-visual aids. Prereq: 411 or consent of instructor. Sp

523 Extension Program Evaluation (2) Principles, estimation, and techniques of identifying, gathering, analyzing, and using data to appraise planning and teaching 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 statistical techniques, 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, 438 or consent of instructor.

532 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: 435, 436, 438.

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 experiences programs and organizational patterns 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 (2) Historical and philosophical foundations of adult education in American agriculture, key figures, issues, legislative movements, 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 individual 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., Ph.D. Wisconsin
Easwood, D. B., Ph.D. Tufts
English, B. C. Ph.D. Iowa State
Keller, L. H. (Emeritus), Ph.D. Kentucky
Klinth, T. H., Ph.D. Kentucky
Leuthold, F. O., Ph.D. Wisconsin
McLemore, D. L., Ph.D. Clemson
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
Pentcost, B. H., J.D. Tennessee
Ray, Daryll E. (Distinguished Prof.), Ph.D. Iowa State
Roberts, R. K., Ph.D. Iowa State
Sappleton, C. B. (Emeritus), Ph.D. Illinois
Whatley, T. J. (Emeritus), Ph.D. Purdue
Williamson, H., Ph.D. Missouri

Associate Professors:
Jensen, K. L., Ph.D. Oklahoma State
Pompelli, G. K., Ph.D. California (Davis)

Assistant Professors:
Davis, George C., Ph.D. NC State
Jakus, Paul M., Ph.D. NC State
Larson, J. A., Ph.D. Oklahoma State
Siegel, Paul B., Ph.D. Virginia Tech

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 600 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, 12 hours in the department (9 hours rural sociology), 6 hours of sociological theory, 3 hours of research methods and 3 hours of statistics 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, 6 hours of economic theory, and 6 hours of quantitative methods. Each student must successfully complete both written and oral comprehensive exams.

Minor

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

THE DOCTORAL PROGRAM

A minimum of 78 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 coursework in 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. The 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 master's level 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) Micro-finance, financial objectives, acquisition of debt and equity funds, capital investments, capital allocation, credit analysis, borrower and lender loan analysis, application analysis, insurance strategies, computer applications, kinds and sources of agricultural 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 effect on 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 process. Economic rationale and effects of policy. Historical development and current characteristics of commodified food, and trade policy. Prereq: Intermediate Agricultural Economics or consent of instructor. Sp

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. Sp

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

450 Agricultural Price Analysis (3) Analysis of demand and supply mechanisms in agriculture; price determination; spatial 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, modeling and policy for analyzing rural development. Prereq: 210 or consent of instructor. F

470 Natural Resource Economics (3) Nature of natural resources; economic efficiency as basis for natural resource use; externalities in natural resource use; factors influencing environmental quality; alternative public policy tools for influencing natural resource use or improving environmental quality. Prereq: 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/N/C 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

520 Research Methodology (3) Nature of scientific method and research processes: role of assumptions, hypotheses, theory and models; methodological problems of social sciences; establishing research priorities. Prereq: Consent of instructor. 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 economics; 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 agriculture, industrial 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 mar-
Agricultural Engineering

(College of Agricultural Sciences and Natural Resources)

MAJORS

Agricultural Engineering .............. M.S., Ph.D.
Agricultural Engineering Technology .... M.S.

C. Roland Mote, Acting Head

Professors:

Blades, B. L., PE, Ph.D. .......... Oklahoma State
Henry, Z. A., PE, Ph.D. .......... NC State
Luttrel, D. H. (Emeritus), Ph.D. .... Iowa State
McDow, J. J. (Emeritus), PE, Ph.D. .................. Michigan State
Mote, C. R., PE, Ph.D. .......... Ohio State
Sewell, J. I., PE, Ph.D. .......... NC State
Shelton, C. H. (Emeritus), M.S. ............... VPI
Tomkins, F. D., PE, Ph.D. .......... Tennessee
Wilhelm, L. R., PE, Ph.D. .......... Tennessee
Wills, J. B., M.S. ............ University of Kentucky

Associate Professors:

Freeland, R. S., PE, Ph.D. .......... Tennessee
Grandle, G. F., Ph.D. .......... Tennessee

Assistant Professors:

Baxter, D. O., M.S. .......... Missouri
Buschermohle, Michael J., Ph.D. ....... Clemson
Hart, W. E., Ph.D. .......... Purdue
Prather, T. G., M.S. .......... Georgia
Raman, D. R., Ph.D. .......... Cornell
Wilkinson, J. B., Ph.D. .......... Purdue
Womac, A. R., Ph.D. .......... Tennessee
Yoder, D. C., Ph.D. .......... Purdue
Yoder, R. E., PE, Ph.D. .......... Colorado State

Graduate programs leading to the Master of Science and Doctor of Philosophy with a major in Agricultural 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 Agricultural Engineering Technology is available to graduates of a recognized curriculum in agriculture or 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 his/her advisory committee and must comply with the requirements of The Graduate School.

A completed departmental data sheet and three completed Graduate School Rating Forms are required in addition to The Graduate School application.

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

THE MASTER'S PROGRAMS

Agricultural Engineering

Applicants who have not previously earned a degree from an ABET-accredited engineering program must submit scores from the GRE general and engineering subject examinations. Applicants accepted into the program must complete at least 36 semester hours to earn a degree. Of these 36 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:

Agricultural Engineering 504 (1), 505 (1), and other major subject courses 12 hours

Coursework in computational methods (mathematics, computer science, statistics, or any course containing appropriate computational components that may be approved by the department) 6 hours

Program electives 6 hours

Thesis 500 6 hours

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.

Agricultural Engineering Technology

Thesis Option: 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:

Agricultural Engineering Technology 504 (1), 505 (1), and other major subject courses 12 hours

Coursework in computational methods (mathematics, computer science, statistics, or any course containing appropriate computational components that may be approved by the department) 6 hours

Program electives 6 hours

Thesis 500 6 hours

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.

Non-Thesis Option: A non-thesis option in Agricultural 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:

Agricultural Engineering Technology 504 (1), 505 (1), and other major subject courses 12 hours

Coursework in computational methods (mathematics, computer science, statistics, or any course containing

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 the U.S. and developing countries. Prereq: 580 and Economics 511 or consent of instructor. F

593 Special Topics in Rural Sociology (1-3) Current sociological issues involving application of sociological theory. Prereq: Economics 511 or consent of instructor. Sp

593 Special Topics in Agricultural Economics (1-3) Current issues in agricultural economics. Prereq: Economics 511 or consent of instructor. May be repeated. Maximum 9 hrs. S/NC only. E

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, 524, and Economics 651-652, or consent of instructor. Sp, A

640 Agricultural Supply Analysis (2) Evaluation of 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. F, A

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

660 Seminar in Rural Economic Development (2) Current topics in economic development of rural areas. Current literature; evaluation of issues in both international and domestic development. Prereq: 560 or consent of instructor. Sp, A

670 Seminar in Natural Resource Economics (2) Issues in natural resource economics. Current literature; evaluation of theory, methodology and public policy related to allocation of natural resources. Prereq: 570 or consent of instructor. Su, A
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 are required. 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 agricultural engineering and supporting areas (electrical, 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 500) 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 course): 3 hours
- 500 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.

Agricultural Engineering

GRADUATE COURSES

413 Component Design and Machine Synthesis (3) Synthesis of design: structural, kinematic, power, control, system development; preparation of design drawings, specifications, model of device; written and oral report on project. Prereq: Engineering Design Fundamentals I and II. 3 hrs.

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 quality, system characteristics, and impact on crop yield and water quality. Prereq: Soil and Water Conservation and Engineering Lab. 1 hr and 2 labs.

430 Mobile Hydraulic Power System Design (2) Functional and operational characteristics of mobile hydraulic systems, components, system design, and analysis of system requirements; design and development of control devices, and verification and calibration of simulation model results. Prereq: Basic Engineering 101 or equivalent. 2 hrs and 1 lab.

451 Electronic Systems (4) Basic electronics with an introduction to digital electronics, television, electronic circuits, operational amplifiers, electronic components, and microprocessors. Prereq: Basic Engineering 101, 102, or equivalent. 2 hrs and 1 lab.

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

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only.

504 Professional Development Seminar (1) Planning and executing research program; ethics and professionalism in the design and development of professional projects. Prereq: Basic Engineering 101. 1 hr.

505 Professional Communications Seminar (1) Review and discussion of recent advances and current topics; presentations by students. Prereq: 504. May be repeated. S/NC only.

510 Similitude in Design and Research (3) Dimensional analysis; governing equations; theory of models; true, distorted, dissimilar, and equivalent models; design content; interpretation of data; applications to machinery, soil and water structures, agricultural buildings and other agricultural and biological applications. Prereq: Agricultural Engineering 504. 3 hrs.

525 Soil Erosion and Sediment Yield (3) (Same as Environmental Engineering 525.)

530 Research Problems in Agricultural Engineering (1-3) Theoretical and experimental studies relating to current problems in agricultural engineering. May be repeated. Maximum 6 hrs.

541 Principles of Compact Engineering (3) Comprehensive study of compacting; survey of installed systems; design of compactors; and techniques for determining the effectiveness and efficiency of compactors. Prereq: 451 or Equivalent. 3 hrs.

543 Instrumentation and Measurement (3) Modern instrumentation techniques. Static and dynamic response of instrumental elements; signal conditioning; temperature, moisture, optical radiation, displacement, strain, pressure, velocity, acceleration, and flow measurements; digital data acquisition and control. Prereq: 451 or Equivalent. 3 hrs.

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

554 Monitoring Hydrologic Phenomena (3) Application of instrumentation to monitoring hydrologic phenomena; techniques for designing systems; use of digital computers in monitoring, data collection, and data analysis. Prereq: 543. 3 hrs.

556 Environmental Engineering (3) (Same as Environmental Engineering 556.)

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

Agricultural 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, and food processes. Prereq: Basic Engineering 101, 102, or equivalent. 3 hrs.

430 Mobile Hydraulic Power System Design (2) Functional and operational characteristics of mobile hydraulic systems, components, system design, and analysis of system requirements; design and development of control devices, and verification and calibration of simulation model results. Prereq: Basic Engineering 101 or equivalent. 2 hrs and 1 lab.

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

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only.

504 Professional Development Seminar (1) Planning and executing research program; ethics and professionalism in the design and development of professional projects. Prereq: Basic Engineering 101. 1 hr.

505 Professional Communications Seminar (1) Review and discussion of recent advances and current topics; presentations by students. Prereq: 504. May be repeated. S/NC only.

510 Similitude in Design and Research (3) Dimensional analysis; governing equations; theory of models; true, distorted, dissimilar, and equivalent models; design content; interpretation of data; applications to machinery, soil and water structures, agricultural buildings and other agricultural and biological applications. Prereq: Agricultural Engineering 504. 3 hrs.

525 Soil Erosion and Sediment Yield (3) (Same as Environmental Engineering 525.)

530 Research Problems in Agricultural Engineering (1-3) Theoretical and experimental studies relating to current problems in agricultural engineering. May be repeated. Maximum 6 hrs.

541 Principles of Compact Engineering (3) Comprehensive study of compacting; survey of installed systems; design of compactors; and techniques for determining the effectiveness and efficiency of compactors. Prereq: 451 or Equivalent. 3 hrs.

543 Instrumentation and Measurement (3) Modern instrumentation techniques. Static and dynamic response of instrumental elements; signal conditioning; temperature, moisture, optical radiation, displacement, strain, pressure, velocity, acceleration, and flow measurements; digital data acquisition and control. Prereq: 451 or Equivalent. 3 hrs.

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

554 Monitoring Hydrologic Phenomena (3) Application of instrumentation to monitoring hydrologic phenomena; techniques for designing systems; use of digital computers in monitoring, data collection, and data analysis. Prereq: 543. 3 hrs.

556 Environmental Engineering (3) (Same as Environmental Engineering 556.)

560 Selected Topics (1-3) Lecture, group discussion, and individual study on specialized developments. May be repeated. Maximum 6 hrs.
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 2 hrs for M.S. students; 4 hrs for Ph.D. students.

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
Bletter, J. K. (Emeritus), Ph.D. ......... Ohio State
Chamberlain, C. C. (Emeritus), Ph.D. .... Iowa State
Erickson, B. H., Ph.D. ................. Kansas State
Godkin, J. D. (Liaison), Ph.D. ......... Pennsylvania State
Hall, O. G., Ph.D. ..................... Iowa State
Hanes, R. L. (Emeritus), Ph.D. ............. Florida
Henry, R. W., D.V.M., Ph.D. ......... Ohio
Hollingsworth-Jenkins, K., Ph.D. ..... Nebraska
Hubbard, M. L. (Emeritus), Ph.D. ....... Texas A&M
Miller, K. J., 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. P., Ph.D. .................. NC State
Shirley, H. V. (Emeritus), Ph.D. ............ Illinois
Schultz, T. W., Ph.D. ......... Tennessee
Sims, M. H., Ph.D. .................. Auburn
Tugwell, R. L. (Emeritus), Ph.D. ....... Kansas State

Associate Professors:

Backus, W. R., Ph.D. ................. Tennessee
Bell, M. R., Ph.D. .................... NC State
Eller, H., D.V.M., Ph.D. ......... Illinois
Heitmann, R. N., Ph.D. .............. Maine
Hitchcock, J. P., Ph.D. .............. Michigan State
Kattes, H. G., Ph.D. ................. VPI
Massengrue, F. B., Ph.D. .......... Kansas State
Quigley, J. D., Ph.D. ............. Virginia Tech

Smith, M. O., Ph.D. ................. Oklahoma State
Waller, J. C., Ph.D. ................ Nebraska

Assistant Professors:

Grizzle, J. M., Ph.D. .................. Florida
Hollingsworth-Jenkins, K., Ph.D. ..... Nebraska
Mathew, A. G., Ph.D. ............... Purdue
Monfardini-Honagama, L. C., D.V.M., Ph.D. ......... Texas A&M
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. Since the department is also a part of the College of Veterinary Medicine, the areas of anatomy, systemic physiology (blood, cardiovascular, and neural), and histology are also available. The Ph.D. program offers concentrations in animal nutrition, animal breeding, animal physiology, animal anatomy, and animal management. For specific information, contact the department head.

During the first fall term of matriculation in each degree program, all graduate students are required to enroll in 595. All first- and second-year students are required to enroll in 596 each fall and each spring term.

THE MASTER'S PROGRAM

For admission to the M.S. program, a student must have obtained a 3.0 grade-point average on a 4.0 scale (or a 3.0 each term during the junior and senior years) in a completed undergraduate degree program in one of the animal sciences or in a related area. The student must submit evidence (letters of recommendation, personal interview, etc.) that indicates ability to complete requirements for the M.S. Prerequisite courses may be repeated if the student has insufficient undergraduate background. If the student has an unsatisfactory grade-point average, acceptance may be on a probationatory (non-degree) basis and a minimum of 9 hours of graduate coursework must be completed the first term with a minimum grade-point average of 3.0 for admission to the M.S. program.

The program requires the writing of a thesis based on original research; the completion of a minimum of 24 hours of graduate coursework, of which at least 14 hours must be taken in courses numbered at or above the 600 level and 6 hours of thesis. Included in the course requirement are 1 hour of Agriculture 512 and a minimum of 3 hours in statistics. These statistics courses must be chosen from the 400, 500, or 600 level of courses approved for use in the Intercollegiate Graduate Statistical Program (ICGSP). The remainder of the coursework will be selected jointly by the student and the major professor depending on the student's area of concentration and professional objectives.

The advisory committee will consist of the major professor, a faculty member of Animal Science, who will act as chairperson of the committee, and a minimum of two other faculty members, one of whom may be outside of the Animal Science Department. The advisory committee approves the student's coursework and research problem and conducts the final oral examination which consists of a comprehensive oral examination and a defense of the thesis.

THE DOCTORAL PROGRAM

The doctoral program requires a minimum of 48 or 51 hours of coursework beyond the B.S. and a minimum of 24 hours of doctoral research and dissertation. The 48 hours of coursework must include:

1. A minimum of 16 hours in related fields outside of animal science.
2. A minimum of 24 hours credit at the 500 and 600 level, exclusive of doctoral research and dissertation, of which a minimum of 6 hours must be at the 600 level. Students in the nutrition, breeding, physiology, or anatomy concentration must complete at least 12 hours at the 500 and 600 level in the respective concentration or closely related area. Students in the management concentration must complete Animal Science 581 and 3 hours at the 500 or 600 level in two non-management concentrations for a total of 12 hours (including 581).
3. A minimum of 1 hour of Agriculture 512 in addition to that required at the M.S. level.
4. A minimum of 6 hours in 600-level, 700-level, or 800-level statistics courses approved for the ICGSP.

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, evaluation, and preservation of sperm, embryonic material, and embryos; application of methods of natural breeding and techniques of artificial insemination and embryo transfer; herd evaluation; pregnancy diagnosis, gestation and parturition; infertility; recent advances in theriogenology. Prereq: 320 or equivalent, 1 hr and 2 labs. 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. 2 labs. Sp

440 Advanced Animal Breeding (2) Computer simulation of genetic improvement for multiple traits in swine, beef, and dairy cattle; evaluation of artificial insemination, and estimating parameters of multiple traits; using computer simulation packages. Prereq: 340 or equivalent, 1 hr and 2 labs. F

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

Animal Science 49
department requires a letter of intent from the applicant indicating career goals and reasons for selecting the University of Tennessee, three letters of recommendation, and a sample of the prospective student's written work (a class paper or research report); these materials should be sent directly to the Graduate Secretary, Department of Anthropology, SSH 250, University of Tennessee, Knoxville, Knoxville, TN 37996-0725.

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

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.

3. 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.

4. All M.A. students must attend the dissertation seminar, and complete their programs in the Fall semester of their second year.

5. Two copies of the thesis are required by the Graduate School. In addition, bound copies of the thesis are to be provided to the department and to the 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

An incoming student should possess an M.A. in Anthropology. Students with an M.A. in another discipline may be admitted after completing specific requirements outlined in the departmental brochure. In addition to the requirements prescribed by The Graduate School for the Ph.D., the Anthropology Department requires the following:

1. Formation of an advisory committee and establishment of a program of study in consultation with the committee.
2. Specific courses to be taken are determined by students and their advisory committees. Students should plan to devote a minimum of 4 years beyond the B.A. to attain the Ph.D.
3. Demonstration of competence in statistics by completing Statistics 531 and 532 with a grade of B or better.
4. Demonstration of knowledge of a foreign language. This language should normally be French, German, Russian, or Spanish, but another language may be substituted at the student's discretion. This requirement may be met by:
   a. Successful performance on a language examination administered by the appropriate language department. Students electing this alternative should consult with their advisor.
   b. Completion of the intermediate (200 level) sequence of a language with a grade of B or better in the second semester.
   c. Completion of the second semester of specialized reading courses for graduate students with a grade of B or better.
   d. Written and oral comprehensive examinations in three areas of specialization to be determined by the committee.
   e. Successful completion of a dissertation and defense 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.A. program in Anthropology is available to residents of the states of Louisiana or Mississippi (concentration in zooarchaeology only), Virginia (concentration in zooarchaeology or cultural anthropology), or West Virginia. The Ph.D. program is available to residents of Alabama, Arkansas, Louisiana, or Mississippi. 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 applied to research in cultural anthropology. Investigation of relationships between language and culture. Prereq: 130 or Linguistics 200. (Same as Linguistics 411.)

412 Folklore in Anthropology (3) Introduction to anthropological study of folklore, using folklore and 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, ethnological, 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 actors (individuals) and structures. Encapsulation of traditional political forms and systems within modern states. Prereq: Cultural anthropology or consent of instructor.

431 Ethnographic Research (3) Conceptual and practical exploration of 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 archaeological 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 interaction between prehistoric and present-day cultures and their environments: ecological theory, methods of analysis, and interpretation of selected case studies. Prereq: 120, 130, 140, or consent of instructor.

461 African Prehistory (3) African cultural history from earliest evidence of human activity to time of European contact. Stone age of African south of Sahara. Prereq: 120 or consent of instructor. (Same as Afro-American Studies 461.)

462 Early European Prehistory (3) Origins and evolution of human culture in Europe through beginnings of settled life. Paleolithic and Mesolithic chronology and lifeways. Prereq: 120 or consent of instructor.

463 Rise of Complex Civilizations (3) Development of complex societies in Old World from origins of agricultural economics to rise of States. Mesolithic, Neolithic, and Metal Age lifeways in Africa, Europe, and Asia. Prereq: 120 or consent of instructor.

464 Principles of Zooarchaeology (3) Basic osteological studies of major vertebrate groups: aboriginal use of animals in subsistence and culture. Identification and interpretation of archaeologically derived mammalian and avian remains; identification and interpretation of associated non-human remains. Prereq: 120 or consent of instructor.

466 Urban Archaeology (3) Field research 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 skeleton. Prereq: 110 and consent of instructor. 3 hrs 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.
499 Human Response to Environmental Stress (3) Psychological, physiological, and sociocultural responses to stress.

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

501 Graduate Research (1-9) Independent investigation of special problems in anthropology. May be repeated. Maximum 18 hrs.

502 Registration for Use of Facilities (3-15) Required for the study of materials otherwise reserved 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

510 Method and Theory in Cultural Anthropology (3) Development of primary theoretical orientations by cultural anthropologists; formulation of research problems and methods of data collection, organizing, and utilizing data. Prereq: Consent of instructor.

511 Special Topics in Cultural Anthropology (3) Seminars for advanced students on topics of special interest: ethnobotany, psychological anthropology, 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 groups in U.S. and peasant societies elsewhere. May be repeated. Maximum 6 hrs.

514 Anthropology of Development (3) Application of anthropological theory, methods, and findings to community and national development programs. Analysis of anthropological research on communities and ethnic groups based on selected case studies. Survey of anthropologists' work in non-academic settings.

515 Medical Anthropology (3) Cultural impact on disease patterning. Theories of disease causation, and modes of therapy. Theoretical and applied aspects of the anthropological study of health and disease. Prereq: Consent of instructor.

516 Nutritional Anthropology (3) Anthropological contributions to study of food-related cultural and biological variability in past and present populations. Prereq: 110, 120, 130, or consent of instructor. Recommended prereq: Basic nutrition course.

517 Forms of Social Inequality (3) Anthropological perspectives on societies stratified along lines of race, class, gender, religious, and cultural inequalities engendered by sex role structure. Construction of social distinctions before and after rise and consolidation of modern world systems. Intersections of race and ethnicity with class and gender.

520 Seminar in Zooarchaeology (3) Approaches to analysis and interpretation of archaeological fauna. Intensive reading; evaluation and discussion of major faunal studies, guides to identification, methods of presenting faunal data. May be repeated. Maximum 6 hrs.

521 Laboratory Studies in Zooarchaeology (4) Examination and comparison of skeletons of major vertebrate groups, shells of terrestrial and aquatic molluscs, in relation to ancient faunas from archaeological contexts. Basic osteology and shell characters of species encountered in eburnial sites; use of comparative collections. May be repeated. Maximum 8 hrs.

522 Seminar in Archaeology (3) Theoretical and practical issues in contemporary archaeology: ethnoarchaeology, paleoethnobotany, taphonomy, ceramic analysis, archaeological origins, and regional archaeological cultures. May be repeated. Maximum 8 hrs.

530 Fieldwork in Archaeology (3-9) Practicum in surveying, excavating, processing, and analyzing 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.

540 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.

541 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.

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

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

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

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

546 Forensic Anthropology (3) Application of physical anthropology to problems in human identification. Determination of age, race, and sex of skeleton and preparation of reports for legal medicine.

547 Paleoanthropology (4) Fossil record from origin of humans to appearance of anatomically modern humans. Functional morphology and phylogenetic relationships of fossil humans.

548 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.

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

550 Bone Anatomy and Physiology (3) Examination of bone microstructure, cellular anatomy, hormonal regulation and micro and macroanatomical response to loading. Prereq: 480 or consent of instructor.

551 Laboratory in Forensic Anthropology (3) Theoretical and practical experiences in forensic techniques: radiographic analysis, dental examination, hair analysis, bone microstructure. Prereq: Human Origins 480, 581 or consent of instructor. 2 hrs and 1 lab.

552 Anthropological Genetics (3) Application of population and quantitative genetic theory to study of human and nonhuman primate populations. Prereq: Consent of instructor.

553 Method and Theory in Biological Anthropology (3) Current methods of analysis in biological anthropology and of past and current history of theoretical perspectives. Paleoanthropology, human osteology, and human variation and population structure. Prereq: Consent of instructor.

554 Foreign Study (1-15) See College of Arts and Sciences.

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

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 (3-6) Topics in prehistoric and historic archaeology. May be repeated. Maximum 6 hrs.

690 Selected Topics in Physical Anthropology (3) May be repeated. Maximum 6 hrs.

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

695 Gross Human Anatomy (9) Skeleton, muscles, and cardiovascular system. Dissection of cadavers. Prereq: 480 or Human Biology. 5 hrs and 5 labs.

Architecture

(College of Architecture and Planning)

MAJOR

DEGREE

Architecture

Marleen K. Davis, Dean

William J. Lauer, Associate Dean

Jon P. Coddington, Graduate Program Head

Professors:

Anderson, G. I., M.Arch ................................... Illinois
Conley, G. (Emeritus), B.Arch ....................... Harvard
Davis, Marleen, M.Arch............................... Pennsylvania
Grieger, F., M.Arch ...................................... Pennsylvania
Kelso, R. M., M.A ..................................... Tennessee
Kesavage, J. A., D.Sc................................. Southern Cal
Kinzy, S. A., Ph.D. ....................................... SUNY (Buffalo)
Lauer, W. J. (Liaison), M.Arch.Engr. ............. Iowa State
Livingston, M., M.F.A................................. Wisconsin
Mayor, J. H., M.Arch................................. Cornell
Meridian, J. M., M.Arch............................... Harvard
Moffett, M.S., Ph.D................................. MIT
Robinson, M. A., M.Arch.The British School at
Rudd, J. W., M.A ........................................ Northwestern
Shore, W. S., M.Arch. .................................... Columbia
Watson, J. S., M.Arch.................................. Pennsylvania
Wodacek, L. M. (On leave), Ph.D. ..................... St. Andrews

Associate Professors:

Coddington, J., M.Arch............................... Pennsylvania
Davis, T. K., M.Arch.................................. Cornell
Herz, D. M., B.Arch.................................... Columbia
Kaplan, M. D., M.Arch................................. Harvard
Martella, W. E., B.Arch............................ California
Rabun, J. S., M.A ...................................... Texas
Yates, S., M.F.A..... North Carolina (Greensboro)

Assistant Professors:

Fox, L. D., M.Arch..................................... Cranbrook
French, R. C., B.Arch................................. Tennessee
Livingston, M., M.F.A................................. Wisconsin
Moir-McCleary, T. W., M.Arch .................... Michigan
vonBuelow, P., M.S................................. Tennessee
Ware, S. M., M.F.A................................. Tennessee

MASTER 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 of university is required. International applicants must have an equivalent 4-year degree and a minimum total GRE score of 300. Candidates with a GPA less than 3.0 may be considered for conditional admission when evidence of exceptional promise is identified. Undergraduate work must include at least twelve semester hours of humanities, a basic understanding of physical principles, systems and analytical procedures, and an understanding of the 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+2 architecture programs, a portfolio is required in addition to the above requirements.

For Track 2 applicants, a Bachelor of Architecture degree from an NAAB accredited program, or foreign equivalent. 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 41 hours of architecture 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 during the final year. A minimum of 3 hours of architecture electives or approved electives from another discipline must be taken at the 500 level or above.

Graduate Program Information

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 Office of Graduate Admission and Records.

GRADUATE COURSES

401 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.

405 Descriptive Analysis of Historic Buildings (3) Identification and analysis of characteristic elements of buildings from various architectural periods, American architecture, survey techniques.

406 Ideas in Architecture (3) Historical and critical review of major ideas of architecture through the ages. Open to all students.

409 Cultural Comparison of Housing Patterns (3) Patterns of spatial organization and social elements of design for specific cultures with emphasis on housing, Cultural, social, economic, climatic, and technical forces in processes of form.

410 History and Theory of Urban Form (3) Patterns of community development. Selection and analysis of historical and contemporary examples. Basic urban design issues and exemplary design approaches through lectures, readings, essays, and sketch projects. Historical change in urban form and design.

412 Non-Western and Indigenous Architecture (3) Building responsive to climate, material availability, and economic level, as designed by anonymous builders. Pre-historic times to present throughout world. Fortress Cremon, Indus Valley, Hindu, Buddhist, and Mughal architecture of India, China, and Japan.

413 Tennessee Architecture (3) History of settlement patterns and buildings in Tennessee. Reading assignments, lectures, discussion, and field trips. Historical change in urban form and design.

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 II (3) Stylistic periods from Gothic Revival through twentieth century.

421 History of Landscape Architecture (3) Intellectual, social, and geographical influences that provide theoretical basis for design. Selection of theories of landscape architecture analyzed in terms of design.

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

425 Special Topics in Architecture (1-4) Individual projects under faculty direction. Credit is awarded for completion of the thesis. May be repeated, Maximum 9 hrs. E

426 Special Topics in History, Theory and Criticism (1-4) Special topics in history-related subjects. May be repeated. Maximum 6 hrs.

433 Building Energy Analysis (3) Balancing heat flow through external skin of residential and small commercial buildings. Local climate evaluation, site planning, building size and orientation, window area, wall treatment, infiltration control, and other design elements. Energy use quantification methods and economic analysis of energy efficient design features. Architectural analysis in design and internal and external load dominated buildings. Prereq: 344.

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.

463 Architectural Development (3) Principles and practices of architectural development. Impact of economics, finance and urban policy on design and development of real estate. Open to all students.

464 Project and Construction Management (3) Principles, methods, and application of project and construction management in building process. Project manager's and construction manager's function, responsibilities, and activities investigated through case studies. Methods and theories of estimating project cost and building cost in current practice, new techniques of cost analysis.

466 Marketing Services (3) Theories of marketing for architectural practice. Case studies. Public relations procedures.

473 Architectural Photography (3) Photography as design and presentation medium. Application of photographic techniques, printing and processing. Color and black and white.

500 Thesis (1-15) 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 Credit only.

511 Graduate Seminar: Environmental Influences (3) Environmental factors which influence regional character of architecture. National forests interacted with these factors, cultural interpretation and response regarding importance and impact.

512 Graduate Seminar: Technological Traditions (3) Technological aspects influencing form. Role of technical aspects of structural, environmental and building infrastructure as integrated systems supporting access and expression of building.

513 Graduate Seminar: Cultural Aesthetics (3) Principles underlying cultural character of architecture. Role of social, political and economic forces which influence interpretation of factors creating building's character.

514 Graduate Seminar: Ethical Imperatives (3) Social, cultural, philosophical and moral issues which impact professional responsibilities. Attitudes, values, and ideas that address formation of profession's ethos.

521 Principles of Architectural Form (3) Historical and contemporary architectural theory through investigation of literature and related examples. Theories of structural, environmental and building traditions of architectural form and space in response to both cultural and environmental focus.

525 Special Topics in Architecture (3) Student- or instructor-initiated course. May be repeated. Maximum 9 hrs.

551 Research Methods (3) Quantitative and qualitative methods of research in architectural inquiry. Systematic study and application of applied and speculative investigations in field of architectural research. Review and identification of techniques and applications for architectural research and scholarship.

552 Professional Practice (3) Management and organizational theories and practices for delivering professional design services: assessment of building industry and its influence on practice; analysis of basic management functions within professional firms; legal and ethical concerns facing practitioners today; and introduction to professional obligations and privileges of design professional.

571 Architectural Design Studio Seminar I: Environmental Forces (6) Environmental forces influencing regional character of architecture. Examination of associated natural forces and cultural interpretation. Readings and discussions; application in design studio to specific projects. Prereq: Design II. 1 hr and 5 labs.

593 Independent Study (1-9)
592 Off-Campus Study (1-9)
591 Foreign Study (1-9)

place and culture and impact on architectural character. 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: Design II. 1 hr and 5 labs.


591 Foreign Study (1-9)
592 Off-Campus Study (1-9)
593 Independent Study (1-9)

Art

(College of Arts and Sciences)

MAJOR DEGREE
Art .............................................. M.F.A.

Norman Magden, Head
William C. Kennedy, Associate Head

Professors:
Blain, Sandra J., M.F.A........................................... Wisconsin
Brakka, P. M., M.F.A.................................................. Yale
Clarke, R.A. (Emeritus), M.S. .......................................... Wisconsin
Cleaver, Dale G. (Emeritus), Ph.D........................................... Chicago
Daehnert, R. H., M.F.A................................................. Wisconsin
Falsetti, Joseph S., M.S. ................................................ Ohio State
Goldenstein, B. M., M.F.A.......................... Nebraska
Kennedy, 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
Magden, Norman, Ph.D. Case Western Reserve
Martinson, Fred, Ph.D................................. Chicago
Nichols, P. G., M.F.A................................. Michigan
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:
Darrow, J. F., Ed.D.............................. Illinois State
Habel, Dorothy, Ph.D.......................... Michigan
LeFevre, Richard, M.F.A.......................... Rochester IT
Longobardi, Parm (Liaison), M.F.A................................ Montana State
Lyons, B., M.F.A.............................. Arizona State
Metros, Susan E., M.F.A.......................... Michigan State
Moffatt, F., Ph.D............................................ Chicago
Nett, A., Ph.D. ............................................. Pennsylvania
Saupe, Ted C., M.F.A............................................ California
Staples, Carolyn, M.F.A............................. Michigan State
Wilson, D., M.F.A........................................... California (San Diego)

Assistant Professors:
Brogdan, Sally B., M.A............................... Penn State
Hiles, Timothy, Ph.D................................. Penn State

The Master of Fine Arts is the terminal degree in studio art. It is offered in the concentration areas of ceramics, graphic design/illustration, drawing, fiber-fabrics, painting, printmaking, sculpture, and watercolor. Inter-area studies are available with consent of the faculty.

THE MASTER'S PROGRAM

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

1. A detailed letter of intent including statement requesting assistantship, if desired.
2. Three letters of recommendation from former professors or professionals in the field.
3. An understanding of the faculty's equivalent proficiency.
4. A portfolio to be evaluated by the faculty. Further information is available by writing to the Department of Art.

M.F.A. Requirements

A minimum of 60 hours is required:

1. A detailed letter of intent including statement requesting assistantship, if desired.
2. Three letters of recommendation from former professors or professionals in the field.
3. An understanding of the faculty's equivalent proficiency.
4. A portfolio to be evaluated by the faculty. Further information is available by writing to the Department of Art.

1. A detailed letter of intent including statement requesting assistantship, if desired.
2. Three letters of recommendation from former professors or professionals in the field.
3. An understanding of the faculty's equivalent proficiency.
4. A portfolio to be evaluated by the faculty. Further information is available by writing to the Department of Art.

GRADUATE MINOR IN THE HISTORY OF ART

A graduate minor in Art History may be arranged with consent of the student's committee, the instructors involved, and the Graduate School. Prerequisite is an undergraduate Art History minor, or its equivalent, and reading knowledge of French, German, or Italian, unless waived by the Art History faculty.

GRADUATE COURSES

400 History of Photography (3) Survey of history of photography from introduction of daguerreotype and calotype to more recent trends. Prereq: 321. May be repeated. Maximum 12 hrs.

411 Drawing IV (6) Individualized pursuit of personal drawing techniques and concepts; supervised by instructor. Prereq: Individual section and group critiques. May be repeated. Maximum 12 hrs.

413 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: Determined by department. May be repeated. Maximum 12 hrs.


422 Ceramics: Advanced Projects (3-6) Development of thematic investigation of specific concept using appropriate techniques, under the direction of the instructor. Prereq: 321 and 322. May be repeated. Maximum 12 hrs.


425 History of Ceramics Seminar (3) Ceramics from ancient times through contemporary. Kinetics sculpture, and...
475 History of 19th-Century Painting and Sculpture

426 Kilns: Design, Construction and Operation (3) Designing kilns, traditional and modern refractories, construction methods, and operation of wood, gas, and electric kilns. Prereq: 321 and 322.

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

431 Photography III (3-6) Individual development of photographic problems and techniques. Prereq: 222 and 331. May be repeated. Maximum 12 hrs.

439 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.

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.

448 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.


452 Advanced Graphic Design II (3) Advanced investigation into visual systems and their impact on visual designs. Prereq: 451.

453 Advertising Illustration (3) Advertising illustration media and techniques as applied to product illustration. Prereq: 354.

454 Editorial Illustration (3) Editorial illustration media and techniques as applied to book, magazine, and newspaper illustration. Prereq: 453.

456 Graphic Design/Illustration Practicum (1-12) Practical experience in design and illustration field. Only after prearrangement with department. Prereq: Senior standing and consent of instructor. May be repeated. Maximum 12 hrs.

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

462 Intaglio III (3-6) Individual projects through advanced color printing methods and combinations with other print media. Prereq: 362. May be repeated. Maximum 12 hrs.

463 Lithography III (3-6) Individual projects through advanced color etching methods from stones and aluminum plates. Prereq 363. May be repeated. Maximum 12 hrs.


471 History of North American Art (3) Landmarks in painting, architecture, sculpture, and design from 1400 to 1950.

472 History of 20th-Century American Art (3) Development of architecture, painting, and design from 1900.

473 19th-Century American Painting (3) From West and Copley to emergence of "The Eight."


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

481 Museology II: Museums, Purpose and Function (3) Development of museums of art, history, natural and applied science. (Same as Anthropology 481.)

482 Museology II: Exhibition Planning and Installation (3) Exhibition concept development and implementation. Exhibition design and installation techniques. Publicity, production, mounting and framing, shipping and storage. Prereq: 481 or consent of instructor. (Same as Anthropology 482.)

484 Museology III: Field Projects (1-12) Special field projects: restoration, preservation, registration, and other related research on or off campus. Prereq: 481 and 482. May be repeated. Maximum 12 hrs. (Same as Anthropology 484.)

486 History of Printmaking (3) Prints from 15th century to present. 20th century in Europe and U.S. Prereq: 172 and 173.

486 Art of Indian Asia (3) History of Indian art: Central Asia and Southeast Asia.

488 Studies in Art History (3) Concentration in individually selected areas of art history and consent of instructor. May be repeated. Maximum 6 hrs.

494 Individual Problems (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

499 Special Topics (3) Student- or instructor-initiated course offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 12 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/N only. E

511 Graduate Drawing I (2-6) May be repeated. Maximum 10 hrs.

512 Graduate Drawing II (2-6) May be repeated. Maximum 10 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.

521 Graduate Ceramics I (2-6) May be repeated. Maximum 10 hrs.

525 Graduate Ceramics II (2-6) May be repeated. Maximum 10 hrs.

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

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

550 Studies in Graphic Design/Illustration History (3) Design and illustration history. 1800 to present. Prereq: M.F.A. candidate or consent of department. May be repeated. Maximum 6 hrs.

551 Graduate Graphic Design/Illustration I (2-6) May be repeated. Maximum 10 hrs.

552 Graduate Graphic Design/Illustration II (2-6) May be repeated. Maximum 10 hrs.

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

561 Graduate Printmaking-Intaglio I (2-6) May be repeated. Maximum 10 hrs.

562 Graduate Printmaking-Intaglio II (2-6) May be repeated. Maximum 10 hrs.

563 Graduate Printmaking-Lithography I (2-6) May be repeated. Maximum 10 hrs.

564 Graduate Printmaking-Lithography II (2-6) May be repeated. Maximum 10 hrs.

571 Studies in Medieval Art (3) Art and architecture of Middle Ages: major monuments from Byzantium or western Europe. Prereq: M.F.A. candidate or consent of instructor. May be repeated with consent of department. Maximum 6 hrs.

572 Studies in Italian Renaissance Art (3) Art and architecture of 14th-, 15th-, and/or 16th centuries in Italy. Prereq: M.F.A. candidate or consent of instructor. May be repeated with consent of department. Maximum 6 hrs.

573 Studies in Baroque Art (3) 17th-century art and architecture: major artists and works from southern or northern Europe. Prereq: M.F.A. candidate or consent of instructor. May be repeated with consent of department. Maximum 6 hrs.

574 Studies in Modern Western Art (3) Selected topics in 19th- and 20th-century western art. Prereq: M.F.A. candidate or consent of instructor. May be repeated with consent of department. Maximum 6 hrs.

575 Studies in Modern American Art (3) Selected topics in 19th- and 20th-century American art. Prereq: M.F.A. candidate or consent of instructor. May be repeated with consent of department. Maximum 6 hrs.

576 Studies in Asian Art (3) Selected topics in Japanese or Chinese Art. Prereq: M.F.A. candidate or consent of instructor. May be repeated with consent of department. Maximum 6 hrs.

579 Special Topics in Art History (3) Student- or instructor-initiated course offered at convenience of department. Prereq: M.F.A. candidate or consent of instructor. May be repeated with consent of department. Maximum 6 hrs.

590 Projects in Lieu of Thesis (10) Prereq: All graduate courses completed with a grade of at least C- before degree is completed. May be repeated. Maximum 10 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.

595 Visiting Artist Seminar (2) Contemporary art issues by different visiting artists. May not be used toward art history requirement. May be repeated. Maximum 8 hrs.

599 Projects in Lieu of Thesis (10) Prereq: All graduate courses completed with a grade of at least C- before degree is completed. May be repeated. Maximum 20 hrs. S/N only. E

Courses listed below offered periodically only at the Pi Beta Phi Arrowmont School of Crafts, Gatlinburg, Tennessee. Courses may be repeated only upon admission to the M.F.A. program at UT Knoxville. A student may apply 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 Painting/Watercolor (2-4) Intermediate to advanced. May be repeated.

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

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

470 Fabric (2-4) Intermediate to advanced. May be repeated.

480 Enameling (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 DEGREES

Audiology.................................M.A.
Speech and Hearing Science.............Ph.D.
Speech Pathology............................M.A.

Patrick J. Carney, Head

Professors:

Asp, Carl W., Ph.D. ..................Ohio State
Carney, Patrick J. (Liaison), Ph.D. ...... Iowa
Luper, Harold L. (Emeritus), Ph.D. ...... Ohio State
Nabelek, Igor V., Sc.D. .................Prague
Peterson, H. A., Ph.D. .................Illinois
Silverstein, B., Ph.D. .................Purdue

Associate Professors:

Burchfield, Samuel B., Ph.D. .........Michigan State
Carney, Patrick J. (Liaison), Ph.D. ...... Iowa
Gordon, Pearl A., Ph.D. ..............Tennessee
Krishnan, Ravi A., Ph.D. ..............Texas
Thelin, J. W., Ph.D. ..................Iowa
Wallace, Glora Jane L., Ph.D. ...........Northwestern

Assistant Professor:

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 intent of each major program is to provide the student with the scholarly and professional skills necessary for functioning as an independent professional clinician in any clinical environment.

Students majoring in either of the two areas are expected to complete the academic requirements for clinical certification from the American Speech-Language-Hearing Association, including the required number of clock hours of clinical practice (minimum 250 hours as a graduate student, 375 total). An exception to this rule must be approved by the appropriate departmental committee. Enrollment in clinical practicum courses is required for all clinical practice experiences. If the undergraduate preparation does not include sufficient coursework in speech pathology, audiology, psychology, and related fields, the student may be required to make up such deficiencies.

Students may elect either the thesis or the non-thesis option. Students in both programs are required to take 511. The master's program with thesis will include a minimum of 30 semester hours of approved graduate credit in speech language pathology or a minimum of 33 semester hours of approved graduate credit in audiology, including 6 hours of 500 credit in the preparation of an acceptable thesis representing original independent work, and a final oral examination. At least two-thirds of these total hours must be at the 500 or 600 level, including no more than 6 hours of thesis and no more than 6 hours of practicum. Students in the non-thesis option program must present a total of 36 semester hours in the speech/language pathology program or 39 semester hours in the audiology program of approved graduate credit and pass a final written examination.

THE DOCTORAL PROGRAM

The Ph.D. program in Speech and Hearing Science seeks to develop individuals for research or college teaching careers in the concentration areas of speech and language pathology, audiology, speech science, and hearing science. This degree program is research oriented, with primary emphasis upon developing the scientific and cognitive skills which allow individuals to identify and independently study important questions concerning the human act of oral and aural communication. Students will be expected to demonstrate their knowledge in the areas of:

1. Basic speech, hearing, and language processes;
2. Speech, hearing, and related disorders;
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 calendar years of graduate study beyond the master's degree with the first year being devoted primarily to formal coursework and the last year to full-time research culminating in the doctoral dissertation.

The total program is a minimum of 60 semester hours, including a minimum of:
1. 24 semester hours in dissertation 600.
2. 6 semester hours in a research tool.
3. 6 semester hours in a cognate area outside the department.
4. 24 semester hours in 600-level coursework within the department of which:
   a. a minimum of 6 semester hours in the area of major interest;
   b. a minimum of 6 semester hours in the topic of major interest;
   c. a minimum of 6 semester hours in the topic of major interest;
   d. 2 semester hours in 611 course work; and
   e. 3 semester hours in supervised teaching experience.

5. A comprehensive examination to demonstrate scholarly knowledge of audiology, speech and language pathology, and speech and hearing science, and advanced knowledge of the specifics of the area of concentration.
6. A final oral 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 Ph.D. program in Speech and Hearing Science is available to residents of the states of Alabama, Arkansas, Kentucky, North Carolina, and West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

431 Stuttering (3) Nature, appraisal, and treatment. Prereq: 304 or consent of instructor.

433 Observation of Clinical Practice (1) Prereq: Speech and Language Development, Articulation Disorders, or consent of instructor.

434 Clinical Practice in Speech-Language Pathology I (1-4) Prereq: 433 and consent of instructor. Enrollment for fewer than 2 hrs must have prior departmental approval.


455 Problems in Speech Pathology (1-3) Prereq: Consent of instructor.


465 Speech and Language of the Culturally Different (3) Speech and language characteristics of children of different ethnic and class membership and from different geographic regions.

471 Audiology II (3) Basic principles of clinical audiology; pure tone, speech, masking, and overview of special auditory tests. Prereq: 391.

494 Aural Habilitation/Rehabilitation of the Hearing Impaired (3) Psychosocial aspects, amplification component, counseling, assistive devices, cochlear implants, hearing experiences. Prereq: 394, 433, or consent of instructor. Prereq: Communication Disorders.

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

502 Registration for Use of Facilities (1-15) Prereq: 454. May be repeated. S/C only. E

504 Planning of Speech and Language Services (3) Planning procedures for Speech and Language Services and related fields. Prereq: 433 or consent of instructor.

507 Anatomy and Physiology of Hearing (3) Structure and function of the peripheral and central auditory systems, and their roles in mediating auditory processes. Prereq: 494 or consent or instructor.

511 Introduction to Research in Speech and Hearing (3) Analysis of research techniques, fundamentals of descriptive, inferential statistics, application of statistics, and completion of a proposal and hypothetical pilot research project. Prereq: Consent of instructor.

512 Clinical Practice in Audiology (1-4) Prereq: 494 and 496. May be repeated. Maximum 9 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: 494 and 496. May be repeated. Maximum 6 hrs.

517 Instrumentation in Audiology and Speech Pathology (3) Principles of instrumentation in audiology and speech pathology, laboratory assignments for familiarization of students with instruments for measuring hearing and speech processes.

520 Aphasia (3) Historical review of aphasia literature, theories of brain functioning, aphasic classification and terminology, and rationale for testing, etiology, therapy considerations, and prognosis for recovery. Prereq: 494 or consent of instructor.

522 Seminar: Articulation and Voice Disorders (3) Current research in diagnosis and management of articulation and voice disorders. Prereq: Undergraduate coursework in articulation and voice disorders or consent of instructor.
531 Seminar on Stuttering (3) Current significant research in stuttering. Prereq: 431 or consent of instructor.

532-533 Advanced Clinical Practice in Speech-Language Pathology (1-4, 1-4, 1-4) Prereq: 454 or equivalent and consent of instructor. May be repeated. Maximum 6 hrs. Enrollment for less than 2 semesters must have prior departmental approval.

535-537 Advanced Clinical Practice in Speech-Language Pathology: Off-Campus Sites (1-4, 1-4, 1-4) Prereq: 461 or equivalent experience, consent of instructor. May be repeated. Maximum 6 hrs each. Enrollment for less than 2 semesters must have prior departmental approval.

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

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


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

543 Amplification Technology (3) Description of hearing aid circuits, components and performance characteristics. Electroacoustical and real-ear analysis of hearing aids. Prereq: 473 or equivalent or consent of instructor.

544 Amplification for the Hearing-Impaired (3) Speech audiometry/psychoacoustics. Influence of noise, reverberation and audition on speech perception. Strategies for selecting amplification. Psychological considerations on selection and counseling. Dispensing models. Prereq: 473, 507, and 543 or equivalent 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 basis for behavioral audiology and acoustic immittance measurement. Prereq: 473 or equivalent or consent of instructor.

547 Special Problems in Audiology (1-3) Prereq: 473 or equivalent or 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 their relation 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: 9 hrs in speech pathology. May be repeated with consent of department. Maximum 9 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 systems, accountability, performance appraisal and clinical supervision for audiologists and speech language pathologists interested in private practice, supervisory or administrative positions.

561 Tutorial in Child Language Pathology (2) Interactions with various staff members of Pediatric Language Programs: selected topics. Prereq: 461 or consent of instructor. May be repeated. Maximum 6 hrs.

563 Practical Applications of Language Habilitation Techniques (3) Various methods and procedures in treating delayed/disordered preschoolers. Alternative augmentative systems included. Prereq: 461 or equivalent 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.

576 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.

579 Psycholinguistic Concepts in Speech Pathology (3) Psycholinguistic concepts and information theory in the study of normal acquisition and development 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 hearing process, counseling, group and individual counseling, selection of hearing aids, troubleshooting, repair, and construction of hearing aids. Prereq: 473 or equivalent or consent of instructor.

595 The Verboten System: Auditory/Speech Perception (3) Involves analysis of speech production and overall oral communication. Prereq: 473 or consent of instructor.

600 Doctoral Research and Dissertation (3-15) FYP only. E

601 Experimental Phonetics (3) Acoustical and perceptual analyses of speech production and overall oral communication. Prereq: 517 or consent of instructor.


603 Language Science (3) Seminar of theories and paradigms of research on language. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

606 Advanced Anatomy and Physiology of the Ear (3) Anatomical and physiological correlates in hearing. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

607 Advanced Aural Habilitation/Rehabilitation of the Hearing-Impaired (3) Study of hearing process, counseling, group and individual counseling, selection of hearing aids, troubleshooting, repair, and construction of hearing aids. Prereq: 473 or equivalent or consent of instructor.

609 Seminar in Speech Science (2) Experimental areas: speech physiology, psychoacoustic analysis, recognition, perception, detection, intelligibility of speech, communication theory, and psycholinguistic measurement of speech and language. Topics vary. Prereq: 601 or consent of instructor. May be repeated. Maximum 6 hrs.

610 Seminar in Hearing Science (2) Advanced study of perception of nonspeech acoustic signals, detectability, pitch, loudness, differential threshold, adaptation, and fatigue. Prereq: 602 or consent of instructor. May be repeated. Maximum 6 hrs.

611 Experimental Design in Speech and Hearing (2) Analysis of experimental design in research and related journals. Generation of experimental designs. Prereq: Consent of instructor.

650 Advanced Seminar in Audiology (2) Topics vary. Prereq: Consent of instructor. May be repeated. Maximum 8 hrs.

652 Advanced Seminar in Speech and Language (2) Topics vary. Abnormalities of voice, articulation, speaking rate and rhythm, language development and use, and language symbolism. Prereq: Consent of instructor. May be repeated. Maximum 8 hrs.

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

656 Directed Research (1-4) Participation in ongoing or non-dissertational research. Prereq: Consent of instructor. May be repeated. Maximum 9 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.

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### Aviation Systems (UT Space Institute)

**MAJOR**

**DEGREE**

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<tr>
<td>Avionics Systems</td>
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<td>Engineering Systems</td>
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**Professors:**

- Collins, F. G., Ph.D. California
- Matson, A. A., Ph.D. Tennessee
- Wu, J. M., Ph.D. Cal Tech
- Young, R. L. (Emeritus), Ph.D. Northwestern

**Associate Professors:**

- Kimberlin, R. D. (Liaison), Ph.D. RWTH (Germany)
- Soles, U. P., Ph.D. Tennessee

The University of Tennessee Space Institute offers a program leading to the Master of Science degree with 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 emphasis includes include flight testing, aircraft design, aviation meteorology, air traffic control, and airport management.

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 graduate work, 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 aerodynamic 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. Three hours in economics or finance.
4. Six hours of electives from the major field, mathematics or engineering.
5. Six hours of Aviation Systems 550 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. 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.

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 UT Knoxville on an in-state tuition basis. The M.S. program in Aviation Systems is available to residents of the states of Arkansas, Florida, Mississippi, 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

2. Six hours in industrial engineering (engineering management).
3. Three hours in economics or finance.
4. Six hours of electives from the major field, mathematics or engineering.
5. Six hours of Aviation Systems 550 demonstrating the ability to conduct and report on an independent investigation.

Biochemistry

(College of Arts and Sciences)

MAJOR DEGREES

Biochemistry ..................................... M.S., Ph.D.

John W. Koontz, Head

Professors:
Churchich, Jorge E., Ph.D. ........................ Sheffield
Joshi, J. G., Ph.D. .................................. Poona
Monty, Kenneth J., Ph.D. ......................... Rochester
Salvo, T. P. (Emeritus), Ph.D. .................... Michigan
Wicks, Wesley D., Ph.D. ......................... Harvard

Associate Professor:
Howell, Elizabeth E., Ph.D. ..................... Lehigh
Koontz, John W. (Liaison), Ph.D. ............... Kentucky
Roberts, Daniel M., Ph.D. ....................... California (Davis)
Serpertu, Engin H., Ph.D. ....................... Hat Coppell

Assistant Professors:
Bruce, Barry, Ph.D. ............................... California (Berkeley)
Feinberg, M. R. (Emeritus), Ph.D. ............... California
Peterson, Cynthia B., Ph.D. ................. LSU

THE MASTER'S PROGRAM

1. At least one year each of Introductory Organic Chemistry with laboratory* and approved physical chemistry.
2. A minimum of 8 semester hours of approved biology courses beyond the introductory level and including the subject areas of genetics and physiology.
3. Biochemistry 511-12 and 515-16.
4. At least 6 hours of advanced seminar courses from the following: 601, 603, 604, 605, 606.
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. Introductory Organic Chemistry*, Introductory Physics*, Differential and Integral Calculus*, approved physical chemistry, and at least 12 hours of biology beyond the introductory level and including the subject areas of genetics and physiology.
2. Biochemistry 511-12 and 515-16.
3. At least two approved graduate courses in chemistry, physics, or other physical science; for example, Chemistry 550, 551, 552; Physics 521, 522, 551. No survey courses will be accepted.
4. At least 6 hours of topics offered in 521 and 522.
5. Participation in 601 and 603 during the entire period of residence.
6. Comprehensive examination, taken before the end of the third year of study.
7. A dissertation reporting the results of original and significant research carried out during the term of candidacy.
8. 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 biochemical 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

410 Cellular and Comparative Biochemistry (4) \textit{Electrolyte behavior; chemistry and structure of proteins; enzyme behavior and biochemical function calix; and energy capture; synthetic metabolism; nucleic acid function; protein synthesis, and biochemical genetics; regulation of biological processes. Prereq: Chemistry SCI 50-60-69 and Biology 110-20. 3 hrs and 1 discussion. F,Sp}


471-81 Biophysical Chemistry (3,3) Physicochemical principles with applications to biological systems. 471—Thermodynamics; chemical equilibrium; solution chemistry; transport; electrochemistry; kinetics; enzyme-catalyzed reactions. 481—Elementary quantum chemistry; interactions of light with biological molecules; optical and magnetic spectroscopy; protein folding and structure; case studies of selected macromolecules. Prereq: Calculus, Organic Chemistry, General Biology or consent of instructor. (Same as Chemistry 471-471.) F,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 does not use faculty time before degree is completed. E

511 Advanced Concepts in Protein Structure, Protein Function and Intermediary Metabolism (4) Protein structure and dynamics; regulation of enzyme activity; intermediary metabolism; membrane structure and function. Organic literature and review articles, contemporary experimental approaches. Prereq: 410, 420 or consent of instructor. 3 hrs and 1 discussion. F

512 Advanced Molecular Biology (4) Replication, repair, transcription, translation and control mechanisms. Prior knowledge of fundamentals of gene expression. Prereq: 511 or Life Sciences 511. 3 lectures and discussion. (Same as Life Sciences 512.) Sp

515 Experimental Techniques I (3) Modern experimental methodology and instrumentation in lab. Primarily for departmental graduate students. Prereq: Consent of instructor.

516 Experimental Techniques II (3) Laboratory rotations. Students work in laboratories of faculty member on clearly defined project or personal proposal and oral report. Primarily for departmental graduate students. Prereq: 515. Sp

525 Graduate Research Participation (3-12) Tutorial laboratory experience. May be repeated. Maximum 12 hrs. E

561 Environmental Toxicology (3) Basic concepts in toxicology, molecular toxicity and detoxification, reproductive toxicology, mutagenesis, teratogenesis, carcinogenesis; pathologic changes and environmental impact. Prereq: Chemistry 350-60-69 or consent of instructor. (Same as Biology 561.) F

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

601 Advanced Biochemistry Seminar (1) Invited speakers. Topics posted in advance. Required every semester in residence. S/NC only. F,Sp

603 Current Topics in Biochemistry (1) Seminars and lectures dealing with current advances in field of chemical biology. Required every semester in residence. S/NC only. F,Sp

604 Current Topics in Environmental Toxicology (1) Critical reviews of research problems and methods in environmental toxicology, behavioral toxicology, biochemical and ecological effects, biostatistics and epidemiology. Presentations by students, faculty and guest lecturers from academia and industry. May be repeated with consent of department. Maximum 4 hrs. (Same as Ecology 604.) S/NC only. F,Sp

605 Current Topics in Regulation of Protein Function (1) Covalent modifications of proteins by phosphorylation-dephosphorylation allosteric interactions. Prereq: 410 or equivalent. May be repeated. Maximum 6 hrs. S/NC only. F,Sp

606 Current Topics in Biological Membrane Research (1) Prereq: 410 or equivalent. May be repeated. Maximum 9 hrs. S/NC only. F,Sp

621 Advanced Topics (1-3) Biochemical and biophysical methods, mechanistic aspects of enzyme regulation, membrane structure and function, metabolic regulation, physical biochemistry. Prereq: 511-12 or consent of instructor. May be repeated. Maximum 9 hrs.

Biomedical Sciences

(O ffice of the Vice Chancellor for Academic Affairs)

MAJOR DEGREES

Biomedical Sciences M.S., Ph.D.

Raymond A. Popp, Director

Professor:

Olins, Donald E., Ph.D. Rockefeller Research Professor:

Olins, 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 experience 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, virology, radiation and environmental biology, virology, cytology, developmental pathology, microbial and mammalian genetics, mutagenesis, structural biology, and genomic analysis. ADOPTION 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 and physical chemistry. A course in physical chemistry is offered by the school in order to meet the last requirement. 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 the Director, 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); Cell Biology (518); Computing for the Life Sciences (525); and Statistics for Biologists (574).

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 encouraged.

4. Satisfactory completion of formal advanced courses in the areas of the student's interest. 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 formal seminar 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 such a degree within the Oak Ridge National Laboratories; however, a limited number of students from other...
institutions may be accepted if qualified and as space is available. The requirements for the degree are:

1. Graduate credit or a proficiency in the following core courses: Biochemistry (511); Biophysical Biochemistry (514); Cell Biology (516); plus any two of the following courses: Genetics (515); Bioinformatics (574); or Computing for the Life Sciences (525). 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 a 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

507 Physical Chemistry (3) Thermo-dynamics; phase equilibria; chemical equilibria; electrode potentials; surface chemistry; electrolyte solutions; kinetics; conductance; viscosity; diffusion.

511 Biochemistry (3) Chemistry of carbohydrates, lipids, proteins, and coenzymes; enzyme kinetics; intermediary metabolism and photosynthesis; biosynthesis of amino acids, lipids, and macromolecules. Coreq: 507.

514 Biophysical Biochemistry (3) Chemistry of metabolism; biosynthesis of purines, pyrimidines, and nucleic acids; biosynthesis of RNA, DNA, and proteins; energy levels and excited states of large molecules; optical instrumentation; adaptation to systematic perturbations; properties of macromolecules in solution; molecular solution; molecular conformation; 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 plasmids; mapping, linkage, and mutations; cytoplasmic inheritance. Mechanisms of recombination, chromosome structure and replication.

518 Cell Biology (3) Structure and composition of major nuclear and cytoplasmic organelles of eukaryotic cells. Pertinent instruments and techniques; meiosis and mitosis; cell cycle; chromosome structure; nuclear RNA metabolism; nucleic acid biogenesis; survey of specialized cells for study in genetic transcription and translation in bacteria. Coreq: 511.

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.

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; excited-state bio-physics; chemical physics or macromolecules; pathology; mammalian genetics coverage.

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

651-52-53 Advanced Topics in Biomedical Sciences (3,3,3) Current and future research developments: protein synthesis, protein chemistry and enzyme mechanisms; cytobiology; and special topics. Either as tutorial or literature survey requiring substantial student preparation. May be repeated.

660 Mammalian Genetics (3) Known genetic variants affecting each organ system of experimental mammals, especially laboratory mice. Inheritance of phenotypes and biochemical traits in rodents and other laboratory animals. Prereq. 515.

666 Cytogenetics (3) Chromosome structure, chromosomal alterations (mitosis and meiosis), mechanisms of induction of chromosome changes and recombination, chromosome structure and replication. Prereq. 515.


Botany

(College of Arts and Sciences)

MAJOR

Botany ........................................ M.S., Ph.D.

Edward E. Schilling, Head

Professors:

Caponetti, J. D., Ph.D. .............. Harvard
Clebsch, E. C. (Emeritus), Ph.D. .... Duke
DeSelms, H. R. (Emeritus), Ph.D. .... Ohio State
Evans, A. M. (Emeritus), Ph.D. .... Michigan
Hendron, W. R. (Emeritus), Ph.D. .... Vanderbilt
Hickok, L. G., Ph.D. ................... Massachusetts
Holton, R. W., Ph.D. .................. Michigan
Hughes, K. W., Ph.D. ................ Utah
Jones, L. W., Ph.D. ................... Texas
Mullin, B. Ph.D. ....................... NC State
Norris, F. H. (Emeritus), Ph.D. .... Ohio State
Petersen, R. H. (Distinguished Prof.), Ph.D. .......... Columbia
Schilling, E. E. (Liaison), Ph.D. .... Indiana
Sharp, A. J. (Emeritus), (Distinguished Prof.), Ph.D. .... Ohio State
Smith, W. O., Ph.D. .................... Duke
Walpe, P. L. (Distinguished Prof.), Ph.D. .... Texas

Associate Professors:

Amundsen, C. C., Ph.D. ............ Colorado
Halman, A. S., Ph.D. .............. Ohio State
Schwarz, O. J., Ph.D. .............. NC State
Smith, D. K., Ph.D. ............... Tennessee
Wofford, B. E. (Curator), Ph.D. .... Tennessee

Assistant Professor:

Cruzan, M. B. C., Ph.D. .... SUNY (Stony Brook)

Lecturer:

McFarland, K., Ph.D. .................. Tennessee

The Botany Department offers the Master of Science and Doctor of Philosophy degrees with concentrations in anatomy, botany, ecology, cytogenetics, cell biology, plant physiology, plant ecology, and taxonomy. Educational service is required of each graduate degree candidate 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: a 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-terium 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 aptitude 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 preparation 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. Written approval of the final dissertation.

7. Approval by the Department's Graduate Committee.

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5. College mathematics: 6 semester hours including 1 term of calculus.

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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 aptitude 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 preparation 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. Written approval of the final dissertation.

7. Approval by the Department's Graduate Committee.
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 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. Presentation of one or more cognate areas outside of the department totaling 6 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.

GRADUATE COURSES

401-02 Field Studies in Botany (1-3,1-3) Field experience and taxonomy of special plant groups. Topics vary: biology, lichenology, teratology, agrostology, mycology, phycology, aquatic vascular plants, synecology, woody plants, and botanical photography. May be repeated under different topic. Maximum 9 hrs.

403 Mechanisms of Plant Speciation (3) Process of speciation and evolution, botanical examples. Geographic variation, allopatric speciation, mechanisms of quantum radiation, selection, transposable elements, plant development. Lab: isolation of DNA and RNA, molecular hybridization, isolation and preparation of plasmids, PCR amplification of specific sequences, DNA sequencing and transformation. Prereq: General genetics with grade of B or better and consent of instructor. 2 hrs and 4 labs.

412 Plant Anatomy (3) Cells, tissues and organs; development in vegetative and reproductive structures of vascular plants - seed plants. Prereq: 110-20 or Biology 110-20.

431 Plant Ecology (3) Interactions between individuals, species, communities and their environments. Circulation of energy and matter in ecosystems. Weekly field trips or laboratory periods, and at least two weekend field trips. Prereq: 330 or equivalent. Su.

451 Plant Tissue Culture (3) Methods for culture of cells, tissues, and organs: media preparation and maintenance of cultures. Prereq: 110-20 or Biology 110-20 or equivalent and Consent of instructor. 30-30, 21-12, 412; Histochemistry 310 or 316; Ornamental Horticulture and Landscape Design 330, and Plant and Soil Science 331.

502 Registration for Use of Facilities (1-3) 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/N only.

503 Non-Thesis Research (2) Library, field, or laboratory research under supervision of staff member. Not for thesis candidates. E. A maximum 4 hrs. E.

504 Physiology (2) Comparative study of major algal phyla, both freshwater and marine: morphological, developmental, ecological, taxonomic and phylogenetic aspects. Field and laboratory studies, identification, classification, experimentation. Prereq: general genetics with grade of B or better and consent of instructor. 3 hrs and 1 lab. Su.

506 Biological Illustration (3) Principles and applications of photography (B/W and Color) photomicro- and photomicrography, drawing, graphics and video for recording and presentation for research and publication of data in pictorial and graphic form.

510 Introduction to Electron Microscopy - Transmis- sion Electron Microscopy (4) (Same as Zoology 510.)


530 Advanced Taxonomy of Flowering Plants (3) Evolution and classification of families of angiosperms, local flora. Prereq: 330 or equivalent. 2 hrs and 1 lab. F,A.

531-32 Special Problems in Botany (1-4,1-4) May be repeated. Maximum 12 hrs.

543 Seminar in Botany (1) Readings and discussions of current literature and selected topics in botanical research. May be repeated. Maximum 8 hrs. S/N only.

573 Population Biology (3) (Same as Zoology and Ecology 573.)

580 Bryophytes and Pteridophytes (4) Taxonomy, phycology, ecology and development of cellular morphology: field studies and current literature. Prereq: 410-20 or consent of instructor. 2 hrs and 2 labs. F,A.

582 Methods and Instrumentation in Laboratory Inves- tigation (1) Project experience and theoretical background in various research methods, ion exchange resins, adsorption spectroscopy, disciple electrophoresis, polya- lomerization, gel electrophoresis, gel chromatography, automatic analyzers, microscopy, culture methods, use and care of equipment for radiotisotope. Prereq: Chemistry 350, 360; Physics 121, 122. May be repeated. Maximum 5 hrs. S/N only.

565 Methods and Instrumentation in Field Investig- ation (1) Appropriate methods and instrumentation.
Business Administration

(Office of Graduate Business Programs, Suite 527, Stokely Management Center, College of Business Administration, The University of Tennessee, Knoxville, TN 37996-0552, Telephone: (615) 974-5033. For the executive program, telephone (615) 974-1660.

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 Arkansas, Louisiana (concentration in forest industries management or logistics and transportation), and 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 thenext 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 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. Many corerequirements 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 the second semester. In any event, selection must be made after completion of the first year. Requests for changes in concentration area must be submitted for 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 item should reach The Graduate School no later than the MBA application deadline. Additional information is required. The Graduate School for international students.

For admission to the MBA program, consideration is given to (1) applicant's academic record with particular attention to the last two years of undergraduate work and previous graduate studies, (2) scores on the GMAT and the Test of English as a Foreign Language (TOEFL) for those whose native language is not English, (3) work experience and other activities that demonstrate potential for leadership, and (4) recommendations from professors and work supervisors. The admission decision is based on all factors 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.

Prequisites

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. If, in any event, the student is not able to take the calculus course, the student may be placed in a mathematics course as a prerequisite. 

The MBA core consists of two 15-credit-hour MBA core courses in the first year and 24 credit hours of concentration/elective courses in the second. Elective courses carry 3 or 6 semester hours of graduate credit.

Admission Requirements

Applications are accepted for fall semester only. The application deadlines for fall semester are March 1 for international students and April 1 for others. Applications by U.S. citizens and permanent residents received after April 1 will be considered on a space-available basis. 

To be considered for admission, the applicant must be a graduate of an accredited college or university with a baccalaureate degree in business administration or a related field.

Business Administration

DEGREES

M.B.A., J.D.-M.B.A.

The College of Business Administration offers two college-wide programs, the MBA and the Ph.D. with majors in Business Administratio

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: (615) 974-5033. For the executive program, telephone (615) 974-1660.
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
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 and 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 Area: 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 this 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 analysis of 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

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 conferment of both the Doctor of Jurisprudence and the Master of Business Administration. The dual program saves the student approximately one semester over the time that would be required to earn both degrees independently.

The establishment of the dual program recognizes the increasingly complex body of knowledge necessary to the creative conduct of business and business-related law practice, the complementary nature of many aspects of the graduate programs of the College of Law and the College of Business Administration, and the intellectual benefits inherent in the concurrent study of both business and business-related law. The program is designed to accommodate the interests of students who (a) contemplate a career in public service and want to acquire the skills and perspective of the lawyer and the business-oriented manager, (b) contemplate a career in business management and want to acquire the skills and perspective of a lawyer, or (c) contemplate a career as a lawyer specializing in business-related law and want to acquire the skills and perspective of the business-oriented manager.

Admission Requirements

Applicants for the J.D.-M.B.A. 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.

Upon receipt of the application, the Dual Program Committee will determine eligibility and assign students to advisors who will be responsible for course approval and supervision of the student’s progress through the dual program.

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 their 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 programs.
Admission 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 and grades for law courses accepted by the College of Business Administration will be 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 type will be used on a regular graded basis for any appropriate purpose in the college 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 comprised of 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 applications 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 in one twelve-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 employer, 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 the 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 setting. The third term is comprised of Executive Core III and Management Project III; it includes two residence sessions.

The core courses are full-term curriculum with reading and study, case work and problem solving, as well as analyses and applications within the sponsoring organization during the off-campus periods. The topics introduced 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.

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 with the number of vacancies in each department. The Graduate School requires the Graduate School Application, transcripts from all previous colleges 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 five concentrations offered in the Ph.D. program:
Degree Requirements

Doctoral students must file a program of study that has been approved by their temporary doctoral advisory committee and the Associate Dean by the end of the first semester of coursework. Graduate work taken in concentration areas at other institutions is considered by the temporary doctoral advisory committee in approving the program. 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. All work in the above areas is subject to approval by the temporary doctoral advisory committee and the Director of Graduate Business Programs. Specific majors may have prerequisites not listed above.

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 to direct doctoral research. When the doctoral committee has been formed, the temporary doctoral advisory committee ceases to exist.

Admission to Candidacy

Students may apply for admission to candidacy for the 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 disciplines, concentration and cognate area). Graduate courses accepted from other institutions must be included. Under "Other Requirements," the date of acceptance of the research proposal by the doctoral committee should be indicated. The application must be approved by the student's doctoral committee and the Associate Dean before submission to the Graduate School.

Dissertation

Minimum of 24 semester hours. The student must complete the dissertation, analyzing the results of original research demonstrated and 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. 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, human-resource management) through year-long case in which student 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). Professional development: management skills: teambuilding, written and oral communication, and assessment of student's leadership ability. 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, marketing strategy, ethics and social responsibility, and strategic planning. Capstone: long-term business simulation. Prereq: Core II 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 CASE (Computer-Aided Software Engineering).

510 Management of Responsive Service Organizations (3) Management of organizations which respond to customer requests or to receive non-profits, economics, relationship building and management methods. Case-based learning, personal growth, and mentoring. Prereq: Core I or consent of Director of Graduate Business Programs.
Chemical Engineering
College of Engineering

MAJOR DEGREES

Chemical Engineering........................................ M.S., Ph.D.

Charles F. Moore, Head

Professors:
Biehalkowski, Paul R., Ph.D................................. Purdue
Bogue, Donald C., Ph.D................................. Delaware
Counce, Robert M., Ph.D................................. Tennessee
Crawford, Lloyd W. (UTSI), Ph.D............................ Cincinnati
Culberson, Oran L. (Emeritus), Ph.D........................ Texas
Cummings, Peter T. (Distinguished Scientist), Ph.D............................. Melbourne

Fraizer, George C., Jr. (Condra Prof.), D.Eng................................. Johns Hopkins
Hansen, Marion G., Ph.D................................... Wisconsin
Holmes, John M. (Emeritus), Ph.D........................ Tennessee
Hsu, Haian-Wen (Emeritus), Ph.D........................ Wisconsin
Moore, Charles F. (Alumni Prof.) (Liaison), Ph.D.............................. Louisiana State
Perona, Joseph J., Ph.D................................. Northwestern
Prados, John W. (University Prof.), Ph.D............................. Tennessee

Sheth, Atul C. (UTSI), Ph.D................................. Northwestern
Thomas, Carl O., Ph.D................................. Tennessee

Associate Professors:
Bruns, Duane D., Ph.D................................. Houston
Wang, Tae-Wei, Ph.D................................ MIT
Weber, Frederick E., Ph.D................................. Minnesota

Graduate programs lead to the degrees of Master of Science and Doctor of Philosophy in Chemical Engineering with concentrations in chemical engineering, chemical bioengineering, advanced control systems, and polymer science and engineering.

THE MASTER'S PROGRAM

Thesis Option: The standard master's program includes a thesis and leads to the Master of Science. Minimum departmental requirements are as follows:

1. A total of at least 21 hours in graduate coursework in chemical engineering and related areas excluding thesis. The minimum requirements are 15 hours in chemical engineering, 3 hours in other engineering, scientific, or business areas (approved by the departmental faculty); and 3 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 39 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 5 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 (CHE 580).

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 following:

1. Graduate courses in chemical engineering, totaling approximately 24 semester hours, at least 9 of which must be in CHE 501 every semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated.

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 chemical engineering principles, transport phenomena and separations.

4. Active participation in graduate seminars conducted by the department. Resident students must register for CHE 501 every semester it is offered.

GRADUATE COURSES

403 Introduction to Optimization (3) Principles and applications of optimization techniques to chemical process design: unconstrained and equality constrained optimization, linear programming, dynamic programming, and geometric programming. Prereq: Mathematics 241.


447 Honors: Transport Phenomena (3) Momentum, heat and mass transfer processes, analogies, differential and macroscopic balances, applications involving molecular diffusion, simultaneous mass transfer and chemical reaction. Prereq: Mass Transfer and Separation Processes and consent of instructor.


485 Hydrocarbon Processing (3) Chemical and physical properties of selected hydrocarbons and chemical processes utilized in conversion of raw material into valuable fuels and selected chemical feedstocks. Prereq: Mass Transfer and Separation Processes, Organic Chemistry.

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

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 semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated.

505 Engineering Analysis (3) Formulation and solution of problems in chemical engineering and materials areas, including partial differential equations; types of ODE, PDE and solution techniques; transform methods; conformal mapping; variational methods; introduction to numerical methods. (Same as Materials Science and Engineering 505.)

507 Application of Numerical Linear Algebra in Systems and Control Engineering (3) Fundamental concepts of linear algebra to problems in systems and control areas. Geometric and physical interpretations of relevant concepts. Least squares problems, LU, QR, and SVD decompositions of matrix, eigenvalue problems and similarity transformations in solving difference and differential equations. Numerical computation of roots of various algorithms. Application of linear algebra concepts in optimization studies. Introduction to linear programming. Computer projects. Prereq: Graduate standing or consent of instructor. (Same as Electrical and Computer Engineering 507 and Mechanical Engineering 507.)

531 Advanced Chemical Engineering Thermodynamics (3) Phase equilibrium in ideal and nonideal solution; composition relationship between phases, solubility behavior and application to macromolecules; introduction to microscale approach to thermodynamics.

532 Statistical Mechanics (3) Molecular distribution functions; stochastic process; molecular dynamics; expansions, distribution function theories, perturbation theories, time-dependent correlation functions, theory of transport processes, and phase transitions. Prereq: Background in mathematics, thermodynamics, transport phenomena, and computer programming.

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, energy and reaction, and mass transfer operations in packed towers and agitated vessels, membrane separations. Equilibrium stage concepts applied to mass transfer operations emphasizing nonisothermal and multicomponent systems.

561 Chemical Reactor Analysis (3) Rate models for heterogeneous reactions, properties of porous catalysts, catalyst deactivation, fluid-fluid and fluid-solid reactions.

681 Process Modeling and Simulation (3) Theories and structures of models and art of simulation. Model development from basic principles. Model development from plant test data. Use of models in operation, optimization and control. Prereq: Chemistry 507.

756 Applied Microbiology and Bioengineering (3) Crossdisciplinary course combining basic concepts in microbiology, biochemistry, reaction kinetics, and biochemical and environmental engineering. Prereq: Biochemical and Environmental Engineering 507, Microbiology and Biochemistry 507, Engineering Microbiology 407, and consent of instructor.
immobilization methods. Fundamental laboratory techniques during 8-week laboratory period. (Same as Environmental Engineering 575, Agricultural Engineering 575 and Microbiology 575.)

590 Technical Review and Assessment (3) Preparation of critical review of literature in area 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, process safety, 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 Sciences 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) P/NP only. E

631 Advanced Topics in Statistical Thermodynamics and Molecular Dynamics (3) Statistical thermodynamics, molecular based computer simulations, Monte Carlo and molecular dynamic calculations; applications to supercritical fluids, macromolecules and biological systems. PreReq: 531.

641 Advanced Diffusional Operations (3) Fixed and fluidized bed operations, recent developments in separation processes. PreReq: 533.

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, methods for study of interaction, regulation of growth and regulation at several levels (molecular, cellular, physiological and molecular). Experimental methods for data gathering, signal recognition and processing, mathematical signal analysis, mathematical modeling of the growth and interaction, statistical, stochastic, physiological, and utility and limitation of approach. PreReq: 575 or consent of instructor. (Same as Environmental Engineering 675.)

691 Advanced Topics in Chemical Engineering (3) May be repeated. Maximum 6 hrs.

Chemistry
(College of Arts and Sciences)

MAJOR

DEGREES

Chemistry ..................................... M.S., Ph.D.

Gleb Mamantov, Head

Professors:

Adcock, J. L., Ph.D. ..................... Texas
Alexandratos, S., Ph.D. ................. California
Baker, D. C., Ph.D. ...................... Ohio State
Bartmess, J. E., Ph.D. ................. Northwestern
Bloch, J. E. (Emeritus), Ph.D. ........ Manchester
Bull, William E., Ph.D. ............... Illinois
Chambers, J. O., Ph.D. ................. Kansas
Compton, R. N., Ph.D. ................. Tennessee
Cook, K. D., Ph.D. ..................... Wisconsin
Dean, J. A. (Emeritus), Ph.D. ........ Michigan
Eastham, J. F. (Emeritus), Ph.D. ..... California
Fletcher, W. H. (Emeritus), Ph.D. .... Minnesota
Grimm, F. A., Ph.D. .................... Cornell

Guilcher, G. (Distinguished Scientist), Ph.D. ........... Ecole Polytechnique and Paris VI
Kabalka, G. W. (Distinguished Prof.), Ph.D. ............... Purdue
Kleinfelter, D. C., Ph.D. ............... Princeton
Kovac, J. D., Ph.D. .................... Yale
Litke, M. H. (Emeritus), Ph.D. ......... Wisconsin
Magid, L. J., Ph.D. ..................... Tennessee
Mamantov, Gleb (Distinguished Prof.), Ph.D. ............. Louisiana State
Pagni, R. M., Ph.D. ..................... Yale
Peterson, J. R., Ph.D. .................. California
Schweitzer, George K. (Distinguished Prof.), Ph.D. ...... Illinois
Sepaniak, M. J., Ph.D. ................. Iowa State
Smith, W. T. (Emeritus), Ph.D. ........ Ohio State
Van Hout, W. A., Ph.D. ............... Johns Hopkins
Wethy, E. L., Ph.D. ..................... Purdue
Williams, T. F. (Distinguished Prof.), Ph.D. .............. London
Woods, C., Ph.D. ...................... NC State
Wunderlich, B. (Distinguished Scientist), Ph.D. .......... Northwestern

Associate Professors:

Barnes, C. E., Ph.D. .................... Stanford
Felgerle, C. S. (Lissian), Ph.D. ........ Colorado
Lane, C. A., Ph.D. ..................... California
Schell, F. M., Ph.D. .................... Indiana

Assistant Professor:

Dayam, Mark, Ph.D. ................. California
Hinde, Robert J., Ph.D. ............... Illinois
Tumbar, Albert, Ph.D. ................. California
Xue, Z. B., Ph.D. ...................... California

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-half year of inorganic chemistry is also required. Students who have deficiencies may be admitted with appropriate deficiencies that must be removed without graduate credit. Applicants are required to take the general Graduate Record Examination.

Students minoring 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. The requirements for the M.S. in Chemistry consist of the satisfactory completion of:

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

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

3. Prescribed remedial courses based on performance on entrance examinations.

4. Sufficient graduate coursework to satisfy the 18 hours requirement in item 5.

5. A final oral examination.

THE DOCTORAL PROGRAM

The department offers concentrations in eight areas for the Ph.D.: analytical chemistry, physical chemistry, inorganic chemistry, organic chemistry, polymer chemistry, and theoretical chemistry.

The requirements for the Ph.D. in Chemistry consist of the satisfactory completion of:

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

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

3. Prescribed remedial courses based on performance on entrance examinations.

4. Completion of the comprehensive examination series 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 501 and one of the following sequences: 510-11-12, 530-31-32, 550-51-52, 554-53-54, 570-71-72-73, and 590-94-95.

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 5 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 modern techniques for characterization, coordination and organometallic chemistry. Prereq: 426. Coreq: Coreq or coreq: 380 or 381. Sp

431 Radioactivity and Its Application (2) Radioactive materials in tracer and therapeutic applications, introduction to applications, decay and its decay products, techniques and tracer procedures, safety precautions in agriculture, biology, medicine, nutrition. Not for credit by chemistry or physics majors or minors. Prereq: Mathematics 122 or equivalent and knowledge of general chemistry. Sp


471-81 Biophysical Chemistry (3.3) (Same as Biochemistry 471-81)

473 Physical Chemistry (3.3) Students may not receive credit for both 473 and 473C nor for both 481 and 483. 473-473C Properties of gases: first, second, and third laws of thermodynamics, chemical equilibrium, oscillating wave phenomena, properties of solutions; introduction to statistical thermodynamics. 483-483C Kinetic theory introduction to quantum mechanics and applications to electronic structure of atoms and molecules; molecular spectroscopy. Prereq: General Chemistry, Fundamentals of Physics, and Calculus III. E

479-89 Physical Chemistry Laboratory (2, 2) Experiments on topics discussed in 471-81 or 473-85.
484 Advanced Physical Chemistry (3) Chemical dynamics, statistical thermodynamics, quantum mechanics of atomic and molecular systems, crystal structure and solid state. Prereq: 481 or 483. Sp.

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

501 Chemistry Seminar (1) Lectures and discussion on current research. May be repeated. Continuous registration required for resident graduate students. S/NC only. 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.

506 Special Problems (3) Specially assigned theoretical or experimental work on problems not covered in other courses. Prereq: Consent of department. May be repeated. Maximum 6 hrs. S/NC only.

510 Analytical Spectroscopy (3) Principles and practice of optical and mass spectrometric techniques in quantitative chemical analysis. Prereq: 1 yr of physical chemistry.

511 Analytical Separations (3) Principles and practice of chemical separations based on extraction, chromatographic, and electrophoretic phenomena. Prereq: 1 yr of physical chemistry.

512 Electroanalytical Chemistry (3) Fundamentals of electrode processes; principles and practice of electroanalytical techniques in quantitative chemical analysis and applied to study of chemical systems. Prereq: 1 yr of physical chemistry.

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, ligand field theories, solid state. Prereq: 1 yr of physical chemistry.


532 Experimental Methods of Inorganic Chemistry (3) Electronic, infrared, Raman, Mossbauer, mass, and photoelectron spectroscopies for characterization of inorganic compounds. Prereq: 530. F.

540 Nuclear and Radiochemistry (3) Nuclear properties, radioactivity, radioactive decay processes, nuclear structure and models, nuclear reactions, radiation and matter, radiation detection. Prereq: 1 yr of physical chemistry.

550 Structure and Reactivity in Organic Chemistry (3) Structure and bonding in organic compounds: molecular orbital theory, stereochemistry, conformational analysis, and molecular mechanics; substituent effects on acidity and reactivity; introduction to reaction mechanisms. Prereq: 360. F.


553 Spectroscopic Characterization of Organic Compounds (2) Organic structure elucidation using spectroscopic methods: nuclear magnetic resonance, infrared, ultraviolet, and mass spectrometry. Prereq: 360 or equivalent. F.

554 Organic Spectroscopy Laboratory (1) Use of IR, UV, MS and multinuclear FT NMR spectrometers. Development of problem-solving ability in area of spectroscopic characterization of organic molecules. Prereq: 360 or equivalent. Coreq: 552. F.

570 Quantum Chemistry and Spectroscopy (3) Basic principles of quantum mechanics and their applications to molecular orbital theory, molecular structure, and spectroscopic consequences therein. Prereq: 1 yr of physical chemistry.

571 Advanced Quantum Chemistry and Spectroscopy (3) Prereq: 570 or consent of instructor. Sp.

572 Thermodynamics and Statistical Mechanics (3) Macroscopic and microscopic description of equilibrium systems. Basic principles of the thermodynamics and statistical mechanics, and application to selected chemical systems. Prereq: 1 yr of physical chemistry.

573 Chemical Kinetics and Transport (3) Time-dependent phenomena in chemistry: chemical kinetics, chemical dynamics, transport theory. Prereq: 1 yr of physical chemistry.

580 Fundamental Topics in Physical Chemistry (3) Quantum chemistry, spectroscopy, chemical kinetics, transport properties, thermodynamics, and statistical thermodynamics. Prereq: 1 yr of physical chemistry.

590 Polymer Chemistry (3) Fundamentals of polymer synthesis and characterization through application of organic and physical chemical principles. Prereq: 1 yr each of organic and physical chemistry.


595 Physical Chemistry of Polymers (3) Conformation of macromolecules, solution and bulk properties, rubber elasticity, kinetics of polymerization, polymer thermodynamics. Prereq: 590 or equivalent. 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. E.

610 Selected Topics in Analytical Chemistry (3) Topics of current significance. Prereq: 510-11-12 or consent of instructor. May be repeated. Maximum 12 hrs.

630 Selected Topics in Inorganic Chemistry (3) Topics of current significance. Prereq: 530-31-32 or consent of instructor. May be repeated. Maximum 12 hrs.

650 Selected Topics in Organic Chemistry (3) Topics of current significance. Prereq: Two of 595-51-52 or consent of instructor. May be repeated. Maximum 12 hrs.


670 Selected Topics in Physical Chemistry (3) Topics of current significance. Prereq: 570-72-73 or consent of instructor. May be repeated. Maximum 12 hrs.

690 Selected Topics in Polymer Chemistry (3) Topics of current significance. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.
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 the 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 584, 565, 9 hours of CFS courses in the area of concentration; and a written comprehensive examination.

**Track 2** - All students in the early childhood education licensure program must enroll in Human Ecology 574, 575, 591, and Holistic Teaching/Learning 505 (or equivalent CFS course). Thesis students are required to take: CFS 510 or 512; 3 hours of 500-level statistics; 3 hours of 500-level research methods; two courses selected from CFS 520, 521, 522, 530, 540, 525, 590; 6 hours of thesis credit; and an oral comprehensive examination (45 hours). Non-thesis students are required to take: CFS 510 or 512; three courses selected from CFS 520, 521, 522, 530, 540, 525, 590; 3 hours of 500-level statistical methods or interpretation of statistics and research methods; and a written comprehensive examination (39 hours).

Students in the early childhood education licensure program may choose to complete their M.S. degree requirements with a major in Child and Family Studies or Human Ecology. The family studies concentration consists of specializations in family life intervention and family science. Thesis and non-thesis options are available in both concentrations. Students should also consider an interdisciplinary minor in gerontology to provide a life span perspective to human development or family studies.

Students in the family studies concentration must enroll in CFS 550, 571, and 540 or 560. At least 6 hours in a cognate area outside the department are required. 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 584, 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 and of 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 current disciplinary nature of the field and the necessity for a broad-based background to formulate theoretical questions, and broadens the empirical literature for addressing those questions.

**Requirements include:**

1. Minimum 16-18 credits in child and family studies required foundation courses: 510, 550, 570, 571. 532 is also required for family studies area students.
2. Minimum 12 credits in 500- and 800-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 specialized 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 some states 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. 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 facility time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
507 Development of Interpersonal and Supervision Skills (2) Refinement of interpersonal skills needed to work with families and other professionals. Supervisory training in others' skill development, active listening, self-disclosure, relationship building, and negotiation.
510 Survey of Theory and Research in Child Development (3) Prerequisite: 550. Theoretical and empirical 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. F
512 Survey of Research in Early Childhood Education (3) Prerequisite: 510 or equivalent or consent of instructor. F
515 Children in Contemporary Society (3) Prerequisite: 510 or equivalent or consent of instructor. F
520 Curriculum and Program Development in Early Childhood Education (3) Current programming issues in early childhood education: description, analysis, and evaluation of curriculum models, teaching methods, administrative style, and supervision of personnel. Experience in designing and evaluating early childhood programs for young children. Special needs, infancy-age 8. Prereq: 9 hrs of either upper division undergraduate or graduate social science or consent of instructor. F
521 Organizational Management in Early Childhood Education (3) Designing, implementing, and evaluating physical and human resources in educational environments. Development of skills in environmental organization, interpersonal leadership, and supervision of staff. Prereq: 512 or equivalent or consent of instructor.
Civil and Environmental Engineering

(College of Engineering)

MAJORS

<table>
<thead>
<tr>
<th>DEGREES</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Engineering</td>
<td>M.S., Ph.D.</td>
</tr>
<tr>
<td>Environmental Engineering</td>
<td>M.S. (Ph.D. through Civil Engineering)</td>
</tr>
</tbody>
</table>

Gregory D. Reed, Head

Professors:
- Bennett, R. M., Ph.D. .......... Illinois
- Burdette, E. G. (Fred N. Peebles Prof.), Ph.D. .......... Illinois
- Chatterjee, A., Ph.D. .......... NC State

Environmental Engineering

For a Master of Science with a major in Environmental Engineering, normally a Bachelor's degree in a field of engineering is required. For a student who does not have an engineering background, the following minimum prerequisite courses will be required: Basic Engineering or Computer Science 101; Basic Engineering 121, 131; Engineering Science and Mechanics 231; Statistics 251; Civil Engineering 390, 395, 380; 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 coursework. 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 approval by the student’s major professor. A student’s program must include a minimum of 9 semester hours of advanced engineering design courses selected from a list provided by the student's committee.

Normally, the graduate program of study will be adjusted by the head of the department and the student’s committee to suit the individual academic objectives.

**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 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 master's level 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 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

408 Legal and Ethical Aspects of Engineering (3) Legal principles underlying engineering work; laws of contracts; torts; real property; professional registration and ethics. Prereq: Senior standing.

421 Portland Cement and Asphalitic Concrete (3) Aggregate properties and tests, 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, 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 interrelationship; traffic studies: basic considerations of traffic circulation and control; lighting; capacity analysis; roadway safety analysis; and design. Prereq: 210, 251, 352.

453 Airport/Railroad Planning and Design (3) Airport master planning and railroad engineering. Runway configuration, airfield capacity and geometric and terminal layout and design; railroad capacity, geometrics and systems layout and design. Prereq: 210, 251, 352.

461 Analysis of Framed Structures (3) Maximum stresses due to moment; deflections; influence lines; forces due to earthquake; wind load; analysis of portals, building frames, and space frames; matrix methods; use of computer in structural analysis. Prereq: Structural Analysis II.

472 Steel Design (3) Design of plate girders and composite beams; consideration of members subjected to combined stresses; design of typical framed building connections. Prereq: 471.

474 Reinforced Concrete Design (3) Reinforced concrete beams and slabs; columns with combined axial loads and bending; footings and retaining walls. Prereq: 471.

485 Principles of Geohydrology (3) (Same as Geological Sciences 485.)

490 Water Resources Project Design (3) Coherent development of multipurpose reservoir and dam project; data storage, data analysis, and computer-aided analysis of earth and gravity dam stability analyses; drains and filters; maintenance and operation principles; and dam safety concepts; dam break analyses. Prereq: 390, 395.

494 Urban Drainage Engineering (3) Design and management of stormwater control structures. Application of hydrologic and hydraulic principles to design of drainage systems for urban, strip mining, and highway development; design of underground structures, catchments, culverts, and detention and retention basins; application of commonly-used computer runoff models; evaluation of land-use on streamflow quantity and quality. Prereq: 380, 385.

495 Water Resources Development and Management (3) Principles of water resources project development planning and management. Institutional framework; water law, evaluation procedures for comparing and selecting among resources development alternatives, multi-objective programming, principles of engineering economics, benefit-cost analysis, and cost allocation methods; environmental impact assessment procedures; decisions using risk-based methods; case studies. Prereq: Senior standing.

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

510 Urban Systems: Engineering and Management (3) Various urban systems usually under responsibility of city manager and/or city engineer: streets, lighting, water, sewerage, refuse collection. Personnel management, finance, planning and public relations. Prereq: Graduate standing or consent of instructor.

521 Pavement Design (3) Empirical and theoretical based methods of pavement design and analysis; strengthening existing pavements, pavement distress and economical design alternatives. Prereq: 321 and 330.


534 Geological Engineering (3) Influence of geologic origin and weathering characteristics of rocks and soils; application of geology in planning, design and construction of civil engineering projects. Prereq: Introduction to Soil Behavior. (Same as Geological Sciences 534.) 2 hrs and 1 lab.


537 Issues in Geotechnical Engineering (1-3) Special problems, discussions, and presentations in geotechnical engineering. Prereq: Graduate standing or consent of instructor. May be repeated.


554 Statically Indeterminate Structures (3) Deflections of beams and frames; stress analysis; practical applications of structural analysis software. Prereq: Structural Analysis I and Matrix Computation or equivalent.

580 Transportation Planning (3) Preparation of transportation as elements of comprehensive development plans. Analysis of relationships between various transportation modes and the urban system and other community features. Use of planning tools to establish existing travel patterns, modeling of demand, passenger activity analysis and evaluation. Prereq: Graduate standing. (Same as Planning 580.)

581 Traffic Accident Reconstruction (3) Data collection and analysis as basis for accident prevention on control programs; roadside hard shoulder design and crash testing. Prereq: 452 or graduate standing.

592 Traffic Engineering-Operations (3) Signs, signals, traffic control, short-term operations, controllers, signal timing, phase sequencing, one-way reversible flow; system optimization; identification and correction of high-accident locations and system deficiencies. Prereq: 551 or 452.

593 Geometric Design and Layout of Roadways and Community Facilities (3) Functional and geometric design and urban roadways of all classes; subdivide layout; configuration of urban roads of all classes; traffic analysis for access control; freeway interchange and street intersections; and parking. Prereq: 451 or consent of instructor.

594 Urban Transportation Planning (3) Transportation problems in urban area; systematic planning for identification of future problems; travel surveys and demand modeling; implementation of transportation planning tools; special topics; urban goods movement, transportation system management. Prereq: 362 or graduate standing.

595 Public Transit Planning (3) Characteristics of transit modes - conventional and paratransit; operational design of transit services; route planning and scheduling; cost analysis; mode choice models; performance evaluation; transit survey; organization and financing. Prereq: 554 or graduate standing.

596 Traffic Accident Reconstruction (3) Data collection and analysis as basis for accident prevention on control programs; roadside hard shoulder design and crash testing. Prereq: 452 or graduate standing.

597 Transportation Planning and Operations with Computer Applications (3) Transportation system management techniques and application of microcomputers to analysis of transportation alternatives. Prereq: 554, 551.

598 Planning and Transportation (3) Preparation of transportation as elements of comprehensive development plans. Analysis of relationships between various transportation modes and the urban system and other community features. Use of planning tools to establish existing travel patterns, modeling of demand, passenger activity analysis and evaluation. Prereq: Graduate standing. (Same as Planning 580.)

599 Urban Transportation Planning (3) Transportation problems in urban area; systematic planning for identification of future problems; travel surveys and demand modeling; implementation of transportation planning tools; special topics; urban goods movement, transportation system management. Prereq: 362 or graduate standing.

651 Computer-Aided Structural Analysis (3) Fundamental concepts of computational methods used in structural analysis; matrix and finite element methods; practical application of structural analysis software. Prereq: Structural Analysis I and Matrix Computation or equivalent.

653 Geotechnical Engineering (3) Influence of geologic origin and weathering characteristics of rocks and soils; application of geology in planning, design and construction of civil engineering projects. Prereq: Introduction to Soil Behavior. (Same as Geological Sciences 534.) 2 hrs and 1 lab.


657 Issues in Geotechnical Engineering (1-3) Special problems, discussions, and presentations in geotechnical engineering. Prereq: Graduate standing or consent of instructor. May be repeated.

658 Finite Element Applications in Geotechnical Engineering (3) Application of finite element method to solve typical problems in geotechnical engineering. Confined and unconfined flow through porous media; stresses and strains in geotechnical systems; design of nonlinear soil behavior with elastic and plastic models; soil–structure interaction effects. Prereq: Introduction to Soil Behavior and 561.

659 Geotechnomy Seminar (1) Seminar topics in geotechnical engineering. Prereq: Graduate standing and consent of advisor. May be repeated. S/N Only.

661 Pavement Design (3) Empirical and theoretical based methods of pavement design and analysis; strengthening existing pavements, pavement distress and economical design alternatives. Prereq: 321 and 330.


665 Finite Element Applications in Geotechnical Engineering (3) Application of finite element method to solve typical problems in geotechnical engineering. Confined and unconfined flow through porous media; stresses and strains in geotechnical systems; design of nonlinear soil behavior with elastic and plastic models; soil–structure interaction effects. Prereq: Introduction to Soil Behavior and 561.

667 Structural Systems (3) Structural system analysis and design; dead, live, wind, and earthquake loads on buildings; vertical and lateral load resisting systems; use of computers in analysis and design. Prereq: Introduction to Structural Design.

671 Behavior of Steel Structures (3) Behavior of structural steel members due to static and fatigue loading; relation between research results and current specifications and design. Prereq: 471.

672 Connections for Steel Structures (3) Design, analysis and behavior of connections for struc-
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. Consent of instructor. May be repeated. Maximum 9 hrs.

675 Microbial Systems Analysis (3) (Same as Chemical Engineering 675.)

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:

Gesell, G. C., Ph.D. ....................................... North Carolina
Rutledge, H. C., Ph.D. ........................................ Ohio State

Associate Professors:

Craig, C. P., Ph.D. ....................................... North Carolina
Martin, S. D., Ph.D. ......................................... Michigan
Sholton, J. E., Ph.D. ......................................... Vanderbilt
Tandy, D. W., Ph.D. ........................................... Yale

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

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, practice in prose composition, writings of Cicero, Caesar. Prereq: 351-52 or consent of instructor.

422 Seminar in Classical Studies (3) Field of classical studies today: recent achievements in areas of both philology and archaeology; impact of decipherment of Linear B; new understandings of culture and politics of "golden age" of Pericles and Augustus; classical studies and academic profession on both high school and college levels. May be repeated. Maximum 9 hrs.

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: 351-362 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, religion, and society of Greece and Rome. May be repeated with consent of department. Maximum 8 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 writings of Roman jurists, world's first legal professionals. Understanding legal institutions in relationship to Roman society, Roman property and contract law. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

501 Special Topics in Greek Literature (3) Advanced study of classical Greek literature, authors selected by students and instructor. May be repeated. Maximum 9 hrs.

502 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.

541-42 The Latin Epic: Lucretius, Vergil (3,3) Advanced study of epic masterpieces of Lucretius and Vergil; both Genesius and Aeneid of Vergil.

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.

562 Problems in Old World Archaeology (3) Selected topics and research problems in European, Asian, and African problems. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. (Same as Anthropology 562.)

Communications
(College of Communications)

MAJOR

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.

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 candidate status normally include a 3.0 (4.0 system) grade-point average in undergraduate studies and scores above the fiftieth percentile in verbal and quantitative aptitude on the Graduate Record Examination. All application materials are screened by an admissions committee authorized by the faculty of the College of Communications.

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

A baccalaureate degree in communications or a related field is recommended. Admission is possible with other baccalaureate degrees. However, all applicants without the appropriate background are required to take up to 15 semester hours of prerequisite and corequisite courses as determined by the department in which the student is enrolled. Students may take a proficiency test on any prerequisite course, subject to review by the master's or doctoral committee of the College of Communications.

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

ACADEMIC 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 or Kentucky (concentration in advertising only) or Louisiana. 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 graduate grade-point average is 3.0 or higher at the end of the probationary period. The probationary period is defined as the next 12 semester hours of 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.

THE MASTER'S PROGRAM

The Master of Science with a major in Communications is intended for students who desire a career in the mass media with an emphasis on communications management and a deeper understanding of the communication process and social role of the media. The program follows a broad-based multi-media approach while allowing the student to concentrate in one of four fields: advertising, broadcasting, journalism or public relations. Both thesis and non-thesis options are available.

The prospective student who is interested only in acquiring basic skills in one of the areas listed above is advised to enroll for a second baccalaureate rather than an advanced degree.

Degree Requirements

The M.S. program emphasizes communications management in the areas of advertising, broadcasting, journalism (publications), and public relations. For the thesis option, a minimum of 31 hours of approved graduate work is required. The non-thesis option requires 34 hours.

1. Ten hours of core courses: Communications 510, 512, 540, and 550 or 560, the first three of which must be taken during the first two semesters of the student's program, except with written approval of the Associate Dean for Graduate Studies for the College.

2. Twelve hours within one department of the college, at least 6 hours at the 500 level or above. An internship, if needed, is included.
**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 courses outside the College in the related social and behavioral sciences. The program is flexible and will accommodate a wide variety of career goals in communications. New students may be admitted to the program at any time; however, core courses begin only in the fall semester.

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

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. 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.

**GRADUATE COURSES**

400 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 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

510 Orientation to Master's Studies (1) Degree and thesis requirements. Committee formation and planning. Overview of research methods and informational sources. Prereq: Consent of instructor or admission to program. S/N/C only. F

512 Fundamentals of Media Research (3) Applications of communications research techniques for management. Gathering and analysis of data for assessing media audiences and message impacts. Prereq: Consent of instructor or admission to program. S/N/C only. F

521 Tutorial in Communications Teaching (1) Experience as a teacher under guidance of faculty member. Prereq: Consent of instructor: S/N/C 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. F

550 Seminar in Mass Communications Issues (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. E

551 Seminar in Science, Society, and the Mass Media (3) Scientific and social impacts of mass communications on mass media, and mass media's impact on science and society. Prereq: Consent of instructor. E

552 Seminar in Communication Research (3) Methods, problems, and issues in communication research. Prereq: Consent of instructor. E

590 Seminar in Risk Communications (3) Interaction of risk scientists and risk communicators. Prereq: Consent of instructor. E

593 Seminar in Mass Communications Issues (3) Contemporary topics in communications. Prereq: Consent of instructor. E

597 Independent Study (3) Reading, research or projects outside the regular offerings. Prereq: Consent of instructor. 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. Prereq: Consent of instructor. E

612 Fundamentals of Mass Communications Research (3) Overview of research process from defining ideas and problems to reporting results. Prereq: Consent of instructor. E

620 Seminar in Communications Education (3) Role and scope of mass communications teaching unit, historical perspectives of curricular trends. Prereq: Consent of instructor. E

622 Quantitative Research (3) Techniques for evaluation of research design and measurement. Prereq: Consent of instructor. E

632 Mass Communications History and Historiographical Methodology (3) History and historiography of mass communications. Prereq: Consent of instructor. E

640 Communications Theory I (3) Evaluation and critique of mass communications theory in light of mass communications research. Prereq: Consent of instructor or admission to program. F

641 Communications Theory II (3) Historical and critical perspectives. Prereq: Consent of instructor or admission to program. F

642 Qualitative Research (3) Theory and application of qualitative research methods. Prereq: Consent of instructor. E

652 Mass Communications Law and Legal Research (3) Legal and ethical issues in mass communications. Prereq: Consent of instructor. E

662 Mass Communications Law and Legal Research (3) Legal and ethical issues in mass communications. Prereq: Consent of instructor. E
Comparative and Experimental Medicine

(Office of the Vice Chancellor for Academic Affairs)

MAJOR DEGREES

Comparative and Experimental Medicine .................. M.S., Ph.D.

L. N. D. Potgieter, Director

Joint Graduate Coordinating Committee:

Fuhr, J. E., Ph.D., Medical Biology
Lavire, J. E., Ph.D., Psychology
Lutino, 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, immunopathology, hematology, aberrant metabolism, oncology, and genetic disorders. 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, the Oak Ridge National Laboratory, Knoxvile Zoological Park, Hemophilia Clinic, Developmental and Genetic Center, Hematology and Oncology services, and departments of life sciences.

For additional information, write to the Office of Research and Graduate Programs, P.O. Box 1071, Knoxville, TN 37901-1071.

ADMISSION REQUIREMENTS

Admission requirements of the Graduate School of UT Knoxville are described in the Admissions Section. 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 presenting evidence of exemplary performance on the Graduate Record Examination.

Exceptional graduate 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 Life Sciences programs 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.

The graduate committee (at least 3 members) is chosen after the first term and must include at least one member from the College of Veterinary Medicine and at least one member from the Graduate School of Medicine. If a minor is declared, one member must be from the minor discipline.

A final oral examination is given at the end of the program.

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 Life Sciences programs for information on these courses. In addition, students must complete a minimum of 8 hours of coursework in a specified discipline. Areas of emphasis may include hematobiology, oncology, comparative pathobiology, comparative pharmacology, toxicology, immunology, genetics, infectious diseases, or biochemistry of disease. At least 24 hours of coursework, including a minimum of 8 hours at the 600 level, and 24 hours of Dissertation 600 are required for a total of 48 hours. For students with professional degrees, a minimum of 18 hours of coursework beyond the professional degree is required for a total of 42 hours.

The doctoral committee (at least 4 members) is chosen during the first year. Three of the four members, including the chair, must be approved by the Graduate Council to direct doctoral research. At least one member must be from the College of Veterinary Medicine and at least one member from the Graduate School of Medicine. A comprehensive oral examination is given at the completion of coursework. A seminar and final oral defense of the dissertation culminate the program.

Comparative and Experimental Medicine -- Veterinary Medicine

GRADUATE COURSES

Participating departments include: Animal Science, Comparative Medicine, Microbiology, Pathology, Large Animal Clinical Sciences and Small Animal Clinical Sciences. Several faculty in the Department of Microbiology hold joint appointments in the College of Veterinary Medicine. See Microbiology under Fields of Instruction for additional 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/C only, E

503 Predictive Toxicology (3) Principles and techniques of predictive toxicity: structure-activity relationships, expert systems, neural nets and molecular similarity.

505 Laboratory Animal Care and Use (2) Review of basic laboratory animal care and use as a prerequisite to conducting research using animal subjects. Compliance issues and techniques.

506 Experimental Animal Surgery (3) Competency in performing human surgical modifications of experimental animals. Techniques of anesthesia, drug administration and postoperative care. Prerequisite: Embryology, parasitology, physiology and/or consent of instructor. 1 hr and 2 labs. F

521 Advanced Mammalian Physiology I (4) Membrane, neuron, central nervous system, muscle, cardiovascular system, and control mechanisms. Prerequisite: general undergraduate anatomy and physiology and Biochemistry 410 or equivalent or consent of instructor. Recommended prerequisite: Biochemistry 419. (Same as Zoology 521.) 3 hrs and 1 lab.

522 Advanced Mammalian Physiology II (4) (Same as Zoology 522.)

530 Wildlife Diseases (2) (Same as Wildlife and Fisheries Science 530.)

533 Epidemiology/Public Health (4) (Same as Veterinary Medicine 533.)

536 Toxicology (2) (Same as Veterinary Medicine 536.)

537 Multi-Population Medicine (4) (Same as Veterinary Medicine 537.)

538 Nutritional Aspects of Companion Animal Health (2) (Same as Animal Science 536.)

545 Principles of Medical Science (2) (Same as Veterinary Medicine 545.)

551 Mammalian Organology (3) (Same as Animal Science 551.)
Correlative interpretation of clinical diseases and histological examination of tissues and microscopic post-mortem examination of animals.

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

602 Surgical Pathology (1-2) Examination of biopsy specimens and interpretation of observations. Prereq: Consent of instructor. May be repeated. Maximum 3 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 6 hrs. E

605 Pathobiology Seminar (1) Subjects of current interest in biomedical science. Students present one seminar per term oralized. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. E

560 Doctoral Research and Dissertation (3-15) P/NP only, E

610 Medical Bioloquad Seminar (1) Invited speakers. Topics posted in advance. May be repeated. S/NC only. F,Sp

611 Advanced Topics in Medical Science (1-3) New developments in biological research applicable to medical science. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. (Same as Zoology 611) F,Sp

652 Special Topics in Pathology (1-3) Pathologic anatomy, biochemical pathology, and related areas. Primarily for doctoral candidates in Comparative and Experimental Medicine. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. F,Sp

653 Clinical Pathology (3) Principles of clinical pathology and histopathology and mechanisms of disease. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. F,Sp

654 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 6 hrs. E

554 Pharmacology (3) Principles of pharmacokinetics and pharmacodynamics, properties of drugs: mode of action, pharmacokinetic effects, chemical and physical properties, metabolism, toxicities, important idiosyncrasies, and clinical applications. Prereq. Consent of instructor. F

551 Principles of Oncology (3) Lectures, classroom discussion, and case reports surveying major topics of oncology. Prereq: Biology 220-30 or consent of instructor. F

592 Correlative Pathology and Histology (3) Course emphasizes the correlation of clinical and pathological states. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. F,Sp

581 Pharmacology (4) Principles of pharmacokinetics and pharmacodynamics, properties of drugs: mode of action, pharmacokinetic effects, chemical and physical properties, metabolism, toxicities, important idiosyncrasies, and clinical applications. Prereq. Consent of instructor. F

580 Graduate Research Participation (3) Advanced research techniques with conducting individual biomedical research projects under supervision of faculty. Open to all graduate students. Prereq: Consent of instructor. May be repeated with consent of instructor. Maximum 9 hrs. S/NC only. E

521 Principles of Oncology (3) Lectures, classroom discussion, and case reports surveying major topics of oncology. Prereq: Biology 220-30 or consent of instructor. F

541 Molecularen Vascular Disease (4) Disease at molecular level. Changes in molecular events in cells that lead to disease and occur as result of disease. Correlation with clinical and pathological states. Prereq: Biochemistry 410-419 or equivalent. F,Sp

545 Clinical Pathology (3) Principles of clinical pathology and mechanisms of disease. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. (Same as Zoology 611) F,Sp

560 Doctoral Research and Dissertation (3-15) P/NP only, E

610 Medical Bioloquad Seminar (1) Invited speakers. Topics posted in advance. May be repeated. S/NC only. F,Sp

611 Advanced Topics in Medical Science (1-3) New developments in biological research applicable to medical science. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. (Same as Zoology 611) F,Sp

652 Special Topics in Pathology (1-3) Pathologic anatomy, biochemical pathology, and related areas. Primarily for doctoral candidates in Comparative and Experimental Medicine. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. F,Sp

654 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 6 hrs. E

554 Pharmacology (3) Principles of pharmacokinetics and pharmacodynamics, properties of drugs: mode of action, pharmacokinetic effects, chemical and physical properties, metabolism, toxicities, important idiosyncrasies, and clinical applications. Prereq. Consent of instructor. F
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 communication networks research. Prereq: Completion of core 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 computer 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 Analysis (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 degree is completed. May not be used toward degree requirements. May be repeated. S/N/C only. E

521 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.

523 Machine Learning (3) Algorithms whereby computers exhibit aspects of learning or inference about their environment. Supervised and unsupervised methods; data-driven pattern analysis; explicit and implicit structures. Prereq: 521.

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.


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 statistical pattern analysis. Deterministic and statistical decision rules, feature extraction and representation; symbolic and semantic methods, relational models. Prereq: Digital design and probability or statistics.

552 Image Analysis (3) Techniques of computer image processing and understanding. Prereq: 551.


563 Operating Systems (3) Operating system design, alternative strategies for memory, device, and processor allocation and management. Protection, time sharing, real-time systems. Memory management, dispatchers, interrupts. Design project. Prereq: System Programming. 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 factorization, data structures, numerical algorithms, complexity analyses, parallel algorithms. Prereq: Numerical linear algebra.

580 Frontiers (3) Finite automata and regular sets, 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.


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.

640 Advanced Topics in Databases/Information Retrieval (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 Softwre 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.

Counselor Education and Counseling Psychology (College of Education)

MAJORS

DEGREES

Education ............................................... M.S., Ed.D., Ph.D.
Education Psychology ..................................... M.S., Ph.D.
Education Psychology and Guidance .............. Ed.S., Guidance

M. A. Hector, Leader

Assistant Professor

Hutchens, Teressa A., Ph.D. .................. Georgia

Huck, Schuyler W., Ph.D. .................... Michigan

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

Poppin, William A., Ph.D. ............ Ohio State

Thompson, C. L., Ph.D. .................... Ohio State

The Counselor Education and Counseling Psychology unit offers graduate programs leading to the following: Master of Science with a major in Educational Psychology, concentration in community counseling; Master of Science with a major in Guidance, concentrations in elementary guidance, secondary guidance, and school counseling; Educational Specialist with a major in Educational Psychology and Guidance, concentration in school counseling; and Doctor of Education with a major in Educational Psychology, concentration in counselor education. The unit also participates in the college-wide Ph.D. program with a major in Education. The concentration area is theories and practice of educational and personal adjustment with specializations in counselor education, counseling psychology, and educational psychology. See Education under Fields of instruction for full description of all degree requirements.

Several programs in the unit are accredited. The Ed.D. counselor education concentration and the Ph.D. specialization in counselor education are accredited by the Council for Accreditation of Counseling and Related Educational Programs; counseling psychology by the American Psychological Association. Also, the school counseling program has the approval of the National Council for Accreditation of Teacher Education. The community counseling and school counseling programs are accredited by the Council for Accreditation of Counseling and Related Educational Programs. The program in Educational Psychology has

Hutcheson, Teresa A., Ph.D. .................. Georgia
The unit derives its intellectual identity and orientation from disciplines such as anthropology, history, philosophy, psychology, and modern sociology, and from more specialized forms of inquiry such as ethnography, semiotics, literary theory, hermeneutics, linguistics, and feminist theory.

For further information, write the Cultural Studies in Education unit.

GRADUATE COURSES

500 Thesis (1-15) S/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 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.

503 Problems in Lieu of Thesis (2-3) May be repeated. Maximum 3 hrs. S/NC only. E

505 History of Olympics: Ancient and Modern (3) Examination of major features of the Olympic Games. Ancient Olympics, 776 BC to 393 AD: Panhellenic Games, Modern Olympics, 1896 to date; political, social, class, gender, and racial issues that influence Games. E


514 Advanced Philosophy of Sport (3) Major philosophical theories of sport. Various conceptual, moral, aesthetic, and social-political issues. E

515 Social Theories of Sport (3) Liberal, democratic and Marxist social theories of sport. Same as Sociology 594.

526 Philosophy of Education (3) Truth, knowledge, and valuation in relation to work in schools. Prereq: Undergraduate course in general philosophy or consent of instructor. E

539 Development of Education Thought (3) Historic and philosophical approach to life and writing of influential educators: Plato, Quintilian, Comenius, Rousseau, Pestalozzi, Froebel, Dewey. Prereq: Graduate status and consent of instructor. Sp,Su

528 Motor Behavior: A Theoretical Perspective (3) Motor behavior from information processing perspective; overview of current research that supports theoretical bases. Prereq: Undergraduate course in general psychology or consent of instructor. E

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. E

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. Prereq: Undergraduate course in general psychology or consent of instructor. E

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. E

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.


544 Survey in Contemporary Philosophies of Education (3) Existential, phenomenological, philosophical, or sociological perspectives. Prereq: Consent of instructor. Sp,Su

545 Educational Sociology (3) Sociological analysis of American education system. Controversial sociocultural issues that affect educational system and possible solutions offered by various programs. Open to juniors, seniors, 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 of education; selected nations and their cultures. May be repeated. E

600 Research and Dissertation (3-15) May be repeated. F,Su

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 seminar and research project. Readings selected by faculty and participants. Knowledge and philosophy of education. Part of general core for Ph.D. program. Prereq: Dissertation in Education. 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

626 Advanced Seminar in Philosophy of Education (3) Advanced topics in philosophical issues in education. Prereq: 2 courses in philosophy or education. May be repeated with consent of instructor. Sp

630 Doctoral Research and Dissertation (3-15) May be repeated. F,Su

633 Advanced Motor Behavior (3) In-depth analysis, synthesis, and discussion of contemporary literature and topics; research development and production; motor control learning, sport psychology, motor development. May be repeated. Maximum 9 hrs. F,Su

646 Topics in Sociology of Education (3) May be repeated. Sp

652 Advanced Studies in Educational Anthropology and/or Sociology (3) Ethnographic methods applied to formal and non-formal educational settings. Analysis of selected research in field. Prereq: 451, 2 courses in cultural anthropology, or consent of instructor. Sp


661 Practicum (1-3) Intern experience in areas of major interest. May be repeated. F,Su

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) Study for doctoral students in selected aspects of cultural studies. May be repeated. Maximum 9 hrs. S/NC or letter grade.

ECOLOGY

(College of Arts and Sciences)

MAJOR

DEGREES

Ecology .................................................. M.S., Ph.D.

Dewey L. Bunting, Director
J. Larry Wilson, Associate Director
Paul A. Delcourt, Associate Director

Professors:
Bunting, Dewey L. (Liaison), Ph.D.............................................. Oklahoma State
Emier, D. A., Ph.D.................................................. Minnesota
Farks, Walter, Ph.D.................................................. Duke
Cormical, J. F., Ph.D.................................................. Emory
Fink, S. L., Ph.D.................................................. New Mexico State
Richert, Susan E., Ph.D.............................................. Wisconsin
Sayler, Gary S., Ph.D................................. Idaho State
Smith, W. O., Ph.D.................................................. Duke

Stacey, G., Ph.D.................................................. Texas

Associate Professors:
Amundsen, C. C., Ph.D.............................................. Colorado State
Havel, Hazel, Ph.D.................................................. Minnesota
Delcourt, Paul A., Ph.D.............................................. Minnesota
Drake, James A., Ph.D.............................................. Purdue

Gross, L. J., Ph.D.................................................. Cornell

Shared faculty are drawn from other University departments, the Oak Ridge National Laboratory, and the Tennessee Valley Authority.

The Graduate Program in Ecology offers Master of Science and Doctor of Philosophy degrees. This interdisciplinary program provides advanced courses in contemporary ecology for students from undergraduate programs in basic and applied biology, social sciences, mathematics, and engineering. Research opportunities in both fundamental and applied ecology are intended to prepare students for academic careers as well as professional positions in industry or government. The Environmental Sciences Division of the Oak Ridge National Laboratory, the National Park Service, and the Tennessee Valley Authority provide advisors and research facilities. The Great Smoky Mountains, Cumberland Plateau, valley and ridge topography, TVA reservoirs, and wild rivers provide locally a spectrum of natural habitats and consequent biological diversity that is truly unique. In addition, faculty research programs provide opportunities for student research elsewhere on this continent and abroad.

ADMISSION REQUIREMENTS

Requirements for admission to this program are: (1) admission to The Graduate School; (2) chemistry including organic, mathematics including calculus, and 3 semester hours of ecology at the upper division level (Physics highly recommended); (3) departmental application and 3 rating forms; (4) the Graduate Record Examination.

Application forms for admission should be obtained from The Graduate School as well as
the Ecology Program. Inquiries concerning the admission requirements should be addressed to the Director, Graduate Program in Ecology, University of Tennessee, Knoxville, Tennessee 37996-1610.

THE MASTER'S PROGRAM

Within the minimum requirements of The Graduate School, the program of study must include Ecology 573, 574, and 610 as designated, or an approved equivalent and one course from an approved list of quantitative methods offerings. The list is available from the ecology office and is updated annually by the Ecology Curriculum Committee. The remainder of a student's course program is determined in consultation with the graduate thesis committee. A listing of approved campus-wide ecology offerings is provided to each student during orientation.

A graduate minor in ecology is available on an individual basis.

THE DOCTORAL PROGRAM

The requirements for this degree are in general the same as those of The Graduate School. The doctoral program must include Ecology 573, 574, and 610 as designated, or an approved equivalent and one course from an approved list of quantitative methods offerings. A student cannot enroll for dissertation hours until the research proposal has been discussed and approved by the doctoral committee. A foreign language is required.

ADVISORS

Advisors are selected from ecologists on the shared faculty of the University who have competence in the area in which the student expects to work. Entering students should consult early with the director of the program on the choice of a faculty committee. The master's committee need not have more than three members. Doctoral committees consist of the major professor as chairperson, one additional member who should have an appointment in the same department, and at least two additional Ecology faculty from other departments.

MINOR IN ENVIRONMENTAL POLICY

The department participates in a program designed to give master's level 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 Ecology is available to residents of the states of Alabama or Texas. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

484 Conservation Biology (3) (Same as Zoology 484.)

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 Special Problems in Ecology (1-3) Individual investigations in ecology. May be repeated with consent of instructor. Maximum 6 hrs.

520 Ecology for Planners and Engineers (3) Ecological principles and effects that human-caused changes have on living organisms. Lectures and field trips. Appropriate for students in Planning and Environmental Engineering.

552 Development Planning in the Third World (3) (Same as Planning 552.)

555 Environmental Planning (3) (Same as Planning 555.)

561 Environmental Toxicology (3) (Same as Biochemistry 561.)

573 Population Biology (3) (Same as Zoology 573 and Botany 573.)

574 Communities and Ecosystems (3) Patterns underlying principles behind short and long term community and ecosystem organization, dynamics, energetics and nutrient cycling.

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

604 Current Topics in Environmental Toxicology (1) (Same as Biochemistry 604.)

610 Special Topics in Ecology (3) Seminars on advanced topics and recent developments. Prerequisite: Consent of instructor. May be repeated. Maximum 9 hrs.

620 Seminar in Ecology (2) May be repeated. Maximum 12 hrs.

635 Environmental Assessment and Sustainable Development in Third World Countries (3) Concepts and methods of environmental impact assessment and risk assessment. Sustainable development concepts and issues in developing countries. The role of risk and impact assessment in achieving sustainable development. Prerequisite: General ecology or equivalent. (Same as Botany and Planning 635.)

Economics

(Majors of Business Administration)

MAJORS DEGREES

Economics M.A., Ph.D.

Business Administration MBA

William F. Fox, Head

Professors:

Bohm, Robert A. (Liaison), Ph.D. .... Washington (St. Louis)

Bolby, Roger L., Ph.D. .......... Texas

Carroll, Sidney L., Ph.D. .......... Harvard

Cheng, Hui S., Ph.D. .......... Vanderbilt

Clark, Don P., Ph.D. ......... Michigan State

Cole, William E., Ph.D. .......... Texas

Davidson, Paul (J. Fred Holly Chair), 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

Moore, John R. (Distinguished Prof.) (Emeritus), Ph.D. .......... Cornell

Neale, Walter C. (Emeritus), Ph.D. .......... Iowa State

Russell, Milton, Ph.D. .......... Oklahoma

Schlottman, Alan M., Ph.D. .......... Washington

Spiva, George A. (Emeritus), Ph.D. .......... Texas

Associate Professors:

Gauger, Jean A., Ph.D. .......... Iowa State

Glustost, Errol, Ph.D. .......... Stanford

Kahn, James R., Ph.D. .......... Maryland

Mayo, John W., Ph.D. .......... Washington (St. Louis)

Murray, M. N., Ph.D. .......... Syracuse

Phillips, Keith E., Ph.D. .......... Washington

Assistant Professors:

Bearce, Peter M., Ph.D. .......... Virginia

Farmer, Amy L., Ph.D. .......... Duke

Rubin, Jonathan D., Ph.D. .......... California (Davis)

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 of 18 hours in economics, at least 12 hours must be in one field of study. 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
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 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 515 with a grade of B or better, or by qualifying examination.
   c. Quantitative Methods: Completion of 581, 582 and one additional course in quantitative methods approved by the department 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 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: Agricultural Economics and Rural Sociology; Civil and Environmental Engineering; Ecology; Economics; Forestry, Wildlife and Fisheries; Geography; Management; Political Science; and Sociology.

Students may request admission to the minor following admission to the master's 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's discipline and one course in quantitative methods are required. These requirements may be fulfilled before or after admission to the minor. 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 520 or Plant and Soil Sciences 414 or Geography 433 or an equivalent course approved by the coordinating committee.
2. Six hours of coursework outside the master's discipline 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 Microeconomic Theory (3) Analysis of microeconomic theory and methods of applying microeconomic theory to economic problems. Prereq: Introductory microeconomic theory. May be repeated.

415 History of Economics (3) History of economic thought. Prereq: History of Economics 513 or equivalent. May be repeated.

424 Political Economy of World Development (3) Topics vary: Latin America, Asia, Soviet Union and Eastern Europe, Analysis of political economy of world development. Prereq: 201. This course includes a major writing requirement. May be repeated when topic varies. Maximum 2 hrs.


462 Economics of Resources and Environmental Policy (3) Analysis of environmental policy and allocation of resources. Prereq: 582. May be repeated.

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 the student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. SNG only. E

511-12 Microeconomic Theory (3,3) Theory of consumer choice and demand, theory of revealed preference, attributes of goods and implicit prices, market demand, labor supply, individual behavior under uncertainty, theory of firm, theory of production and cost, market structures, derived demand and factor pricing.

513-14 Macroeconomic Theory (3,3) Determination of national income, prices, and employment. Results using Keynesian, neoclassical, monetarist, and rational expectations paradigms.

515 History of Economics (3) History of economic thought. Prereq: History of Economics 513 or equivalent. May be repeated.

624 Economic Development: Western Impact on Asia and Africa (3) Study of economic development of Asian and African countries. Prereq: 21 hr of economics or consent of instructor.
Arbitrariness and direct regulation. Prereq: Consent of instructor.

642 Labor History and Legislation (3) Development of organized labor as an important economic and political force in U.S., from Colonial times to present. Evolution of legal status of labor unions and of individual workers versus their employers.

651 Monetary Theory (3) Study of money, credit, and liquidity as related to real output determination, interest rates, employment, and prices. Prereq: 513.

652 Topics in Monetary Theory (3) Advanced monetary models, issues in monetary policy, open economy monetary theory and policy. Student participation. Prereq: 651.

661 Regional and Urban Location and Development Theory (3) Theory of industrial and agricultural location and human migration. Economic basis for land-use patterns, central places, and urban form. Spatial inequalities and urban problems. National policies for regional and urban assistance.

662 Methods of Regional and Urban Analysis (3) Theory of regional urban economic structure and growth. Regional income and product accounts, shift and share analysis, economic base studies, and regional urban input-output models. Theory and problem solution.


672 Public Finance: Taxation and Intergovernmental Relations (3) Theory of taxation; tax incidence and tax efficiency; policy analysis of U.S. tax structure at federal, state, and local levels. Theory of fiscal federalism and intergovernmental relations.

677 Environmental and Natural Resource Economics (3) Alternative paradigms for allocating and valuing environmental resources. Exploration of issues related to market failure and differences between renewable and nonrenewable resources.

678 Economics of Environmental Policy (3) Topics in environmental policy analysis. Consideration of alternative policy instruments, defining policy objectives and role of risk in decision-making process.

681-682 Econometric Methods (3, 3) Theory and techniques of statistical testing of economic hypotheses and construction and estimation of econometric models. Review of classical least squares regression model, and approaches to simultaneous equation models with application to current econometric research. Prereq: 592 or equivalent.

690 Workshop (3) Advanced topics in economics. Student participation. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

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Education

(College of Education)

MAJORS

DEGREES

College Student Personnel ...................... M.S.
Curriculum and Instruction ..................... M.S., Ed.S., Ed.D.
Education ........................................ Ph.D.
Educational Psychology ........................ M.S.; Ed.D.
Educational Psychology and Guidance .... Ed.S.
Guidance .......................................... M.S.
Human Performance and Sport Studies ........ M.S., Ed.D.
Leadership Studies in Education ............... M.S., Ed.S., Ed.D.
Rehabilitation Counseling ...................... M.S.
Special Education .............................. M.S.

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

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

Psychoeducational Studies

Rehabilitation and Deafness

Sport and Physical Activity

The College also offers an extended teacher preparation program with majors in Curriculum and Instruction and in Special Education. The program features a professional year internship with accompanying coursework.

TEACHER LICENSURE

For teacher licensure, a student must complete the 24 hours associated with the professional year as follows:

Fall Semester

575 Internship ................................. 4 hrs

--- Specialty Studies ......................... 6 hrs

574 Analysis of Teaching for Professional Development ........................... 2 hrs

Spring Semester

575 Internship ................................. 8 hrs

591 Clinical Studies ........................... 4 hrs

TOTAL ........................................ 24 hrs

To receive graduate credit, a student must be admitted to The Graduate School prior to the first semester of internship and register as a graduate student. If a master's degree is desired with a major in either Curriculum and Instruction or Special Education, a student must be admitted to the program prior to completion of the first semester of internship. See the individual Track 2 program descriptions below for complete details.

THE MASTER'S PROGRAMS

College Student Personnel

This program under the unit of Leadership Studies is designed for individuals interested in entering the field of student personnel administration in colleges and universities and in 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, with a minimum of 12 hours in Higher Education courses.

Curriculum and Instruction

Two tracks for the master's degree with a major in Curriculum and Instruction are offered. Track 1 is for students who are already certified to teach in a curriculum and instruction disciplinary area or those who are seeking a master's degree without certification. Track 2 is for students seeking initial licensure. Thesis and non-thesis options are available for both tracks.

Track 1 - Concentrations are available in social foundations under Cultural Studies; curriculum, elementary education, instructional media and technology, mathematics education, and science education under Education in the Sciences, Mathematics, Research, and Technology; elementary education, reading education and social science education under Holistic Teaching/Learning; elementary education under Inclusive Early Childhood Education; and art education, English education, foreign language education and reading education under Language, Communication, and Humanities Education.

The non-thesis option requires the completion of 33 hours of coursework. The thesis option requires the completion of 30 hours, including 6 hours of Thesis 500. Both options require a minimum of 12 hours in the major discipline.

For art education, the non-thesis requirements are Art Education 510, 520, 530, and 540; Education 517, 574, 575, 591; and 3 hours selected from Social Foundations of Education 511, 526, 542, 543, 544. Education in the Sciences, Mathematics, Research, and Technology 536, 558, 569 or 588 for a total of 36 semester hours.

Track 2 - Concentrations are available in elementary teaching and in secondary teaching under Education in the Sciences, Mathematics, Research, and Technology, and under Holistic Teaching/Learning; elementary teaching under Cultural Studies in Education, and under Inclusive Early Childhood Education; and art education and secondary teaching under Language, Communication, and Humanities Education.

The requirements are the same as those for Teacher Licensure plus 12 hours in the academic discipline as approved by the student's committee, for a total of 36 hours. The thesis option requires 6 additional hours of Thesis 500 for a total of 42 hours.

For both tracks, a comprehensive written examination is required. An oral exam is given over the thesis.

Educational Psychology

Admission requirements include up-to-date scores from the GRE, the unit admissions application form and letters of recommendation. All programs include thesis and non-thesis options. Under Counselor Education and Counseling Psychology, a major in Guidance, concentrations in community counseling, requires 60 hours plus supervised practicum and internship experiences working with clients. Under Psychoeducational Studies, the major in Educational Psychology requires 36 hours. A final examination is required of all master's degree students.

Guidance

Admission requirements include up-to-date scores from the GRE, the unit admissions application form and letters of recommendation. The program includes thesis and non-thesis options. Under Counselor Education and Counseling Psychology, a major in Guidance, concentrations in elementary guidance, school counseling, and secondary guidance, requires 48 hours and supervised practicum and internship experiences working with clients. A final examination is required.

Human Performance and Sport Studies

Concentrations are available in motor behavior and sociocultural foundations under Cultural Studies in Education; exercise science (exercise physiology/fitness, kinesiology/sports medicine) under Exercise Science; and sport administration/management under Sport and Physical Activity. Both thesis and non-thesis
options are available. The non-thesis option requires 36 hours, including a minimum of 18 in the specific discipline, and a final written and oral comprehensive examination. The thesis option requires 50 hours, including 6 hours of Thesis 500, and a minimum of 12 hours in the discipline.

Track 2 - The requirements are the same as those for Teacher Licensure plus 12 hours in the academic discipline as approved by the student’s committee, for a total of 36 hours. The thesis option requires 6 additional hours of Thesis 500 for a total of 42 hours.

Students completing a program of study in the general special education concentration area are qualified to be teachers and/or consultants in a variety of special education programs providing services to people certified as mentally retarded, learning disabled, emotionally disturbed, gifted, physical-health disabled, multiply disabled, and socially or emotionally disturbed.

General special education majors, in conjunction with their committees, select one or more specializations for their program of study. Six to nine hours of coursework in the designated area should be taken. Approved specializations include effective/motivational approaches, assessment/diagnosis, cognitive education, early childhood, gifted education, rehabilitation, and/or technology. Students also may select a cognate of three to six hours of coursework taken outside the unit.

Students completing a program of study in the education of the hearing impaired concentration area are qualified to teach in public or residential schools for the hearing impaired. Graduates are eligible for both Council on Education of the Deaf (CED) certification and Tennessee state certification. Internships (student teaching) may be completed at the Tennessee School for the Deaf, in mainstream programs in the state or in programs for the hearing impaired in North Carolina, Kentucky, Georgia, Virginia, and the District of Columbia.

THE SPECIALIST IN EDUCATION PROGRAMS

Curriculum and Instruction

The Educational Specialist degree program with a major in Curriculum and Instruction encompasses concentrations in curriculum, elementary education, instructional media and technology, mathematics education, and science education under Education in the Sciences, Mathematics, Research, and Technology; in elementary education, reading education, social science education, and teaching and learning under Holistic Teaching/Learning; in early childhood education under Inclusive Early Childhood Education; and in English education, foreign language education, and reading education under Language, Communication, and Humanities Education. Refer to Degree Requirements under The Graduate School for complete program requirements.

Educational Psychology and Guidance

Under Counselor Education and Counseling Psychology, the minimum number of hours required for the concentration in counselor education is 69. Under Psychoeducational Studies, the minimum number of hours required is 86. The concentration in education is 66. Under Psychoeducational Studies, the concentration in school psychology requires a minimum of 66 hours beyond the baccalaureate; the concentration in educational psychology requires a minimum of 60 hours beyond the baccalaureate. Both thesis and non-thesis options are available.

Refer to Degree Requirements under The Graduate School for complete program requirements.

Leadership Studies in Education

Leadership Studies offers the specialist degree with a concentration in educational administration and supervision. A minimum of 60 hours beyond the baccalaureate is required. The thesis option requires 6 hours of Thesis 500, and the non-thesis option requires 3 hours of Thesis 500. Both options require 6 hours in a cognate area either within or outside the college. An internship is highly recommended but not required. A written comprehensive examination is given as an oral exam over the thesis/problems paper.

Refer to Degree Requirements under The Graduate School for complete program requirements.

THE DOCTOR OF EDUCATION PROGRAMS

Curriculum and Instruction

The Ed.D. program with a major in Curriculum and Instruction is available under Cultural Studies in Education with a concentration in social foundations; under Education in the Sciences, Mathematics, Research, and Technology with concentrations in curriculum, educational research, elementary education, instructional media and technology, mathematics education, and science education under Holistic Teaching/Learning, with a concentration in elementary education, reading education, and social science education; under Inclusive Early Childhood Education, with a concentration in elementary education; under Language, Communication, and Humanities Education, with concentrations in English education, foreign language education, and reading education. Please contact the appropriate unit for further information.

Educational Psychology

Under Counselor Education and Counseling Psychology, the minimum number of hours required for the concentration in counselor education is 79. Under Psychoeducational Studies, the minimum number of hours required is 89. Residency is two consecutive semesters. The concentration in counselor education requires a year-long practicum sequence and the equivalent of a year’s full-time work as an intern in an appropriate counseling setting. It also requires supervised practicum experience in classroom teaching. Coursework in statistics and research design is a requirement for all concentrations/programs. All doctoral students take written comprehensive examinations in the program concentration, supporting specialization and cognate areas. The guidelines for each program concentration may be consulted for further requirements.

Leadership Studies in Education

For the Ed.D. program under Leadership Studies, with concentrations in adult education, educational administration and supervision, and
Human Performance and Sport Studies

The Doctor of Education with a major in Human Performance and Sport Studies is available under Cultural Studies in Education with concentrations in motor behavior and sociocultural foundations (history, philosophy, sociology); under Exercise Science with a concentration in exercise science (exercise physiology/fitness, kinesiology/sports medicine). Please consult the appropriate unit for further information.

THE DOCTOR OF PHILOSOPHY PROGRAM

The intercollegiate Ph.D. program with a major in Education provides five concentrations. The units participating in the Ph.D. program are 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; Psychoeducational Studies; and Rehabilitation and Dearthness.

The program requirements are:

**Requirements Minimum Hours**

<table>
<thead>
<tr>
<th>Research Area</th>
<th>14</th>
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<tbody>
<tr>
<td>Foreign or Computer Language (demonstrate proficiency)</td>
<td>6</td>
</tr>
<tr>
<td>General Core Requirements</td>
<td></td>
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<tr>
<td>--History and philosophy of education, (both areas must be represented)</td>
<td>4</td>
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<tr>
<td>--Learning theory and curriculum (both areas must be represented)</td>
<td>4</td>
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<tr>
<td>--Administrative theory</td>
<td>2</td>
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<tr>
<td>--Trans-college seminar: three consecutive semesters (including summer)</td>
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<tr>
<td>Alternative Core Requirements</td>
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<tr>
<td>--Courses in philosophy of science</td>
<td>3</td>
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<tr>
<td>--Trans-college Seminar: three consecutive semesters (including summer)</td>
<td>3</td>
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<tr>
<td>--Seminar in area of specialization</td>
<td>3</td>
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<tr>
<td>--Courses in learning theory/group or independent study</td>
<td>3</td>
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<tr>
<td>Concentrations</td>
<td></td>
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<tr>
<td>--Primary Concentration: A minimum of 16 hours normally selected from one or two specializations within the primary concentration</td>
<td>16</td>
</tr>
<tr>
<td>--Supporting Specialization: A minimum of 9 hours selected from a specialization in a concentration other than the primary concentration</td>
<td>9</td>
</tr>
</tbody>
</table>

Cognate

--A minimum of 6 hours selected from outside the college in addition to the designated research courses | 6 |

**Dissertation** 24

The concentrations and specializations are:

**Administrative Theory and Practice**

Specializations:
1. School administration
2. Higher education administration
3. Organizational leadership and policy studies

**Theories of Curriculum Development and Foundations of Education**

Specializations:
1. Anthropological, historical, philosophical, and sociological bases for educational planning and curriculum
2. Principles and models for planning, developing, and evaluating educational programs
3. Research design for educational programs

**Instructional Theory and Practice**

Specializations:
1. Principles and models for instructional improvement
2. Elementary and early childhood instruction and practices
3. Secondary/community colleges: (English, foreign language, mathematics, science, social studies education)
4. Elementary: mathematics, science, social studies education
5. Reading education
6. Instructional media and technology
7. Special education and rehabilitation

**Theories and Practice of Educational and Personal Adjustment**

Specializations:
1. Counselor education
2. Counseling psychology
3. Educational psychology
4. School psychology

**Foundations of Human Movement**

Specializations:
1. Exercise Science: Kinesiology/Sports Medicine
2. Motor Behavior: Motor Control
4. Sociocultural Foundations of Sport: Sport History
5. Sport Philosophy
6. Sport Sociology

For the Ph.D. with a major in Education under Counselor Education and Counseling Psychology and under Psychoeducational Studies, two applications are required: one for the Ph.D. in Education program and one for the unit that specifies which specialization is desired, in addition to the application for admission to The Graduate School.

Under Counselor Education and Counseling Psychology, the following minimum number of hours is required in each program specialization: counseling psychology, 98; counselor education, 98; educational psychology, 92. Residence is three consecutive semesters of full-time coursework. The program requires coursework in both a supporting specialization and a cognate area, as well as either foreign language or computer proficiency. Coursework in statistics and research design is a requirement in all specializations. Pre-dissertation research participation is also a requirement. The specializations in counseling psychology and counselor education each require a year-long practicum sequence and the equivalent of a year's full-time work as an intern in an appropriate counseling setting. The specializations in educational psychology and counselor education also require supervised practicum experience in classroom teaching.

Under Psychoeducational Studies, the following minimum number of hours is required in each program specialization: educational psychology, 92; school psychology, 97.

The guidelines for each program specialization may be consulted for further requirements.

MINOR IN GERONTOLOGY

Graduate students in the units of Counselor Education and Counseling Psychology, Exercise Science, or Psychoeducational Studies, may pursue a specialized minor in gerontology. This minor gives the student an opportunity for combining the knowledge about aging in American society with his/her major concentration. Please consult 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 Curriculum and Instruction (concentration in foreign language education—track 1 only) is available to residents of the state of Louisiana. The Ph.D. program in Education is available to residents of the state of Arkansas (concentration in administrative theory and practice only). The M.S. program in Human Performance and Sport Studies (concentration in motor behavior) is available to residents of Georgia. The M.S. in Rehabilitation Counseling is available to residents of Alabama. The M.S. program in Special Education is available to residents of the state of Kentucky (concentration in hearing impaired or early childhood special education), South Carolina or Virginia (concentration in hearing impaired only), or West Virginia. 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 students' programs. May be repeated. Maximum 6 hrs. S/NC or letter grade. E

520 Research: Analysis and Application (3) Analysis of research on instruction. Translation and application of research findings into instructional performance. Prereq: Consent of instructor. E, S

540 Topics in Instructional Research (1-3) Special conferences, workshops, and in-service programs. May be repeated. Maximum 6 hrs. S/NC only. E
Education in the Sciences, Mathematics, Research, and Technology

(College of Education)

MAJOR

DEGREES

Curticism and Instruction .......... M.S., Ed.S., Ed.D. Education .......... Ph.D.

M. E. Myer, Leader

Professors:

Butefish, William L., Ed.D. ............... Texas Tech

Dessart, Donald J., Ph.D. ............... Maryland

Doak, E. Dale, Ed.D. ............... Colorado

French, Russell L., Ph.D. ............... Ohio State

Fransen, Henry, Ph.D. ............... Illinois

McIntyre, Lonnie D., Ed.D. ............... Indiana

Myer, M. E., Ph.D. ............... Florida

Ray, John R., Ed.D. ............... Tennessee

Roeske, C. E., Ph.D. ............... Ohio State

Associate Professor:

Grant, A. D., Ph.D. ............... Wisconsin

Assistant Professor:

Barden, Laura M., Ph.D. ............... Maryland

Robinson, Stephanie O., Ph.D. ............... Florida

Smith, Michael, Ph.D. ............... Tennessee

591Clinical Studies (4) Group or 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.

601Trans-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. S/N only. E

602Registration for Use of Facilities (1-15) 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/N only. E

503Problems in lieu of Thesis (2-3) May be repeated. Maximum 6 hrs. S/N only. E

516Seminar (1-3) Curriculum, instructional technology, elementary education, secondary education, or social foundations as related to goals of students' programs. May be repeated. Maximum 6 hrs. S/N only. E

516Seminar (1-3) Curriculum, instructional technology, elementary education, secondary education, or social foundations as related to goals of students' programs. May be repeated. Maximum 6 hrs. S/N only. E

518Educational Specialist Research and Thesis (3) May be repeated. P/NP only. E

520Techniques of Research in Education (3) Study and application.

522Teaching Mathematics in Elementary and Middle Schools (3) Instructional strategies for helping elementary school children learn mathematics. Examination, development, and use of materials for creating active learning environments. Prereq: 443 or equivalent or consent of instructor. F, Su

531Teaching Science in Elementary and Middle Schools (3) Recent trends in methods, materials and content in teaching elementary school science. Prereq: Course in teaching elementary school science or consent of instructor.

555Curriculum Evaluation and Program Improvement (3) Historical background and importance of educational evaluation in relation to curriculum development. Understanding systematic curriculum evaluation approach and applying it to improve program development and implementation. Prereq: Consent of instructor. E

541The High School Curriculum (3) Identification of problems associated with curriculum study. Tennessee curriculum framework, assessment of trends in programs of local, regional, and national significance. E

557The Junior High and Middle School Curriculum (3) Curriculum and instructional design for junior high and middle school. Examination of students' curricular designs, instructional patterns, and organization and structure of junior high and middle school. Sp, Su

558Curriculum Planning and Development (3) Foundations and principles of curriculum planning and development. Historical and theoretical analysis of curriculum theory, principles of planning and development, and classroom applications for improved learning. E

561Educational Statistics (3) Applications of descriptive and inferential statistics to educational and instructional problems. Use of elementary calculus in educational research. Prereq: One year of college mathematics, an elementary course in statistics, or consent of instructor. F, Su

565Instructional Trends and Issues in Science Education (3) Analysis of current trends in science instruction, instructional issues facing elementary, secondary, and community college science teachers, and application of learning theory to teaching biological, physical, and environmental sciences. Prereq: 406, 422, or equivalent.

566Administering Instructional Media Programs (3) Leadership roles and responsibilities of professional media administrator in variety of organizational settings. F

569Advanced Production of Audiovisual Software (3) Hand and mechanical lettering, flat picture mounting, laminating, overhead projection, audio production, TV studio orientation, synch-taping, multi-screen presentation, and printing techniques. (Same as Information Sciences 568.) Sp, Su

573Utilization of Educational Television and Radio (3) Television and radio as instructional and training media. Selecting, making and evaluating instructional training video and audio tapes. F

577Introduction to Data Processing in Curriculum and Instruction (3) Analysis of current activities in educational computing and data processing. Critical reading of research and development of skills needed for proposal development. E

581Seminar in Mathematics Education (3) Current issues influencing instruction in mathematics in schools, elementary through college. Related teaching methodologies. Opportunities for work on special problems. Prereq: Undergraduate course in teaching of mathematics. Su

582Teaching Enrichment Mathematics in Middle and Junior High Schools (3) Topics to enrich middle
and/or junior high mathematics, Geometrical, laboratory, and problem solving activities. Special attention to metric system. Opportunities for individual projects. Prereq: 581, Su

583 Teaching Mathematics in Senior High Schools and Community Colleges (3) Topics appropriate for high school and community/junior college mathematics curriculum. Special problems related to enrichment, problem solving, and use of microcomputers. Opportunities for special projects. Prereq: 581, F,Sp

586 Teaching Probability & Statistics (3) Teaching of probability and statistics in schools, elementary through college. Probabilities and statistical experiments, demonstrations, and applications. Prereq: 581, F

588 Instructional Theory and Design (3) Relationship of curriculum to instruction; examination of instructional and related learning theories; instructional models and teaching styles. E

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

596 Curricular Trends and Issues in Science Education (3) Analysis of elementary and secondary curriculum projects and instruction related to instruction, physical, and environmental sciences. Impact of current learning theories on future curriculum development projects. Prereq: 496, 422, or equivalent. Prereq or coreq: 565 or consent of instructor.

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

623 Using Research for Curriculum Improvement (3) Research methodology, application to descriptive/survey curricular materials. Critical reading of research, methodological development in descriptive and survey areas. So


669 Instructional Media Research (3) Identification, location, and collection of developmental and experimental research on instructional media. Application of research. Sp

671 Advanced Educational Statistics (3) Applications of parametric and non-parametric statistical inference to educational and psychological problems. Use of microcomputers in educational research. Prereq: 561, Sp,Su

672 Interpretation and Application of Curriculum and Instruction Research (3) Analysis of research in curriculum and instruction, newer methodologies and strategies. Utilization of research to improve curriculum and instruction practice, application of research principles in context of specific professional assignments. Prereq: Consent of instructor. Sp

675 Curriculum Evaluation: Theory and Application (3) Evaluation trends and issues. Theoretical frameworks to design evaluation studies for various educational programs. Sp

676 Curriculum Theory (3) Influential curriculum theories and approaches, implications for structure and design of educational programs. Nature and function of theory, theory building activities. Prereq: Consent of instructor. E

683 Advanced Studies in Elementary School Mathematics (2) Research in elementary school mathematics. Prereq: Graduate course in mathematics education or consent of instructor. Sp

689 Internship (1-3) Experiences in application of principles and practices of curriculum development and instructional improvement. Prereq: Program prerequisites and consent of instructor. May be repeated. Maximum 9 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

696 Research Trends in Science Education (3) Analysis of current research trends in science education and relationship of such trends with broader educational community. Prereq: 626.

Electrical and Computer Engineering

(College of Engineering)

MAJOR DEGREES

Electrical Engineering M.S., Ph.D.

R. C. Gonzalez, Head

Professors:
Alexeff, Igor, PE, Ph.D. ................. Wisconsin
Bailey, J. Milton, Ph.D. ................. Georgia Tech
Birdwell, J. Douglas, Ph.D. ............. MIT
Bishop, Ase O., Jr., Ph.D. .............. Clemson
Blaiack, T. Vaughn, Ph.D. .............. Tennessee
Bodenheimer, Robert E., Ph.D. ....... Northwestern
Bose, Bimal K. (Condra Chair of Excellence), Ph.D. ............ Calcutta
Bouldin, Donald W., PE, Ph.D. ....... Vanderbilt
Gonzalez, R. C. (Distinguished Prof.), Ph.D. ................................................................. Florida
Hoffman, Graham W., Ph.D. ........... Harvard
Hung, James C. (Distinguished Prof.), PE, Ph.D. .......... New York
Kennedy, Eldredge J., PE, Ph.D. ....... Tennessee
Lawler, Jack S., Ph.D. .................... Michigan State
Leffell, Will O. (Emeritus), M.S. ...... Tennessee
Neff, Herbert P., PE, Ph.D. .......... Auburn
Pace, Marshall O. (Liaison), PE, Ph.D. ................................................................. Georgia Tech
Pierce, J. Frank (Distinguished Prof.) (Emeritus), PE, Ph.D. ...... Pittsburgh
Pujo, Alfonso Jr. (UTSI), Ph.D. ....... Vanderbilt
Roberts, M. J., Ph.D. ................. Tennessee
Rochelle, Robert W. (Emeritus), Ph.D. ................................................................. Maryland
Roth, J. Rose, Ph.D. .................. Cornell
Symonds, Frederick W., Ph.D. ....... Nottingham
Tillman, James D. (Emeritus), Ph.D. ...... Auburn
Trivedi, Mohan M., Ph.D. ............ Utah State
Wesvar, Charles H. (Emeritus), PE, Ph.D. ................................................................. Wisconsin

Associate Professors:
Abidi, M. A., Ph.D. ................. Tennessee
Bomar, Bruce W. (UTSI), Ph.D. .......... Tennessee
Brzakovik, Dragana, Ph.D. ........... Florida
Cirulli, Paul B., Ph.D. ................. New Mexico State
Cirullo, Roy D. (UTSI), Ph.D. .......... Case Western
Kosh, Daniel, Ph.D. ................... Missouri (Rolla)
Rosenberg, David, Ph.D. .............. New York
Rochelle, James M., Ph.D. .......... Tennessee
Walker, J. Wayne, Ph.D. .............. Tennessee

Assistant Professor:
Smith, L. Montgomery (UTSI), Ph.D. ................................................................. Tennessee

The Electrical and Computer Engineering Department has a graduate committee to administer, promote, and advance the general well-being of the graduate program.

The Department of Electrical and Computer Engineering and the Department of Nuclear Engineering jointly offer an advanced 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 and Computer 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 may be 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 580 on the TOEFL exam to be considered for admission to the program. The TOEFL must have been taken in the past two years.

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 and computer 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 and Computer 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.C.E. Graduate Committee.
3. An additional 12 semester hours of 500-level work in electrical and computer engineering courses or 6 semester hours of 500-level work in one area of electrical and computer 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 and computer 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, electromagnetics, systems, plasma engineering, power systems, solid-state electronics, and control systems. The Ph.D. degree requires the student to:

1. A Master's degree in Engineering or a closely related field.
2. A minimum of 48 semester hours of coursework beyond the B.S. degree excluding thesis, research, and dissertation credit.
3. A minimum of 24 semester hours of work in electrical and computer engineering courses at the 500 and 600 levels.
4. 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.
5. A minimum of 12 hours of mathematics courses approved by the Electrical and Computer Engineering Graduate Committee.
6. A minimum of 18 hours of courses approved by the Electrical and Computer Engineering Graduate Committee.

GRADUATE COURSES

Note: Courses required in the Electrical and Computer Engineering undergraduate curriculum cannot be used in either the M.S. or Ph.D. programs. No 600-level course may be used toward a graduate degree in Electrical and Computer Engineering except when required by the program.

405 Digital Signal Processing and Filter Design (3) Discrete-time signals and systems, sampling, discrete Fourier transforms, analog filter characteristics, nonreciprocal and recursive filter design, and CDF tools for filter design. Includes laboratory experiments and projects.


412 Linear Control System Design (3) Classical and modern techniques for design and compensation of linear feedback control systems. Prereq: Linear System Analysis.

413 Passive and Active Network Synthesis (3) Review of network analysis techniques; passive network driving point synthesis, transfer function synthesis, approximation theory, topics in active network synthesis. Prereq: Electrical Engineering.

421 Electric Energy Systems (3) Structure and operation of electrical energy grids; load flow; economic loading; planning; control; reliability. Balanced and unbalanced faults; system protection; system stability. Prereq: Electric Energy System Components.

422 Machines (4) Dynamic behavior of rotating machines; transfer functions for common modes of operation of d-c machines; response to different waveforms in supply; describing equations for a.c. machines and their numerical solutions. Includes laboratory experiments and projects. Prereq: Electric Energy System Components.

423 Power Electronics (4) Principles and characteristics of power semiconductor devices, single-phase and three-phase power electronic circuits, converter control, ac phase control, voltage-fed inverter and device converter principles, industry applications. Includes laboratory experiments and projects. Prereq: Electric Energy System Components.


425 Direct Electrical Energy Conversion (3) Principles and practices of energy conversion devices and inverter design to loads, rectifiers, thermoelectrics, MHD, and fuel cells. Prereq: Electric Energy System Components.

431 Digital and Analog Integrated Circuits (4) Basic semiconductor and fabrication of active and passive components for monolithic integrated circuits, characteristics of bipolar, MOS, and JFET transistors in digital and analog circuits; standard digital gates and inverters; NMOS and CMOS, and GaAs gates and arrays; design concepts for op-amps, comparators, references, regulators, and other linear functions. Includes laboratory experiments and projects. Prereq: Electronic Circuits.

432 Analog Signal Processing Electronics (4) Transducer signal and interfacing characteristics; analog integrated circuits: operational, instrumentation, and isolation amplifiers, op-amps, and integrators; multiplexers, mixers, and adders. Interfacing and vernier design, sampling, and signal conversion. Prereq: Electronic Circuits.

433 Electronic Amplifiers (4) Feedback amplifier principles; transistor amplifier design; audio power supply design; oscillator principles. Includes laboratory experiments and projects. Prereq: Electronic Circuits.


442 Antennas and Propagation (3) Linear antennas, array theory, simple antenna antennas, antenna gain, impedance, communication link parameters. Wave propagation in earth bound free space, earth's troposphere and ionosphere. Reflections from earth; effects on link reliability. Prereq: Fields.


451 Microprocessors in Computer Engineering (4) Project-oriented course using microcomputer kit having microprocessor program and development system with cross- assembler, file management, and emulation capability. Interfacing and hardware/software trade-offs in interrupt driven architectures. Term grade dependent on project completed, homework solutions, and laboratory work. Includes laboratory experiments and projects. Prereq: Introduction to Logic Design of Digital Systems.


453 Data Acquisition Systems (4) Digital-to-analog conversion techniques: Quant and R-Z-FI ladder network; error analysis of D/A converters; sample hold circuits; digital-to-analog conversion techniques: open loop systems; direct and matrix converters; closed loop systems; dual slope and successive approximation; error analysis of A/D converters; accuracy, linearity, drift, offset, range, frequency, power, and shielding; software engineering of A/D and D/A converters; device service routines; signature analysis. Includes laboratory experiments and projects. Prereq: Introduction to Logic Design of Digital Systems.

454 Open System Interconnection Reference Model Protocols (3) OSI reference model based networks. MAP and TCP: material from ISO standards, Draft Inter-
503 Modern Transform Methods (3) Frequency-domain transform methods, roll-off considerations, phase, and timing, anti-imaging, and anti-aliasing. Prereq: Consent of instructor.

504 Random Process Theory for Engineers (3) Probability and random variables as applied to stochastic processes and random signals. Prereq: Probability and random processes.

505 Digital Signal Processing I (3) Discrete-time signals and systems, sampling, analysis and synthesis of discrete-time signals and systems. Prereq: Consent of instructor.

506 Digital Signal Processing II (3) Filter properties in the Z and Fourier transform domains, structures for digital filters, and hardware implementation of digital filters.


511 Linear Systems Theory (3) State space models of linear dynamic systems, time-domain, and frequency-domain analysis and design. Prereq: Consent of instructor.

512 Multivariable Linear Control System Design (3) Design of controllers for multivariable systems, including disturbance rejection, command following, and robustness. Prereq: Consent of instructor.

515 Adaptive Control and System Identification (3) Adaptive control of linear deterministic and stochastic systems, adaptive filtering and prediction, parameter estimation, and robustness. Prereq: Consent of instructor.

517 Introduction to Pattern Recognition (3) Design of learning and adaptive machines. Elementary decision theory, perception algorithms, and machine learning algorithms. Prereq: Consent of instructor.

518 Control Systems Design I (3) Linear control systems, variable structure control, feedback systems, and control theory. Prereq: Consent of instructor.

519 Control Systems Design II (3) Nonlinear control systems, variable structure control, and control theory. Prereq: Consent of instructor.


522 Power Systems Analysis II (3) Operation and control of interconnected power systems, transient stability and dynamic stability. Formulation and solving problems in matrix-vector form with application to large-scale power systems. Prereq: Consent of instructor.

523 Power Electronics and Drives (3) Forced commutation, forced commutation inverters, advanced PWM techniques, and current-fed inverters. Prereq: Consent of instructor.

524 High Voltage Systems (3) Phenomena, measurement techniques, and insulation techniques in high voltage systems. Prereq: Consent of instructor.

528 Advanced Electrical Machines I (3) Fundamental processes of electromechanical energy conversion; application in conventional and alternative electrical systems. Prereq: Consent of instructor.

531 Advanced Analog Electronics I (3) Physical operation of modern electronic devices: semiconductor diodes, bipolar transistors, J-FETs, and MOS-FETs. Prereq: Consent of instructor.

532 Advanced Analog Electronics II (3) Design and analysis of high-frequency, wide-band, and low-noise amplifiers and radio-frequency amplifiers using discrete, monolithic, and hybrid devices: voltage and current regulators, switching regulators, and specialized electronics systems in analog signal processing. Prereq: Consent of instructor.

541 Electromagnetic Fields (3) Maxwell's equations, special relativity, wave reflection and transmission, generation, propagation, and scattering. Prereq: Consent of instructor.


551 Plasma Diagnostics I (3) Principles of active, passive, perturbing and nonperturbing diagnostic methods used in low temperature plasmas, and high temperature plasmas of interest in fusion research. Prereq: Consent of instructor.

552 Plasma Diagnostics II (3) Principles of active, passive, and nonperturbing diagnostic methods used in low temperature plasmas, and high temperature plasmas of interest in fusion research. Prereq: Consent of instructor.

556 Industrial Plasma Engineering I (3) Continuation of 551. Principles of active, passive, perturbing, and nonperturbing diagnostic methods used in low temperature plasmas, and high temperature plasmas of interest in fusion research. Prereq: Consent of instructor.

557 Industrial Plasma Engineering II (3) Continuation of 552. Principles of active, passive, perturbing, and nonperturbing diagnostic methods used in low temperature plasmas, and high temperature plasmas of interest in fusion research. Prereq: Consent of instructor.

558 Industrial Plasma Engineering III (3) Continuation of 557. Principles of active, passive, perturbing, and nonperturbing diagnostic methods used in low temperature plasmas, and high temperature plasmas of interest in fusion research. Prereq: Consent of instructor.

559 Industrial Plasma Engineering IV (3) Continuation of 558. Principles of active, passive, perturbing, and nonperturbing diagnostic methods used in low temperature plasmas, and high temperature plasmas of interest in fusion research. Prereq: Consent of instructor.

560 Industrial Plasma Engineering V (3) Continuation of 559. Principles of active, passive, perturbing, and nonperturbing diagnostic methods used in low temperature plasmas, and high temperature plasmas of interest in fusion research. Prereq: Consent of instructor.

561 Industrial Plasma Engineering VI (3) Continuation of 560. Principles of active, passive, perturbing, and nonperturbing diagnostic methods used in low temperature plasmas, and high temperature plasmas of interest in fusion research. Prereq: Consent of instructor.

562 Industrial Plasma Engineering VII (3) Continuation of 561. Principles of active, passive, perturbing, and nonperturbing diagnostic methods used in low temperature plasmas, and high temperature plasmas of interest in fusion research. Prereq: Consent of instructor.

563 Industrial Plasma Engineering VIII (3) Continuation of 562. Principles of active, passive, perturbing, and nonperturbing diagnostic methods used in low temperature plasmas, and high temperature plasmas of interest in fusion research. Prereq: Consent of instructor.

564 Industrial Plasma Engineering IX (3) Continuation of 563. Principles of active, passive, perturbing, and nonperturbing diagnostic methods used in low temperature plasmas, and high temperature plasmas of interest in fusion research. Prereq: Consent of instructor.
using various sensing modalities. Selected topics 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. E


614 Optimal Control (3) Deterministic and stochastic dynamic programming in continuous and discrete time, minimum principle and matrix minimum principle, computational methods in optimal control. Prereq: 511.

617 Special Topics in Systems Theory I (1) Topics of current interest to students and faculty: large scale systems, model order reduction, algebraic and geometric system theories, and advanced design methods. Prereq: 503 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: 517.

623 Advanced Power Electronics and Drives (3) Phase-controlled converters, cycloconverter-fed ac drives, resonant converters, vector and scalar control of synchronous machines, static Kramer drives, static Scherbius drives, VSCG generation, modern control theory in ac drives.

624 Electrical Insulation (3) Principles, testing, and case studies. Basic principles of aging, losses, charging, conduction, and breakdown in vacuum, gas, liquid, solid, and composite insulation systems. Testing with low-voltage instrumentation, pulse height analysis, optics, acoustics, and bridges; associated statistics and distributed parameter effects. Gas studies drawn from active research, power systems, electronic circuits and devices, shielding, and stress grading. Prereq: 503, 504, and consent of instructor.

631 Advanced Topics in Electronic Instrumentation I (3) Based on particular interests of students. Fundamental physical processes in instrumentation transducers: thermoelectric, magnetoelectric, electromechanical and quantum-mechanical devices. Prereq: 531-02 and consent of instructor.


643 Detection and Estimation Theory (3) Detection theory; coding theory; system identification. SignaLS with unknown parameters: optimal filter synthesis, adaptive systems; sequential detection; suboptimal detection. Prereq: 504 or consent of instructor.

644 Coding and Information Theory (3) Structure of algebraic and probabilistic codes; linear codes, convolutional codes, error-correcting codes, decoding methods, identification schemes: deterministic, stochastic, and hierarchical methods. Prereq: 543.

651 Computer-Aided Design of VLSI Systems I (3) Fabrication of microelectronic devices; computer architecture design; algorithmic state machines; partitioning; structured design methodology. Prereq: 551-02 or consent of instructor.

652 Computer-Aided Design of VLSI Systems II (3) Computer-aided design of design and implementation of fully custom very large scale integrated (VLSI) circuits; design for testability; testing of fabricated chips. Prereq: 651.

663 Advanced Plasma Physics I (3) Basic concepts of high-temperature plasma physics. Magneto-hydrodynamics and kinetic description of plasma, plasma transport, plasma waves, equilibrium, and stability. Prereq: Physics 541-02, 611 or 574 or consent of instructor. (Same as Physics 653.)

664 Advanced Plasma Physics II (3) Plasma heating and radiation phenomena. Advanced topics of current interest. Must be taken in sequence. Prereq: 663.

671 Image Processing and Robotics I (3) Three-dimensional scene modeling and recognition, multi-sensor systems. Prereq: 575 or 576 or consent of instructor.

672 Image Processing and Robotics II (3) Stereovision, shape theory. Prereq: 671.

673 Image Processing and Robotics III (3) Time-varying imagery, path planning and navigation. Prereq: 672.

681-92 Quantum Electronics I (3) Prereq: Consent of instructor.

691 Advanced Graduate Seminar (1) Research in department. May be repeated. S/NC or letter grade.

692 Special Topics (1-3) Advanced topics of current interest to Ph.D students in Electrical Engineering. May be repeated. Maximum 9 hrs.

693 Advanced Topics in Quantum Electronics (1) Prereq: 681.

Engineering Science and Mechanics (College of Engineering)

MAJOR

DEGREES

Engineering Science ....................... M.S., Ph.D.

T. G. Carley, Acting Head

Professors:

Antar, B. (UTSI), Ph.D. ..................... Texas

Baker, A. J., PE, Ph.D. ................... New York

Carley, T. G. (Laison), PE, Ph.D. .......... Illinois

Forrester, J. H., PE, Ph.D. ............... Iowa State

Kim, K. H., Ph.D. ......................... NC State

Krieg, R. D., Ph.D. ....................... New Mexico

Landes, J. D., PE, Ph.D. ................. Lehigh

Lee, C. W. (Emanuel), Ph.D. .......... Illinois IT

McCay, M. H. (UTSI), PE, Ph.D. ........ Florida

McCay, T. D. (UTSI), PE, Ph.D. ........ Auburn

Pih, H. (Emeritus), PE, Ph.D. .......... Illinois IT

Remenyik, C. J. (Emeritus), Ph.D. ....... Johns Hopkins

Snyder, W .T., Ph.D............................... Northwestern

Shahroki, F. (UTSI), Ph.D................. Oklahoma

Soliman, O., PE, Ph.D. ................... Tennessee

Stoneking, J. E., PE, Ph.D. .............. Illinois

Wasserman, J., PE, Ph.D. ............... Cincinnati

Weitsman, Y. J., Ph.D. ................. Rensselaer

Associate Professors:

Boulet, J. M., Ph.D........................... Stanford

Caruthers, J. E. (UTSI), Ph.D. ....... Georgia Tech

Engels, R. C. (UTSI), Ph.D. ............. VPI

Madhukar, M. S., Ph.D. ................. Drexel

Matthews, A., PE, Ph.D. ............... Illinois

Steinhoff, J. S. (UTSI), Ph.D. .......... Chicago

Assistant Professors:

Caezaux, J. L., Ph.D.......................... Rensselaer

Iannelli, G. S., Ph.D. .................... Tennessee

Poncke, C. D., PE, Ph.D. ............... Georgia Tech

Yu, N., Ph.D. .............................. California (San Diego)

Graduate programs leading to the degrees of Master of Science and Doctor of Philosophy with a major in Engineering Science are available to graduates of recognized curricula in engineering, mathematics, or one of the physical or biological sciences. Program concentrations include solid mechanics, fluid mechanics, computational mechanics, biomedical engineering, and optical engineering (UTSI only). In each of these concentrations, interdisciplinary programs are arranged to meet individual needs or interests. Each applicant is advised as to any prerequisite courses before entering a program; the student's program of study must be approved by his/her advisory committee, and must comply with the requirements of The Graduate School. The student's major professor may be selected from a department other than the Department of Engineering Science and Mechanics; however, at least one member of the student's graduate advisory committee must be on the faculty of the Department of Engineering Science and Mechanics.

A departmental application is required in addition to The Graduate School application. The names and addresses of four references must be included with the departmental application. The general GRE is required of all international applicants for admission.

The flexibility and interdisciplinary aspect of the program concentrations are intended to be of particular interest to prospective students currently employed in research, development, or design activities and whose interests in continuing education (either full-time or part-time) lie at one of the interfaces between science and engineering or can best be met by interdisciplinary study in engineering. The department'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.

THE MASTER'S PROGRAM

Two M.S. options are offered: option I requires a thesis, while option II does not. The second plan is restricted to those students who have had significant engineering professional work experience.

In option I, a minimum of 30 semester hours including the thesis is required. In option II, a minimum of 33 hours is required. The requirements include the following:

Hours Credit E

Mathematics 6 6

Engineering courses' (Major concentration may include but is not restricted to courses offered by)
and comprehensive examinations, the student and an oral portion. The committee and shall consist of both a written

462 Fluid Mechanics II (3) Differential forms of basic laws: compressibility, isentropic flow, shocks, duct flows with heat transfer and friction; open channel flow, critical flow, energy methods; internal and external viscous flows, boundary layers, elementary turbulent closure models. Prereq: 341, Mathematics 231.

471 Clinical Engineering and Bioloinstrumentation (3) Function and characteristics of health care delivery systems; hospital organization and health care econom-


GRADUATE CREDIT FOR 400-LEVEL COURSES

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.

GRADUATE COURSES

421 Materials of Engineering (3) Mechanical properties of engineering materials; data collection and processing; time dependent and cyclic dependent properties. Prereq: 251, Materials Science and Engineering 201. 3 hrs or 2 hrs and 1 lab.

423 Fracture-Safe Design (3) Critical review of variables controlling fracture toughness: part and flaw geometry, temperature, loading rate, section size, material, characterization of fracture toughness by stress intensity factors, strain energy release rates, J integral, COD data, transition temperature; use of fracture toughness data in design. Prereq: 321 and Materials Science and Engineering 201. (Same as Materials Science and Engineering 475.) 3 hrs or 2 hrs and 1 lab.

431 Fundamentals of Vibrations (3) Free and forced vibrations of damped and undamped lumped parameter systems; energy methods; free vibration of continuous bodies. Prereq: 231, Mathematics 231.

433 Dynamic Systems (3) Three dimensional dynamics of particles and rigid bodies; gyroscopes; variable mass systems; central force motion; Lagrange's equations; stability; transfer functions. Prereq: Dynamics.

435 Engineering Acoustics (3) Concepts of acoustics, measures of sound and their units; noise generation and transmission, noise control principles and application, materials and procedures for noise abatement. Prereq: Introductory course in vibrations or acoustics.


523 Theory of Elasticity (3) Equations of equilibrium; strain energy, strain energy potential, rigid body motion, Lagrange's equations, isostatics, stress fields. Prereq: 321.

525 Theory of Plates (3) Classical bending theory of thin plates; buckling and large deflection problems. Prereq: 523 or 535.


529 Fatigue of Engineering Materials (3) Fatigue life prediction, crack initiation, fatigue crack propagation; Variable amplitude loading, multi-axial loading, environmental fatigue, creep fatigue, metallurgical and microstructural variables; X-ray, neutron, and acoustic techniques. Prereq: Consent of instructor.


536 Advanced Engineering Acoustics (3) Introduction to theory and application of acoustics; analytic vibration of continuous systems, plane and spherical waves, transmission phenomena, reflection, and scattering. Resonance, filters, active and passive techniques, microphones, ultrasonic, sonar transducers. Prereq: 431 or 439.

539 Continuum Mechanics (3) Cartesian tensors, transformation laws, basic continuum mechanics concepts; stress, strain, deformation, constitutive equations. Conservation laws; stress analysis. Applications in solid and fluid mechanics.

541 Fluid Dynamics (3) Kinematic, kinematic and thermodynamic properties of fluids. Development of rate deformation laws; mass, momentum and energy conservation relationships; non-dimensionalization. Applications of Euler and Navier-Stokes equations; exact solutions; potential flow, transonic, boundary layer approximations; coupled heat/mass transfer models. Coreq: 598.

542 Fluid Dynamics II (3) Development of basic continuum concepts and partial differential equations for turbulence and laminar flow field. Formulation for correlation functions, energy spectra, diffusion. Introduction to turbulent transport processes, closure models and turbulence use; basic theory of engineering turbulence closure models; examination of modern numerical and experimental methods. Prereq: 541.

550 Numerical Heat and Mass Transfer (3) (Same as Mechanical Engineering 510.)


552 Computational Fluid-Thermal Analysis (3) Construction of numerical solution algorithms for various Navier-Stokes equations systems: weak statement theoretical framework; non-linear, convection, buoyancy, and turbulence flows. Incompressible Navier-Stokes equations; streamfunction-vorticity and vortical variables algorithms; VGRS, Bubnov-Galerkin, and coordinate imbedded boundary penalty algorithms unified. Theoretical concepts of completeness, accuracy, convergence and stability, gradient boundary conditions, unsteady problems, free surface flow, flows with massive separation, thermally driven buoyant flows. Efficient three-dimensional algorithms, modifications to reproduce finite difference, finite volume and finite element constructions. Computer project. Prereq: 551. (Same as Mechanical Engineering 552.)

553 Computational Solid Mechanics (3) Finite element analysis techniques in structural mechanics and plasticity, non-linear, large deformation, two and three dimensional formulations, isoparametric elements, numerical integration. Equation solving; substructuring, skyline solvers, matrix iteration techniques. Applications in beams, plates and shells: use of representative computer programs, networked mini-computer/work station environment; CAD, graphics, solids models, data base management. Prereq: 551. (Same as Mechanical Engineering 553.)

557 Computational Mechanics Seminar (1) Current developments in computational fluid/thermal/mechanical systems. For departmental thesis students only. May be repeated.

559 Computational Mechanics Laboratory (1) Utilization of networked x-terminal environment for work station environment for conducting computational mechanics experiments. May be taken for credit with each of courses 551, 552, 553, Coreq: 551. (Same as Mechanical Engineering 559.)

562 Experimental Mechanics of Composite Material (3) Stress-strain relationships for orthotropic and transversely isotropic materials; analysis of composite laminas and laminate; stress and strain transformation; laminating plate theories; matrix interface, and composite mechanical properties (tensile, flexure, compressive, shear); physical properties; notch-tip stress field, stress intensity factor, notch sensitivity; strain energy release rate, composite fracture toughness; numerical methods and end effects. Mod. Lab. Prereq: 521 or consent of instructor. (Same as Materials Science and Engineering 562.)


565 Optical Engineering I (4) Wave optics; scalar diffraction theory; introduction to Fourier optics; ray or geometric optics, lenses, mirrors, gratings; paraxial design methods; introduction to aberrations.

566 Optical Engineering II (4) Statistical optics; spontaneous and induced emission; black and gray body radiation; incidence, reflection, and total internal reflection; mutual coherence function; detectors, radiometry. Prereq: 556.

571 Biomechanics of Hard and Soft Tissue (3) Introduction to terminology, physiology, and analytical methods for the mechanics of living tissue. Continuum mechanics analysis of hard and soft tissues, biological fluid flows. Flow properties of blood, menisci of blood in microvessels; biocollodial fluidity of fluids and solids, mechanical properties of blood vessels; skeletal, heart and smooth muscles, bone and cartilage. Research paper.


573 Advanced Topics in Structural Dynamics (3) Theory of the response of structures to dynamic loading. For advanced students. Prereq: Consent of instructor. May be repeated.

574 Advanced Topics in Computational Fluid Dynamics (3,3) Approximation theory; analysis of accuracy, convergence and stability; smooth solutions; shocks, artificial dissipation; two- and three-dimensional, compressible viscous and incompressible flows. For advanced students. Prereq: Consent of instructor. May be repeated.

575 Advanced Topics in Computational Fluid Dynamics (3) Theory of turbulence; isotropic and anisotropic turbulence, energy spectra. Kolmogorov's hypothesis, large and small eddy structure for turbulent flows; flow dissipation by continuous movement; applications to turbulent jets, wakes, pipe flow, and boundary layers. Prereq: 542. (Same as Aerospace Engineering 645.)

576 Advanced Topics in Computational Fluid Dynamics (3,3) Turbulence models; advanced turbulence models; large eddy simulation; sub-grid scale models. Prereq: Consent of instructor. May be repeated.


578 Advanced Topics in Computational Fluid Dynamics (3) Theory of turbulence; isotropic and anisotropic turbulence, energy spectra. Kolmogorov's hypothesis, large and small eddy structure for turbulent flows; flow dissipation by continuous movement; applications to turbulent jets, wakes, pipe flow, and boundary layers. Prereq: 542. (Same as Aerospace Engineering 645.)

579 Advanced Topics in Computational Fluid Dynamics (3) Theory of turbulence; isotropic and anisotropic turbulence, energy spectra. Kolmogorov's hypothesis, large and small eddy structure for turbulent flows; flow dissipation by continuous movement; applications to turbulent jets, wakes, pipe flow, and boundary layers. Prereq: 542. (Same as Aerospace Engineering 645.)

580 Advanced Topics in Computational Fluid Dynamics (3) Theory of turbulence; isotropic and anisotropic turbulence, energy spectra. Kolmogorov's hypothesis, large and small eddy structure for turbulent flows; flow dissipation by continuous movement; applications to turbulent jets, wakes, pipe flow, and boundary layers. Prereq: 542. (Same as Aerospace Engineering 645.)

581 Advanced Topics in Computational Fluid Dynamics (3) Theory of turbulence; isotropic and anisotropic turbulence, energy spectra. Kolmogorov's hypothesis, large and small eddy structure for turbulent flows; flow dissipation by continuous movement; applications to turbulent jets, wakes, pipe flow, and boundary layers. Prereq: 542. (Same as Aerospace Engineering 645.)

582 Advanced Topics in Computational Fluid Dynamics (3) Theory of turbulence; isotropic and anisotropic turbulence, energy spectra. Kolmogorov's hypothesis, large and small eddy structure for turbulent flows; flow dissipation by continuous movement; applications to turbulent jets, wakes, pipe flow, and boundary layers. Prereq: 542. (Same as Aerospace Engineering 645.)

583 Advanced Vibrations (3) Free and forced vibration of structures and systems; natural frequencies and mode shapes; transient response, frequency-domain and time-domain solutions; stability; shock and vibration isolation. Prereq: 535. (Same as Mechanical Engineering 583.)

584 Theory of Turbulence (3) Mathematical descriptions of turbulence; isotropic turbulence, energy spectra. Kolmogorov's hypothesis, large and small eddy structure for turbulent flows; flow dissipation by continuous movement; applications to turbulent jets, wakes, pipe flow, and boundary layers. Prereq: 552. (Same as Mechanical Engineering 584.)

585 Advanced Fluid Mechanics (3) (Same as Mechanical Engineering 585.)

586 Advanced Fluid Mechanics (3) (Same as Mechanical Engineering 586.)

587 Advanced Fluid Mechanics (3) (Same as Mechanical Engineering 587.)

588 Advanced Fluid Mechanics (3) (Same as Mechanical Engineering 588.)

589 Aerospace Engineering (3) Advanced topics in computational fluid/thermal/mechanical systems. For departmental thesis students only. May be repeated.

589 Advanced Topics in Artificial Intelligence (3) Advanced problems in mechanics, group or individually. Prereq: Consent of instructor. May be repeated with consent of department.
**THE MASTER'S PROGRAM**

**Requirements**

**Coursework:** A minimum of 24 semester hours in English beyond the B.A., to include 6 hours at the 600 level; 12 additional hours at the 500-600 level (Only 3 hours of 593 Independent Study may be applied toward the 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 regular 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, both consisting of the same sort of questions as the examination taken by the thesis student.

**Residence Requirement:** There is no residence requirement for the 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.

**Requirements**

The requirements for the writing concentration are the same as those for the thesis option above with the following exceptions:

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

**Writing Projects:** One of the following writing projects for six hours of credit:

1. A thesis, using research to analyze 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.

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

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

**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. to include at least 21 semester hours at the 600 level; at least 15 semester hours at the 600 level or above (only 3 hours of 593 Independent Study may be applied toward the M.A.); a special three-hour course in teaching composition; and 12 additional hours at any level, including the 400 level. Up to 6 of these additional hours may be taken in some other field such as history, philosophy, French. These courses must be drawn from those approved for graduate credit. All other coursework must be in the English department. In this coursework, students must normally maintain a 3.5 GPA.

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

**Language Requirement:** A language requirement met in one of the following ways:

1. Two languages approved by the Director of Graduate Studies in English. The requirement for each language may be fulfilled by (a) completion of French 302 or German 332 with a grade of B or better; (b) completion at UT Knoxville of any two courses on the 300 level or above in the foreign language or literature with at least a grade of B in each course; (c) passing of the regular Ph.D. foreign language examination as currently administered at UT Knoxville.

**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.

**Requirements**

The requirements for the writing concentration are the same as those for the thesis option above with the following exceptions:

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

**Writing Projects:** One of the following writing projects for six hours of credit:

1. A thesis, using research to analyze 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.

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

**Final Examination:** The reading list may be modified by the M.A. examining committee, meeting as a body with the student, to reflect the candidate's particular writing emphasis. However, most of the oral examination should focus upon the literature outlined in the original reading list.
Note. Students enrolling in English graduate courses must first register in the office of the Director of Graduate Studies in English at the 500 or 600 level and approved by the Director of Graduate Studies in English. These courses will not count toward the minimum number of courses for the Ph.D., and anyone electing this language option may not take the comprehensive examination in linguistics.

Examinations: A 4-hour qualifying examination taken before the end of the first year of Ph.D. coursework; this examination is given three times a year, with the M.A. written examination. A comprehensive written examination which may be divided as the department directs; see the English Department graduate brochure. The comprehensive examination is given twice a year, normally in March and September. Before a student may take it, he/she must have completed all coursework required. A student must also have met all requirements for foreign languages before beginning the first part of the examination.

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

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

GRADUATE COURSES

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 Troylus and Crysete in Middle English.

404 Shakespeare I: Early Plays (3) Shakespeare's dramatic achievements between 1589 and 1601. Reading and discussion of selected plays from the early years, including Othello; poetic or epic prose, and other prose works.

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, Watton.

411 Literature of Restoration and Early Eighteenth Century: Dryden to Pope (3) Survey of English literature and culture from 1660 to 1745.

412 Letters of Later Eighteenth Century: Johnson to Burns (3) Survey of English literature and culture from 1745 to 1790.

413 Restoration and Eighteenth-Century Genres and Modes (3) A major genre or literary mode: comedy, novel, poetry, non-fiction prose, or epic, written between 1660 and 1780. 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, Newman, and Mill.

417 Victorian Poetry and Prose II (3) Browning, Arnold, Hopkins, Hardy, Ruskin, Darwin, and Wide.

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: Tennyson, topics vary: Marie de France, Margery 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.)

431 Colonial, Federal, and Early National American Literature (3) From Columbus to Washington Irving.

432 American Romanticism and Transcendentalism (3)

433 American Realism and Naturalism (3)

434 Modern American Literature (3) World War I to present.

435 American Novel before 1900 (3) From earliest sentimental novels through Brown and Cooper, and major figures to 1900: Hawthorne, Melville, Stowe, Clemens, and James.


441 Southern Literature (3) Southern writing from colonial period into twentieth century: frontier humorists, local color writers, and Southern literature of the South.

442 American Humor (3) Early nineteenth century into twentieth century. Mark Twain.

443 Topics in Black Literature (3) Contents vary: particular genres, authors, or theories from 1840 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.

451 Modern British and American Poetry (3) From Yeats and Frost to Auden, Stevens, and recent poets.

452 Modern British and American Drama (3) O'Neill's works as precursor to modern dramatists: Williams, Miller, Albis, and representatives of Black theater, Bullock and Baraka.

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) Persuasive strategies in both student and professional writing. Practice in mastering effective logical and emotional appeals.

460 Technical Editing (3) Editing technical material for publication. Principles of style, format, graphs, layout.

461 Advanced Technical and Professional Writing (3) For students planning careers in industry, education, and government who need technical writing skills. Writing of instructions, process descriptions, sets of instructions, descriptions of mechanisms, recommendation reports, abstracts, proposals, and major reports. Prereq: Junior standing in student's major or consent of instructor.

462 Writing for Publication (3) Principles and practices of effective writing for publication, including research, ideas, and reports in science and technology. Prereq: 459 or consent of instructor.

463 Advanced Poetry Writing (3) Further development of skills acquired in basic writing poetry course. Prereq: 365 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.

471 Sociolinguistics (3) Study of language in relation to society. Empirical and theoretical focus. Large-scale units: tribes, nations, social groups. Prereq: 471 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, and implications for cultural pluralism. Prereq: 371 or 372 or Linguistics 200 or consent of instructor. (Same as Linguistics 472.)

474 Teaching English as a Second or Foreign Language (3) Grammatical structures of English, including pronunciation, intonation, and rhythm. Prereq: 374 or consent of instructor. (Same as Linguistics 474.)

475 Teaching English as a Second or Foreign Language (3) Second language acquisition theory. Issues in teaching four language skills to learners of English. Materials and methods of language teaching and testing: preparation of materials. Observation of and teaching with experienced staff member. Prereq: English 474. (Same as Linguistics 475.)

476 Second Language Acquisition (3) Theoretical models and research: differences between first and second language acquisition, learners of age, cognitive factors in second language acquisition, learner variables, socio-cultural factors, and implications for second language instruction.

479 Literary Criticism (3) Historical survey of major works of literary criticism.


481 Studies in Folklore (3) Topics vary. May be repeated with consent of department. 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, Jane Austen, Whitman, 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.

489 Special Topics in Film (3) Content varies. Particular directors, film genres, national cinema movements, or other topics. May be repeated with consent of department. Maximum 6 hrs. (Same as Cinema Studies 489.)

495 Introduction to Rhetoric and Composition (3) Historical, theoretical, and empirical modes of inquiry in
rhetoric and composition and implications for teaching of composition.

496 Rhetoric of Legal Discourse (3) Application of basic principles of persuasive writing to legal materials. Issue identification and argument through written position papers, briefs, and memoranda. Critical reading and discussion. Introductory research techniques. No prior legal knowledge necessary.

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

506 Teaching Freshmen Composition (3) Introduction to teaching freshman English through study of various techniques and philosophies of composition. Required of all first-year teaching associates.

508 History of the English Language I (3) Phonological, morphological, and syntactic development of the English language. Old and Middle English. F, A

509 History of the English Language II (3) Phonological, morphological, and syntactic development of the English language with concentration on developments after 1500, especially in American English. 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 Sixteenth- and Seventeenth-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: prose, poetry, fiction, drama; period: Restoration, eighteenth century. F

540-41 Readings in English Literature of the Nineteenth Century I and II (3,3) Content varies: 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.

560-61 Readings in Twentieth-Century Literature (3,3) Content varies: genre, theme, literary movement, or other coherent emphasis.

576 Introduction to Contemporary Criticism (3) Introductory survey of twentieth-century literary criticism from New Criticism to present.

580 Fiction Writing (3) Advanced fiction projects under supervision of instructor and time for independent study. Prereq: Extensive background in reading and writing fiction.

581 Colloquium in Poetry Writing (3) Major poetic project or continuation of project begun in 483. Individual consultation with instructor supplements class analysis; readings in contemporary poetry and theory. Prereq: 483 or consent of instructor.

582 Special Topics in Writing (1-3) Topics vary. May be repeated. Maximum 6 hrs. Enrollment by consent of director of graduate studies only.

585 Issues in Invention, Style, and Audience (3) Theoretical perspectives on contemporary research in rhetoric and composition.

586 History of Rhetoric I (3) Survey of rhetoric from Sophocles to Ramanus.

587 History of Rhetoric II (3) Survey of rhetoric from Bacon to present.

588 Readings in Applied Rhetoric (3) Content varies: Writing across curriculum, writing centers, technical communication, text linguistics.

590 Topics in Critical Theory (3) Topics vary.

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 Film History, Rhetoric, and Analysis (3) Film as narrative art form: historical development of film; the "rhetoric" of film; critical approaches to film study: genre, auteur, formalist, and historicist; critical analysis of individual films.

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

610 Studies in Old English Language and Literature (3) Old English grammar with readings in prose and poetry. F, A

611 Studies in Beowulf (3) Translation and critical study of Beowulf. Prereq: English 610 or consent of instructor. Sp, A

620 Studies in Medieval English Literature (3) Seminar in literature and literary genres of Medieval English literature, read in Old and Middle English. Subject matter varies from year to year.

621 Studies in Chaucer (3) Seminar in text, interpretation, and criticism of Chaucer's writings. Prereq: Previous course in Chaucer.


650 Studies in English Romanticism (3) Seminar content varies: particular literary figure or figures, genres, theme, or other coherent focus.

651-52 Studies in Victorian Literature (3,3) Seminar content varies: particular literary figure or figures, genres, theme, or other coherent focus.

660-62 Studies in American Literature (3,3) Southem literature before 1830, frontier, regionalism, woman's literature, Irving, Cooper, Poe, Emerson, Thoreau, Hawthorne, Melville, Whitman, Dickinson, James, and Tawn.

670-72 Studies in Twentieth-Century Literature (3,3) Seminar content varies: particular literary figure or figures, genre, theme, or other coherent focus.

680 Topics in English Language (3) May be repeated with consent of director of graduate studies. Maximum 9 hrs.

682 Studies in Rhetoric and Composition (3) Content varies. Advanced work in theory and/or of rhetoric and composition. Issues in invention, textual, literac, historiography, style and ethics.


686 Studies in Creative Writing (3) Content varies. Connection between theory and practice in writing.

688 Studies in Literary Criticism (3) Content varies. Advanced work in theory and history of literary criticism.

690 Special Topics (3) Content varies: History of ideas, humor, biography, autobiography, extra-literary disciplines.

694 Studies in Film (3) Content varies. Advanced work in film history and analyses.
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**

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 Plant Disease Fungi (4) Morphology, taxonomy, ecology, and genetics of plant pathogenic fungi. Identification and identification of plant pathogenic fungi. Prereq: 313 or consent of instructor. 2 hrs and 2 labs. (Same as Ornamental Horticulture and Landscape Design 511.) F,A

512 Soilborne Plant Pathogens (3) Causal agents; host-parasite-soil environment interactions; epidemiology; and biological, cultural, and chemical control. Prereq: Plant Pathology. 2 hrs and 1 lab. F,A

514 Bacterial Plant Diseases (4) Morphology, taxonomy, ecology, and genetics of bacterial plant pathogenicity. Identification and disease development, pathogenicity and resistance; diagnosis, detection, effect of environment, and management of bacterial plant diseases. Prereq: Plant Pathology or consent of instructor. 3 hrs and 1 lab. F,A

515 Physiology of Plant Disease (3) Biochemical and physiological processes involved in host-parasite interactions. Mechanism of disease resistance. Prereq: Introductory plant physiology and pathology, or consent of instructor. F,A

520 Plant Parasitic Nematodes (4) Morphology, physiology, taxonomy, ecology, and management of plant parasitic nematodes. Prereq: 510 or consent of instructor. 6 hrs biological science or consent of instructor. 2 hrs and 2 labs. Sp,A

521 Plant Virology (3) Symptomatology, epidemiology, and management of virus infection; structure, morphology, replication, transmission, purification, characterization, and classification of plant viruses; serology; plant pathogenic viroids, mycoplasma and spiroplasmas. Prereq: 515 or consent of instructor. 2 hrs and 1 lab. Sp,A

523 Field Crop and Vegetable Insects (2) Identification, biology and management of insects affecting commercial vegetable and home garden crops. Prereq: 321 or basic entomology course. 1 hr and 1 lab. F,A

525 Medical and Veterinary Entomology (3) Morphology, taxonomy, biology and control of arthropod parasites and vectors of pathogens of humans and animals. Ecology and behavior of vectors in relation to pathogen transmission and control. Prereq: 321 or 325, or Zoology 380, or consent of instructor. 2 hrs and 1 lab. Sp,A

530 Integrated Pest Management (3) Principles and application of biological, cultural, genetic, behavioral, and chemical methods of control to maintain pest populations below economic threshold levels. Prereq: 321, or consent of instructor. (Same as Plant and Soil Science 530.) F,A

531 Special Problems in Entomology (1-3) Comprehensive individual study of current problems. May be repeated. Maximum 6 hrs. E

532 Special Problems in Plant Pathology (1-4) Comprehensive individual study of current problems. May be repeated. Maximum 6 hrs. E

533 Concentrated Study in Entomology (1-3) Selected subjects in entomology for advanced students, concentrated in time and subject matter. Prereq: 321 or basic entomology course. May be repeated. Maximum 6 hrs. F,Sp

541 Seminar (1) Review of literature and current research in entomology and plant pathology. May be repeated. Maximum 2 hrs. E

**Environmental Engineering**

**Exercise Science**

*(College of Education)*

**MAJORS**

**DEGREES**

**Exercise Science**

**See Civil Engineering**

**Exercise Science**

**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 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 ASSISTANTS**

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.

**GRADUATE COURSES**

460 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 Zoology 480.)

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

501 Special Project (3) Culminating experience for nonthesis major. Research study, plan, presentation, and practical work. Prereq: Senior status. 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


509 Graduate Seminar in Public Health (1) (Same as Public Health 509, Nutrition 509, and Social Work 509.)


512 Physical Activity and Positive Health (3) Review of the relationships between health and physical activity in diverse populations. Prereq: 480 and 414 or equivalents. (Same as Public Health 568.)

515 Laboratory Techniques in Exercise Physiology (3) Laboratory course in experimental methodology and instrumentation: respiratory and metabolic measurements, blood chemistry, and gas analysis. Prereq: 480.

516 Advanced Physiology of Exercise (3) Quantitative approach to current physiological issues: the health-related components of fitness. Prereq: Elementary statistics, 480 and 414 or equivalents. (Same as Public Health 569.)


520 Cardiac Rehabilitation Practicum (1-3) Supervised experience in hospital-based exercise programs for participants with cardiac and/or pulmonary disorders. Use of telemetry monitoring, leading safe exercise regimens counseling participants on safe exercise guidelines. Prereq: Educational class on topic applicable to participants. Prereq: 480 and 567. Coreq: 569.

593 Independent Study (1-3) May be repeated. S/NC only. E

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

601 Research Seminar in Exercise Science (1) Research topics in different aspects of exercise science. May be repeated. S/NC only.

622 Directed Independent Research (3-6) Prereq: Doctoral student or consent of instructor. May be repeated. S/NC or letter grade.

661 Seminar in Exercise and Applied Physiology (1) Selected topics in exercise and environmental physiology. Prereq: 583 and 586. May be repeated with consent of instructor.

664 Research Participation in Applied Physiology (1-4) Participation in research with faculty member whose interests coincide with those of student. S/NC only.

681 Practicum (1-3) Intern experience in areas of major interest. May be repeated.

693 Independent Study (1-3) May be repeated. S/NC or letter grade. E

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 (3) Strategic issues and broad-based valuation concepts in finance; integrative approach in the investments, corporate finance and institutions areas.

511 Contemporary Issues in Corporate Finance (3) Selected topics in financial management, recent developments that have significant impact on strategic issues in financial management, Capital budgeting, financial and ownership structure, dividend policy and corporate growth and control. 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.

521 Investment Analysis (3) Principles and concepts of investment valuation in competitive and efficient financial markets. Basics of investment analysis of various securities. 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.

551 Financial Management of a New Enterprise (3) Financial issues associated with formation, control, and long-term planning of new enterprise. Acquisition of venture capital. Prereq: 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. Property 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.


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.

Food Science and Technology

(College of Agricultural Sciences and Natural Resources)

DEGREES

MAJOR

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., 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:

Golden, D. A., Ph.D. .......... Georgia

The Department of Food Science and Technology offers the Master of Science and Doctor of Philosophy degrees. Students in the doctoral program may choose research in the concentration area of food products, 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 scholarship and professional potential.

THE MASTER'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 as 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 9 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

410 Food Chemistry I (3) Reactions of proteins, enzymes, and additives in foods. Physico-chemical interactions of food materials. Prereq: Chemistry 110 or equivalent. 2 hrs and 1 lab. F

411 Food Chemistry II (3) Reactions of inorganic compounds, carbohydrates, lipids and vitamins in foods. Prereq: Chemistry 110 or equivalent. 2 hrs and 1 lab. Sp

420 Food Microbiology (3) Physical, chemical and environmental factors affecting growth and survival of foodborne microorganisms. Prerequisites: General Microbiology, Pathology and Ecology of Microorganisms. Prereq: Microbiology 210, Coreq: 429, F

429 Food Microbiology Lab (3) Methods for examination, enumeration, cultivation and identification of foodborne microorganisms. Prereq: Microbiology 210, Coreq: 420, F

430 Sensory Evaluation of Food (3) Principles and methods of sensory evaluation of foods. Prereq: Basic statistics. 2 hrs and 1 lab. F

440 Preservation of Food (3) Prevention of deterioration and spoilage of foods. Methods of preservation. Prereq: Agricultural Engineering Technology 422. 2 hrs and 1 lab. Sp

451 Dairy Products II (3) Science and technology of processing dairy products. Changes, physical and microbiological changes that occur during manufacture. Prereq: Principles of Chemistry 201. Coreq: 420, F

460 Meat Products Technology (4) Processing methods for making cooked, smoked, fresh, flaked and formed products. Effect of processing methods on product characteristics. Prereq: 360 or consent of instructor. 3 hrs and 1 lab. F

470 Food Crop Products (3) Food products from plants: types, manufacturing systems, quality attributes and utility. Prereq: 3 hrs biological sciences. 2 hrs and 1 lab. Sp

480 Cereal Science and Bakery Products (3) Chemistry and technology of processing grains, interactions of components during production and storage of baked products. Prereq: 410 or 411 or equivalent. 2 hrs and 1 lab. Sp

500 Thesis (1-15) S/NC only. E

501 Seminar (1) Individual reports and discussion on topics from current literature. May be repeated. Maximum 3 hrs. E

502 Registration for Use of Facilities (3-15) Required. May be repeated. Maximum 6 hrs. E

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) S/NC only. E

601 Seminar (1) Reports and directed discussion on research topics from current literature. May be repeated. Maximum 3 hrs. F

620 Food Toxicology (2) Basic and applied concepts in food toxicology: toxicological aspects of processed foods. Mode of action, prevention and control of food toxicants in food supply. Prereq: 410-11, 521, or consent of instructor. Sp

640 Advanced Food Processing (3) Role of processing in modification of food properties: texture, flavor and color characteristics. Prereq: 440, 510, 511 or consent of instructor. Sp

Forestry, Wildlife and Fisheries

(College of Agricultural Sciences and Natural Resources)

MAJORS

Forestry ......................................... M.S.

Wildlife and Fisheries Science .................. M.S.

George M. Hopper, Head

Forestry, Wildlife and Fisheries

Professors:

Barrett, J. W. (Emeritus), Ph.D. .......... Syracuse

Buckner, E. R. (Distinguished Prof.), Ph.D. .......... NC State

Core, H. A. (Emeritus), Ph.D. .......... Syracuse

Dearden, B. L. Ph.D. .......... Colorado State

Dimmick, R. W., Ph.D. .......... Wyoming

Hill, T. K., Ph.D. .......... Auburn

Hopper, G. M., Ph.D. .......... VP

Little, R. L., Ph.D. .......... NC State

McCue, C. E., Adjunct, D.F. .......... Duke

Ostermeier, D. M., Ph.D. .......... Syracuse

Pelton, M. R., Ph.D. .......... Georgia

Rennie, J. C., Ph.D. .......... NC State

Schneider, G., Ph.D. .......... Michigan State

Sharp, J. B. (Emeritus), D.P. .......... Harvard

Smalley, G. (Adjunct) Ph.D. .......... Tennessee

Strange, R. J., Ph.D. .......... Oregon State

Stumbo, D. A., Ph.D. .......... Minnesota

Thor, E. (Emeritus), Ph.D. .......... NC State

Wilson, J. L., Ph.D. .......... Tennessee

Associate Professors:

Hay, R. L., Ph.D. .......... Duke

King, M. M., Ph.D. .......... Utah State

Nodvin, S. C. (Adjunct), Ph.D. .......... Cornell

Schwab, S. E., Ph.D. .......... Colorado State

Smith, G. K. (Adjunct), Ph.D. .......... Utah State

Wells, G. R., D.F. .......... Duke

Winstoner, P. M. (Liaison), Ph.D. .......... Iowa State
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. A concentration in managing natural resource organizations is available under the non-thesis option with a major in Forestry. The minimum core requirements include: Forestry 511, 570, and six additional hours of Forestry courses to be selected in consultation with the student's committee; Political Science 564, Management 504, and Planning 560. Fourteen hours of elective coursework are selected with the faculty advisor.

MINOR IN ENVIRONMENTAL POLICY

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

Forestry

GRADUATE COURSES

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.

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: 321, 323, Ornamental Horticulture and Landscape Design 280, or consent of instructor. 2 hrs and 1 lab.

433 Wood Adhesives and Glued Wood Products (2) Theory and practical processes of bonding wood; wood substrate-adhesive interface for bonding; principles of adhesion; wood adhesives; gluing of solid wood and composite wood manufacturing practices; laboratory manufacture and testing of adhesives, adhesive bond strength and glued-wood product performance; day field trips. Prereq: Wood Properties and Wood Identification, or consent of instructor. 1 hr and 2 labs.

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, veneer cutting, and laser machining; day field trip. Prereq: Wood Properties and Uses and Wood Identification, or consent of instructor. 1 hr and 2 labs.

435 Wood Drying and Preserving (2) Discussion of wood moisture relationships. Introduction to commercial wood drying equipment and systems. Proper use, application, and disposal of preservative treated wood. Day field trips. Prereq: Wood Properties and Uses and Wood Identification, or consent of instructor. 1 hr and 2 labs.

500 Thesis (1-15) F/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. 30-credit requirement.

511 Problem Analysis in Forest Resources (3) Problem identification, analysis and solution in forest resource management. Identify, analyze and prepare written reports and make oral presentations. Prerequisites: 500. Open only to students in non-thesis option for M.S. in Forestry.

512 Seminar (1-6) Current developments in forestry. Required of all graduate students in residence in fall. May be repeated. Maximum 6 hrs. SNC only: F

520 Advanced Forest Tree Biology (3) Growth, reproduction, and physiology of trees; forest ecology; variability and taxonomy 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 as exemplified in public agencies and private firms. Forest organization and computerized regulation systems; financial and operational planning tools. Applied to forest resource management. Prereq: Senior-level forest management or consent of instructor. Sp/A

540 Genetics in Forestry (3) Genetic improvement of forest species, 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 alternatives. Overnight field trip. Prereq: Senior level in forest recreation or consent of instructor. F

570 Management & Policy of Forest Resource Organizations (3) Theory and managent 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

580 Advanced Silviculture (3) Silvicultural characteristics, silvicultural practices and systems applied to commercially important hardwoods and softwoods; in-depth analyses of silvicultural principles involved and tools used to protect trees. Prereq: Forest Ecology. Applications in regeneration and management; computer modeling of stand dynamics, structure, growth/yield. Prereq: Undergraduate silviculture course or consent of instructor. 2 hrs and 1 lab.

585 Advanced Forest Biometry (3) Application of sampling techniques to forest inventory; fixed and variable plot sampling; list sampling; Poisson sampling; regression estimators; multistage and multiphase sampling. Growth model prediction for even-aged and uneven-aged forests. Prereq: Land Measurement Techniques and Forest Resource Inventory or consent of instructor. F

590 Advanced Topics in Forestry (1-3) Recent advances in key areas of forest science; 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 General Ecology. Applicable to majors in Forestry and in Wildlife and Fisheries Science. 2 hrs and 1 lab.

416 Planning and Management of Forest, Wildlife and Fisheries Resources (3) Integrated forest and wildland resource management through developing land management plans and analyzing case studies including conflicts and solutions. Applicable to majors in Forestry and in Wildlife and Fisheries Science. Prereq: Senior standing 1 hr and 2 labs.

525 Management of Forestry, Wildlife and Fisheries Resources (2) Current technologies and management
strategies concerning wise use of forestry, wildlife, and fisheries resources necessary for decision-making and implementation.

535 Environmental Impacts to Natural Ecosystems (3) Current environmental problems impacting natural ecosystems: climate change, acid deposition, air pollution, species decline, and introductions of exotic species. Management methodologies to mitigate environmental problems. Prereq: 416 or equivalent or consent of instructor. Applicable to majors in Forestry and in Wildlife and Fisheries Science.


Wildlife and Fisheries Science

GRADUATE COURSES

440 Wildlife Techniques (2) Methods of wildlife damage control, forest, farmland, wetland wildlife habitat management, identification of wildlife, field techniques, wildlife capturing techniques and management plan preparation. Weekend field trip. Prereq: Principles of Wildlife and Fisheries Management or consent of instructor. 1 hr and 1 lab or field. F

442 Fisheries Techniques (2) Active and passive sampling techniques for fish and aquatic organisms; population estimation methods; fish handling and transport; food habits; data analysis; and tagging techniques. age determination and incremental growth analysis, stream assessment; equipment and instrumentation usage and maintenance, safety in sampling methods. Weekend field trip. Prereq: Principles of Wildlife and Fisheries Management or consent of instructor. 1 hr and 1 lab or field. F

443 Fisheries Science (3) Quantification and management of freshwater fisheries: population estimation, age and growth, biological assessment, and stocking. Prereq: Principles of Wildlife and Fisheries Management or General Ecology. 6 hrs of mathematics. 2 hrs and 1 lab. Sp

444 Ecology and Management of Wild Mammals (3) Biological and ecological characteristics of game mammals and endangered mammals. Current principles and practices of wildlife management. Prereq: Principles of Wildlife and Fisheries Management and General Ecology, or consent of instructor. 2 hrs and 1 lab. One weekend field trip required. Sp

445 Ecology and Management of Wild Birds (3) Biological and ecological characteristics of game birds, endangered birds, and bird pests. Current principles and practices of wildlife management. Prereq: Principles of Wildlife and Fisheries Management and General Ecology, or consent of instructor. 2 hrs and 1 lab. Sp

490 Ethics in Wildlife and Fisheries Management (1) Ethical bases for decision-making and application of methodologies in practice of wildlife and fisheries management. Seminars by ethicists, wildlife and fisheries scientists and managers, and foresters to acquaint students with diverse perspective of ethical behavior in practices of wildlife and fisheries management. Lectures, panel discussions, and case studies. Team taught. Prereq: Senior standing. 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 be repeated. Maximum 6 hrs. E


Required of all graduate students in residence in fall. May be repeated. Maximum 2 hrs. SN/C only. F

520 Planning and Administration of Fisheries and Wildlife Programs (2) Factors influencing policy and program planning activities of fisheries and wildlife agencies. Decision-making, case histories. Sp,A

525 Endangered Species Management and Conservation of Biodiversity (3) Status, ecology and management of endangered wildlife and plant species. Historic aspects, policy implications and legal issues surrounding recovery efforts. Approaches to monitor and manage for biodiversity. Prereq: Graduate standing or consent of instructor. Sp

530 Wildlife Diseases (2) Necropy of birds and mammals. Recognition of various diseases and methods of verification. Pathological materials in field and lab. Investigative procedures concerning wildlife diseases. Prereq: 1 yr biology, 444 or 445, or consent of instructor. (Same as Comparative and Experimental Medicine - Veterinary Medicine 530). F,A

540 Predator Ecology (2) Dynamics of terrestrial vertebrate predator populations in human-altered and relatively unaltered environments. Prereq: 444 or 445 or consent of instructor. F,A

545 Population and Habitat Analysis (2) Detail characteristics, assumptions, and current applications of field and laboratory techniques in the study of population dynamics, stress analysis, and habitat analysis. Use of computers. Prereq: Animal Science 571 or Statistics 536 or consent of instructor. A

555 Fish Culture (3) Principles, concepts and techniques of culturing economically important fish and shellfish species. Prereq: 443 or consent of instructor. 2 hrs and 1 lab. Sp,A

560 Advanced Topics in Wildlife and Fisheries Science (1-3) Recent advances and concepts, research techniques and analysis of current problems. Prereq: 444, 445, or consent of instructor. May be repeated. Maximum 6 hrs. E

593 Independent Study in Wildlife and Fisheries Science (1-4) May be repeated. Maximum 6 hrs. E

French

See Romance Languages

Geography

(College of Arts and Sciences)

MAJOR

DEGREES

Geography M.S., Ph.D.

Sidney R. Jumper, Head

Professors:


Associate Professors:

Brinkman, Leonard W., Jr., Ph.D. .............. Wisconsin Harden, Carol P., Ph.D. .................. Colorado Horn, Sally P., Ph.D. .................... California Rehder, John B., Ph.D. ............... Louisiana State

Assistant Professors:

Orvis, Kenneth H., Ph.D. .................. Illinois

The department offers the Master of Science and Doctor of Philosophy degrees. The master's degree emphasizes development of professional competence as a geographer and offers opportunities to gain substantial depth in a concentration or a major technique. An emphasis in geographic information systems is available for students who have appropriate background in mathematics and computer science. The doctoral program is designed 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 MASTER'S PROGRAM

The department offers the thesis and non-thesis option for the Master's degree. Both options require a minimum of 30 semester hours beyond the completion of a sound undergraduate major program. At least two-thirds of the total hours in the degree program must be at or above the 500 level and must include 501 (at each offering during residency), 504 and 3 semester hours at the 600 level. The thesis, 6 hours must be Thesis 500. A final examination is required in both programs.

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, and 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 90 credits, including the dissertation, and (at each offering during residency) 501. A minimum of 12 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 master's level 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-hr lab.

412 Cartography (3) Cartographic techniques applied to design, compilation, and reproduction of maps and other graphic presentations. Prereq: 310 or consent of instructor. 2 hrs and 1 2-hr lab.

413 Remote Sensing: Types and Applications (3) Principles and uses of remote sensing imagery: digital data, and spectral data; geographic interpretation and mapping techniques. Prereq: 310 or consent of instructor.

415 Quantitative Methods in Geography (3) Geographic application of statistical techniques, point pattern analysis, and analysis of area units. Prereq: Math 115 or two semesters of calculus or consent of instructor.

421 Geography of Folk Societies (3) Geographical study of folk culture, traditional material culture and rural settlement, examples from eastern North America and selected foreign areas. Prereq: 101-02 or 320 or consent of instructor.

425 Historical Geography of the United States (3) Survey of changing human geography of United States during four centuries of settlement and development. Changing population patterns, development of agricultural regions, and patterns of urban-industrial development. Prereq: 361 or consent of instructor.

432 The Land-Surface System (3) Characteristics of surface form, water, vegetation, and surface materials, and their relationships to environment. Prereq: Math 115 or two semesters of calculus or consent of instructor.

433 Climatology (3) General circulation system leading to world pattern of climates. Climatic change and modification, and interrelationships of climate and human activity. Prereq: Geography of the Natural Environment or consent of instructor.

435 Biogeography (3) Changing distribution patterns of plants and animals on various spatial and temporal scales. Effects of climate change, and human activity on world biota. Prereq: Geography of the Natural Environment or consent of instructor.

436 Water Resources (3) Global water resources and hydrologic processes; water availability, quality, flooding, and water quality issues from physical and economic geographical perspectives. Prereq: Geography of the Natural Environment or consent of instructor.

439 Plant Geography of North America (3) Characteristics and distribution of major plant communities of Canada, the U.S., Mexico, and Central America. Relationships to climate, soil, fire, and human disturbance. Long-term history and future prospects. Prereq: Coursework in geography or botany or consent of instructor.

441 Urban Geography (3) Concepts and theories concerning development and significance of systems of cities and internal morphology of cities. Prereq: 101-02 or 141 or 340 or consent of instructor. (Same as Urban Studies 441.)

443 Rural Geography (3) Geographical appraisal of rural areas of United States: small towns and urban fringes. Problems and potentials of rural areas. Prereq: 101-02 or 141 or 340 or consent of instructor.

445 Geography of Resources (3) Study of factors related to variations in resource availability from time to time and place to place: energy and metallic resources. Prereq: 101-02 or 141 or 340 or consent of instructor.

446 Geography of Transportation (3) Examination of transportation system trends, effects on land use, location problems, and development. Prereq: 141 or 340 or consent of instructor.

450 Process Geomorphology (3) (Same as Geology 450.)

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

501 Colloquium in Geography (1) Discussion of departmental research, current research literature, and general topics. Registration required of resident graduate students whenever offered. May be repeated. Maximum 4 hrs. May be applied toward graduate degree. S/NC only.

502 Registration for Use of Facilities (3-15) Required prior to registration. May be repeated with consent of instructor. Maximum 4 hrs.

504 Research Design (3) Geographical research from selection of topic and development of research design through field work and final report.

505 Directed Research (2-6) Research on problems as defined by individual students. Prereq: Written consent of instructor and department prior to registration. May be repeated with consent of instructor. Maximum 9 hrs. S/NC or letter grade.

506 Directed Readings (2-6) Readings on topics of interest as defined by individual students. Prereq: Written consent of instructor and department prior to registration. May be repeated with consent of instructor. Maximum 9 hrs. S/NC or letter grade.

509 Topics in Geography (2-3) Topics vary. Prereq: Consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs. S/NC or letter grade.

510 Directed Readings (2-6) Readings on topics of interest as defined by individual students. Prereq: Written consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs. S/NC or letter grade.

512 Topics in Cartography (3) Trends, concepts, problems, and methods in cartography. Prereq: 411 and 412 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.

513 Topics in Remote Sensing (3) Applied research using imagery for interpretation and mapping of geographic data. Prereq: 413 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.

515 Topics in Quantitative Geography (3) Multivariate analysis applied to problems in geography; research problems utilizing appropriate computer programs; usefulness to other disciplines. Prereq: 415 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.

517 Geography Information Management and Processing (3) Concepts and methods in management of geographic information. Database design, manipulation, sampling and analysis. Prereq: Consent of instructor.

519 Graduate Practicum in Cartography/Remote Sensing (2-6) Prereq: Written consent of department before registration. May be repeated with consent of instructor. Maximum 6 hrs.

521 Topics in Cultural Geography (3) Examination of trends, problems, and methods in cultural geography. Prereq: 421 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.

533 Topics in Physical Geography (3) Examination of trends, problems, and methods in physical geography. Prereq: 433 or 434 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.

535 Topics in Biogeography (3) Examination of trends, problems, and methods in biogeography. Prereq: 435 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.

541 Topics in Urban Geography (3) Analysis of research on urban systems, internal morphology, urban problems, and urban spatial behavior. Prereq: 441 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.

549 Topics in the Geography of Transportation (3) Examination of trends, problems, and methods in transportation geography and transportation networks. Prereq: 449 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.

550 Regional Geomorphology (3) (Same as Geology 550.)

577 Biological Conservation (3) Analytical treatment of politics, policies, and forms of biological conservation as practiced in U.S. and abroad. Prereq: Consent of instructor.

591 Foreign Study (1-15) See College of Arts and Sciences. Prereq: Written consent of department prior to registration. S/NC or letter grade.

592 Off-Campus Study (1-15) See College of Arts and Sciences. Prereq: Written consent of department prior to registration. S/NC or letter grade.

593 Independent Study (1-15) See College of Arts and Sciences. Prereq: Written consent of department prior to registration. S/NC or letter grade.

599 Geographic Concept and Method (3) Traditional and modern geographic thought; readings on nature, space, problems, and methods of geography. Prereq: Consent of instructor.

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

601 Seminar in Geography (2-3) Topics vary. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

633 Seminar in Physical Geography (3) Prereq: 533 or consent of instructor. May be repeated. Maximum 6 hrs.

635 Seminar in Biogeography (3) Prereq: 535 or consent of instructor. May be repeated. Maximum 6 hrs.

641 Seminar in Urban Geography (3) Prereq: 541 or consent of instructor. May be repeated. Maximum 6 hrs.

643 Seminar in Rural Geography (3) Prereq: 443 or consent of instructor. May be repeated. Maximum 6 hrs.

649 Seminar in Geography of Transportation (3) Prereq: 549 or consent of instructor. May be repeated. Maximum 6 hrs.

653 Seminar in Geography of the American South (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

663 Seminar in Geography of Latin America (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

677 Seminar in Biological Conservation (3) Conduct of original research. Prereq: 577 or consent of instructor. May be repeated. Maximum 6 hrs.

Geological Sciences

(College of Arts and Sciences)

MAJOR DEGREES

Geology ................................ M.S., Ph.D.

Harry Y. McSween, Head

Professors:

Broadhead, Thomas W., Ph.D......................... Iowa
Driese, Steven G., Ph.D............................. Wisconsin
Dunne, William M., Ph.D.................. Bristol
Hatcher, Robert D., Jr. (Distinguished Scientist), Ph.D........ Tennessee
Kopp, Otto C., Ph.D................................. Columbia
Labotka, Theodore C., Ph.D.......................... Caltech
McLaughlin, Robert E. (Emeritus), Ph.D........ Tennessee
McSween, Harry Y., Ph.D............................ Harvard
Graduation requires passing a comprehensive examination, taken no later than the end of the second year, completion of all course requirements with a minimum 3.0 GPA, completion of the language requirement, and successful oral defense of the dissertation.

The comprehensive examination includes both written and oral parts in which the candidate will be tested on his/her knowledge of the area concerned. 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 sum 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.

**GRADUATE COURSES**

401 Quantitative Methods in Geology (3) Applications of calculus and differential equations to problems in earth sciences. Examples of the use of differentiation and integration in geology, wave equation in geophysics, mechanical modeling and boundary conditions in structural geology and tectonics.

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

520 Registration for Use of Facilities (3-15) Required for the student to other research 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

505 Structure of the Southern and Central Appalachians (2) Structural development of Southern and Central Appalachians from extensional Late Proterozoic—early Paleozoic rift-platform margin through processes related to compressional events producing accretionary elements that formed Appalachians throughout the Paleozoic. Comparisons to similar orogens.

510 Clay Mineralogy (3) Origin, chemistry, structures, and properties of clay minerals; application of mineralogical techniques in clay mineral studies.

521 Data Analysis in Geology and Environmental Science (3) Application of statistical and other quantitative techniques using computers to analyze geological data; environmental problems.

525 Biostratigraphy (3) Examination of principles of stratigraphy and biostratigraphy through selected case histories. 1 hr plus field trips.

530 Petrogenesis of Crystalline Rocks (4) Origin and properties of igneous and metamorphic rocks, processes, classification of mineral deposits with examples, and processes related to formation of sedimentary structures. May be repeated. S/N only. E

540 Seminar in Local Geology (1) Introduction to geology of Southern Appalachians. 1 hr plus field trips.

545 Sandstone Petrology/Physical Sedimentology (4) Field and microscopic analysis of terrigenous clastic rock: physical, chemical, and biological processes of sedimentation, transport of sediment, and formation of sedimentary structures. Prereq: 340 or equivalent. 3 hrs and 1 lab.

546 Carbonate Sedimentology (4) Environments of deposition of modern and ancient carbonate sediments and diagenesis of resultant rocks; field and laboratory analysis of sample material and preparation of scientific reports. 3 hrs and 1 lab.

550 Regional Geomorphology (3) Integrate approach to development of surface earth based upon case histories, maps, remote sensing imagery. Prereq: 101-02. (Same as Geography 450.) 2 hrs and 1-2 hr seminar.

555 Basic Environmental Geology (3) Applications of ecological sciences toward comprehension of effects of geological processes on human activities on earth's environments. Prereq: 12 hrs of geology courses, 2-15 hrs of geology lab or field period.

600 Principles of Geochemistry (3) Application of chemical principles to geologic problems. Crystal chemistry and relation between basic atomic structure and chemical behavior of elements in earth's crust.

470 Applied Geophysics (3) Basic principles of geophysical exploration: applications to environmental problems. Seismic and electromagnetic methods. 4 hrs of geology courses numbered above 300, 1 2-3 hr seminar.

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 and consent of instructor. 4-6 semesters.

475 Physical and Chemical Systems of the Earth (3) Development of physical earth from solar nebula to present. Formation, composition and evolution of hydrosphere, crust, mantle, and core. Interdependence of plate tectonics, volcanism, plate tectonics, geomagnetism, and chemical and isotopic processes of the earth, and core temperature. Historical perspective on major controversies of the field, and problems addressed 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 chronological processes.

485 Principles of Geohydrology (3) Ground water flow, aquifer analysis, ground water contamination, and ground water management.

490 Quantitative Methods in Geology (3) Applications of calculus and differential equations to problems in earth sciences. Examples of the use of differentiation and integration in geology, wave equation in geophysics, mechanical modeling and boundary conditions in structural geology and tectonics.

495 Principles of Geological Processes (3) Quarter-hourly classes for students in geology, 1-2 hours seminar.

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

520 Registration for Use of Facilities (3-15) Required for the student to other research 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

505 Structure of the Southern and Central Appalachians (2) Structural development of Southern and Central Appalachians from extensional Late Proterozoic—early Paleozoic rift-platform margin through processes related to compressional events producing accretionary elements that formed Appalachians throughout the Paleozoic. Comparisons to similar orogens.

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521 Data Analysis in Geology and Environmental Science (3) Application of statistical and other quantitative techniques using computers to analyze geological data; environmental problems.

525 Biostratigraphy (3) Examination of principles of stratigraphy and biostratigraphy through selected case histories. 1 hr plus field trips.

530 Petrogenesis of Crystalline Rocks (4) Origin and properties of igneous and metamorphic rocks, processes, classification of mineral deposits with examples, and processes related to formation of sedimentary structures. May be repeated. S/N only. E

540 Seminar in Local Geology (1) Introduction to geology of Southern Appalachians. 1 hr plus field trips.

545 Sandstone Petrology/Physical Sedimentology (4) Field and microscopic analysis of terrigenous clastic rock: physical, chemical, and biological processes of sedimentation, transport of sediment, and formation of sedimentary structures. Prereq: 340 or equivalent. 3 hrs and 1 lab.

546 Carbonate Sedimentology (4) Environments of deposition of modern and ancient carbonate sediments and diagenesis of resultant rocks; field and laboratory analysis of sample material and preparation of scientific reports. 3 hrs and 1 lab.

550 Regional Geomorphology (3) Integrate approach to development of surface earth based upon case histories, maps, remote sensing imagery. Prereq: 101-02. (Same as Geography 450.) 2 hrs and 1-2 hr seminar.

555 Basic Environmental Geology (3) Applications of ecological sciences toward comprehension of effects of geological processes on human activities on earth's environments. Prereq: 12 hrs of geology courses, 2-15 hrs of geology lab or field period.

600 Principles of Geochemistry (3) Application of chemical principles to geologic problems. Crystal chemistry and relation between basic atomic structure and chemical behavior of elements in earth's crust.

470 Applied Geophysics (3) Basic principles of geophysical exploration: applications to environmental problems. Seismic and electromagnetic methods. 4 hrs of geology courses numbered above 300, 1 2-3 hr seminar.

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 and consent of instructor. 4-6 semesters.

475 Physical and Chemical Systems of the Earth (3) Development of physical earth from solar nebula to present. Formation, composition and evolution of hydrosphere, crust, mantle, and core. Interdependence of plate tectonics, volcanism, plate tectonics, geomagnetism, and chemical and isotopic processes of the earth, and core temperature. Historical perspective on major controversies of the field, and problems addressed 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 chronological processes.

485 Principles of Geohydrology (3) Ground water flow, aquifer analysis, ground water contamination, and ground water management.

490 Quantitative Methods in Geology (3) Applications of calculus and differential equations to problems in earth sciences. Examples of the use of differentiation and integration in geology, wave equation in geophysics, mechanical modeling and boundary conditions in structural geology and tectonics.

495 Principles of Geological Processes (3) Quarter-hourly classes for students in geology, 1-2 hours seminar.
American glacial with paleo-oceanographic changes in Atlantic and Pacific Oceans. Prereq: 101 or consent of instructor.

557 Quaternary Paleoclimatology (3) Perturbation, process, and pattern within Quaternary ecosystems; climatic change and vegetational responses during last 2.5 million years. Prereq: 310 or consent of instructor.

561 Aqueous Geochemistry (4) Introduction to and applications of equilibrium thermodynamics to earth surface environments; geochemistry of natural water, weathering reactions, and early sediment diagenesis. Prereq: Chemistry 120-30, 3 hrs and 1 lab or seminar.

563 Stable Isotope Geochemistry (3) Theoretical aspects of isotope fractionation and applications to geologic systems. Isotope exchange, variations in natural waters, diagenetic, hydrothermal and metamorphic systems. Prereq: General Chemistry or equivalent.


572 Fracture Analysis (3) Field and subsurface characterization, and mechanical development of natural fractures; role in groundwater flow. Prereq: Structural Geology or equivalent, or consent of instructor.

575 Plate Tectonics and Orogeny (4) Tectonic development of orogenic belts in context of newest aspects of plate tectonics; current literature and ongoing research for both modern and ancient examples. Prereq: 370 or consent of instructor. 3 hrs and 1 lab or seminar.

576 Reflection Seismology (3) Imaging: subsurface features using reflected seismic waves. Energy sources, modes of wave propagation, field procedures, computer data processing, and pitfalls. Applications to tectonic and environmental problems. Prereq: 470 or consent of instructor.

585 Contaminant Hydrogeology (3) Physical transport processes, isotopes and groundwater age dating, processes influencing inorganic, organic and microbial contaminants, sampling and monitoring methods, remediation of contaminated groundwater, aquifer protection. Prereq: 485 or 535; 460 or 561; or Environmental Engineering 553 or equivalent; and consent of instructor.

586 Field and Laboratory Methods in Hydrogeology (2) Research methods. Measurement of hydraulic properties, drilling, sampling and instrumentation, tracer experiments. Formulating hypotheses and research plans. Prereq or coreq: 485 or 535, 585, and consent of instructor.

900 Special Problems in Geology (1-3) Directed study or special topics. Prereq: Consent of instructor. May be repeated. Maximum 10 hrs.

910 Foreign Study (1-15) See College of Arts and Sciences.

916 Seminar in Structural Geology (3) May be repeated with consent of department. Maximum 9 hrs.

920 Seminar in Geochemistry (3) Advanced treatment of selected topics in geochemistry. Prereq: 470 or consent of instructor.

920 Seminar in Economic Geology (3) May be repeated with consent of department. Maximum 9 hrs.

920 Seminar in Geophysics (3) Advanced treatment of selected topics in geophysics. Prereq: 470 or consent of instructor.

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 at least two foreign 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 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: (1) at least 39 hours in the first concentration; (2) at least 18 hours in the second concentration; and (3) at least 6 hours in a cognate field.

1. First Concentration: French, German, or Spanish. It consists of a minimum of 39 semester hours beyond the Bachelor's degree, distributed as follows:
   - A maximum of 6 hours of 400-level classes taken for the M.A. may be applied.
   - A minimum of 21 hours at the 500 level (exclusive of thesis hours) including French 584 (3), German 560 (3), or Spanish 550 (3); German 512 (3), French 512 (3), or Spanish 512 (3); French 515-16 (2.2) or German 520 (3);
   - At least 12 hours at the 600 level (exclusive of dissertation hours).

2. Second Concentration: French, German, Italian, Russian, or Spanish (different from the first concentration). It consists of at least 18 hours of courses beyond the Bachelor's degree, at least 12 of which must be at the 500 or 600 level.

3. Cognate Field: Six hours must be 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. If the cognate field is yet a third foreign language, a reading proficiency exam will be administered after completion of the 6 cognate hours by the language section concerned.

The coursework for Track II must be distributed as follows: (1) at least 45 hours in the first concentration; (2) at least 12 hours in the second concentration; and (3) at least 6 hours in a cognate field.

- First Concentration: French, German, or Spanish. It consists of 45 semester hours beyond the bachelor's degree, distributed as follows:
  - A maximum of 6 hours of 400-level classes taken for the M.A. may be applied.
  - A minimum of 27 hours at the 500 level (exclusive of thesis hours) including French 584 (3) or Spanish 550 (3); French 512 (3) or Spanish 512 (3); French 515-16 (2.2) or German 520 (3);
  - At least 12 hours at the 600 level (exclusive of dissertation hours).
obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

**German**

**GRADUATE COURSES**

331-32 Elements of German for Upper-Division and Graduate Students (3,3) Elements of language, elementary and advanced readings, and a final 10,000 word translation project. Open to graduate students preparing for language examinations, and upper division students desiring reading knowledge of the language. Credit no credit only. Maximum 12 hrs. Interdisciplinary credit only.

411-12 Advanced Conversation and Composition (3,3) Prereq: 311-12 or equivalent or consent of depart.  

420 Selected Topics in German Literature from 1750 to 1900 (3-3) Prereq: 311-12 or equivalent or consent of depart. May be repeated. Maximum 6 hrs. Interdisciplinary credit only.

421 German Lyric Poetry (3) Prereq: 6 hrs of 300-level courses (excluding 331-32 and courses in English translation) or equivalent.

422 German Drama (3) Prereq: 6 hrs of 300-level courses (excluding 331-32 and courses in English translation) or equivalent.

423 German Narrative Prose (3) Prereq: 6 hrs of 300-level courses (excluding 331-32 and courses in English translation) or equivalent.

424 German Literary Movements (3) Survey of major periods in development of German literature since 1750. Problems and pitfalls of periodization.

425 Introduction to Descriptive Linguistics (3) (Same as French 425, Spanish 425, Linguistics 425, and Russian 425.)

426 Methods of Historical Linguistics (3) Prereq: Consent of instructor. Study of historical development of a language, emphasis on phonological, morphological, and syntactical changes. May be repeated. Maximum 6 hrs.

427 Phonetics and Advanced Grammar (3) Prereq: Consent of instructor. Study of the phonetic system of a language, with emphasis on phonological theory. May be repeated. Maximum 6 hrs.

435 Structure of the German Language (3) Prereq: Consent of instructor. Study of the phonetic system of a language, with emphasis on phonological theory. May be repeated. Maximum 6 hrs.

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. Development of German as a literary language.

450 Business German (3) Survey of German used in business, government, administration, and economics. Prereq: 6 hrs of upper-division German excluding courses in translation and graduate reading courses. (Same as Linguistics 450.)

**Russian**

**GRADUATE COURSES**

401-02 Advanced Grammar, Conversation, and Composition (3,3) Prereq: Russian Composition and Conversation or equivalent.

425 Introduction to Descriptive Linguistics (3) (Same as French 425, German 425, Spanish 425, and Linguistics 425.)

426 Methods of Historical Linguistics (3) (Same as French 425, German 425, Spanish 425, and Linguistics 426.)

519 Bibliographical Methods (1) Bibliographical methods, major reference works and bibliographical problems in language and literature.

520 Seminar in Russian Literature (3) Advanced study of literature, with special emphasis on selected major novels.

551 Russian Grammar, Reformulation and Baroque (3) Content varies. May be repeated. Maximum 6 hrs.

552 Russian Enlightenment, Rococo, and Sturm und Drang (3) Content varies. May be repeated. Maximum 6 hrs.

553 Russian Classicism and Romanticism (3) Content varies. May be repeated. Maximum 6 hrs.

554 Russian Realism and Naturalism (3) Content varies. May be repeated. Maximum 6 hrs.

555 Modern Russian Literature 1890-1945 (3) Content varies. May be repeated. Maximum 6 hrs.

556 Modern Russian Literature 1945-Present (3) Content varies. May be repeated. Maximum 6 hrs.

560 Russian Literary Theory and Criticism (3)

561-62 Directed Readings in Russian Language and Literature (3,3)

571-72 Old Norse 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. Letter grade or S/N only.

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

610 Gothic (3) Phonology, morphology, and syntax of Gothic language. Relationship to Indo-European languages and other Germanic languages. Readings from Gothic Bible.

611 Old High German (3) Phonology, morphology, and syntax of Old High German. Representative readings.

621 Seminar in German Literature (3,3) May be repeated. Maximum 18 hrs.

631 Seminar in German and Germanic Philology (3,3)
520 Proseminar (3) Bibliography; methods; illustrative problems; preparation of papers.

521 Works of Dostoevsky in English Translation (3) Crime and Punishment, Brothers Karamazov, and other works. No foreign language credit.

522 Works of Tolstoy in English Translation (2) War and Peace, Anna Karenina, and other works. No foreign language credit.

550 Studies in Russian Literature (3) Content 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.

Health, Leisure, and Safety Sciences
(Students of Human Ecology)

MAJORS

<table>
<thead>
<tr>
<th>MAJORS</th>
<th>DEGREES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human Ecology</td>
<td>Ph.D.</td>
</tr>
<tr>
<td>Health Education</td>
<td>Ed.D.</td>
</tr>
<tr>
<td>Health Promotion and Health Education</td>
<td>M.S.</td>
</tr>
<tr>
<td>Public Health</td>
<td>M.P.H.</td>
</tr>
<tr>
<td>Recreation and Leisure Studies</td>
<td>M.S.</td>
</tr>
<tr>
<td>Safety Education and Service</td>
<td>M.S.</td>
</tr>
</tbody>
</table>

Charles B. Hamilton, Head

Professors:
- Gorski, June, Dr.P.H. ....... UCLA
- Hamilton, Charles B. (Liaison), Dr.P.H. ...... Oklahoma
- Hayes, Gene E. (Liaison), Ph.D. ............... North Texas State
- Kirk, Robert H., H.S.D. ........ Indiana
- Wallace, Bill C. (Liaison), Ed.D. ............ Northern Colorado

Associate Professors:
- Blanton, Mary Dale, Re.D. .... Indiana
- Krick, Ken L., Re.D. ......... Indiana
- Pursley, R. Jack, Ph.D. ........ Iowa

Assistant Professors:
- Blackmon, James T., Ed.D. ......... Tennessee
- Ellison, Jack S. (Liaison), 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 and Leisure Studies, and Safety Education and Service, and to the Master of Public Health degree in Public Health. The department provides doctoral preparation in Health Education (Ed.D. and Ph.D.) and in the Health Professions through concentrations in Health Promotion, Health Services, and Public Health Administration. The department is committed to the educational value of community-based experiential learning.

Health

Graduate programs are available leading to the Master of Science with a major in Health Promotion and Health Education (thesis and non-thesis options) and to the Doctor of Education with a major in Health Education. The Master of Science, with thesis and non-thesis options, requires completion of 30 semester hours. The Doctor of Philosophy with a major in Human Ecology offers a concentration in health education.

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 Ed.D. program in Health Education is available to residents of the states of Kentucky or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

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 401.) Sp

405 Alcoholism and Alcohol Education (3) Problems of alcoholism. Factors which make alcoholism a serious health and safety problem. (Same as Public Health 405.) Sp

406 Death, Dying and Bereavement (3) Aspects of dying, death and handling of loss. Medical, financial, psychological, legal and social implications of death. (Same as Public Health 406.) Sp

420 Sex Education As It Relates To Human Sexuality (3) Exploration of science of human sexuality. Trends, issues, and content of sex education. E

425 Women’s Health (3) Factors influencing women’s health and women consumers in nation’s health service delivery systems. Health problems/concerns of women and techniques for prevention, maintenance and/or correction. (Same as Women’s Studies 425.) E

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 suspected causes; pharmacology of drugs and effects on society; strategies for intervention and education. Sp

465 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 registered during any semester when student uses University facilities and/or facility time before degree is completed. May not be used toward degree requirements. May be repeated. SNC only. E

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/admistration. 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. Preferential consideration for admission to degree status shall be given to those with a minimum undergraduate grade-point average of 3.0 and to those with a minimum of 2 years of full-time professional experience in health related fields.
point average of 2.8 and with at least one year of professional experience in a health-related occupation. No provisions students will be admitted. As a restricted program, non-degree admission requires department recommendation. Deadlines for completed applications are 1 March for Summer term and 1 May for Fall semester.

THE MASTER'S PROGRAM

The M.P.H. is a non-thesis program requiring completion of 38 semester hours of coursework including 9 weeks of 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 thesis 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.

MINOR IN GERONTOLOGY

Graduate students in Public Health may pursue a specialized minor in gerontology. This 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.P.H. program in Public Health is available to residents of the states of Arkansas, Kentucky, Louisiana. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

COURSE REGISTRATION

Provisional graduate students are ineligible to enroll in 500-level public health courses. Non-degree students must obtain permission from the department head to register for 500-level public health courses. Provisional coursework assigned as a condition of admission to the M.P.H. program must be completed promptly, with a grade of B or better, typically within the first semester or two of enrollment in graduate studies.

GRADUATE COURSES

400 Consumer Health (3) (Same as Health 400.)

410 Health in the Work Environment (3) Fundamental activities in field of industrial health aimed at reducing health problems for employees. Workplace health hazards and problems of concern to nurses, medical staff, management, engineers and others in industrial health and safety fields. Prereq: Consent of instructor. May not be taken for credit by occupational health concentration majors.

493 Directed Independent Study (3) Individual in-depth study of selected issues. Prereq: 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 during any semester when student status ceases or is interrupted. May not be used toward degree requirements. May be repeated. S/N only. E

509 Graduate Seminar in Public Health (1) In-depth discussion of time, place, and person focusing on scope of public health as discipline and its interrelations with other academic and professional disciplines. Speakers both internal and external. May be repeated. Maximum 4 hrs. (Same as Nutrition 410, Environmental Science 509 and Social Work 509.) S/N only. F, Sp


511 Fundamentals of Industrial Hygiene (3) Occupational health practice, theory and regulations: recognition, evaluation and control of workplace health hazards. Pertinent workplace problems and situations. Prereq: 2 yrs of chemistry and biology and consent of department. F


513 Industrial Hygiene Instrumentation and Sampling (3) Instruments and methods for evaluating industrial environment for personal exposure to chemical and physical stresses affecting worker's health. Lectures, demonstrations, and laboratory exercises. Prereq: 511, MPH-OMHS majors, and consent of department. F

514 Industrial Toxicology and Occupational Exposures (3) Principles of industrial toxicology: toxic mechanisms, portals of entry, physiologic and biochemical responses. Occupational exposure assessment, physical factors and environmental conditions that influence exposure characteristics, sampling and transport of contaminants into general environment. Prereq: 1 yr of general chemistry and 1 semester of human biology.

520 Public Health Policy and Administration (3) Administrative considerations of community-based health care programs and practices. Health policy formulation, political environment and governmental involvement in health, legal responsibilities, and management concepts/techniques/process. F, Su

521 Organization Theory and Health Care Delivery (3) Administrative theories related to health facilities: operation 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. Special problems presenting unique challenges and requiring appropriate attention. Prereq: Consent of instructor. F, Su

525 Financial Management of Health Programs (3) Financial management concepts and practices applied to health service programs. Fundamentals of budgeting, costing, financing, rate setting, financial reporting and control. Opportunities to apply techniques. Prereq: 520 or consent of instructor. F

530 Biostatistics (3) Application of descriptive and inferential statistical methods to health-related problems and programs. Microcomputer applications, use and interpretation of vital statistics and introductory research methodology preparation for first course in epidemiology. Prereq: Introductory statistics or consent of instructor. F

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, etiology reasoning, disease screening and injury control. Prereq: or consent 530. F, Sp


550 Principles and Practices of Community Health Education (3) Theoretical foundations for community health education; opportunities for skill development in a variety of educational processes; and introduction to community health analysis. F

552 Community Health Problem Solving (4) Dynamic of community organization, community needs assessment, educational interventions, and application of program planning and evaluation techniques. Opportunity to practice skills in realistic setting. Prereq: 550 or consent of instructor. Sp


556 Theories and Techniques in Health Planning (4) Overview of health planning concepts and methodologies; systems-oriented planning process. Major elements of planning formulation and conceptualization of problem; plan design, evaluation and implementation. Health problems of institutions, communities and selected population groups; appropriate diagnoses, and programs for addressing needs. 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 569.)

580 Special Topics (3) Prereq: Consent of instructor. May be repeated under different topic. Maximum 6 hrs.

585 Seminar in Gerontology (1) (Same as Human Ecology 585, Counselor Education 585, Exercise Science 585, Nursing 585, Psychosocial Education 586, Social Work 586, Sociology 586.)

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. Prereq: MPH major, one semester advance notice and consent of major advisor. S/N available only for approved extended placements. S/N only. E

590 Research Methods in Health (3) (Same as Health 590.)

593 Directed Independent Study (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

650 Health Aspects of Gerontology (3) (Same as Health 650.)

655 Seminar in Nation's Health (3) (Same as Health 655.)

660 International Health (3) (Same as Health 660.)

Recreation and Leisure Studies

Graduate study with a major in Recreation and Leisure Studies leads to the Master of Science. Professional preparation concentrations are available in therapeutic recreation, general recreation, and sport administration/
management. The third concentration is an interdisciplinary program with the unit of Sport and Physical Activity in the College of Education.

The M.S., with thesis and non-thesis options, requires completion of 32 semester hours. The following retention policy applies to graduate students seeking the M.S. with a concentration in sport administration/management:

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 department head 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 COURSES**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>410</td>
<td>Maintenance and Management of Recreation and Sports Related Facilities (3)</td>
<td>3</td>
<td>Principles for operationalizing recreation and maintenance systems and management strategies. Cost tracking, inventory systems, specialized maintenance techniques, safety guidelines, maintenance management systems and security. Prereq: 410, 310 or consent of instructor.</td>
</tr>
<tr>
<td>415</td>
<td>Managing Leisure/Sport and Related Facilities (3)</td>
<td>3</td>
<td>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.)</td>
</tr>
<tr>
<td>430</td>
<td>Organization and Administration of Leisure Services (3)</td>
<td>3</td>
<td>Principles of administration applied to provision of leisure services offered by public, private and/or commercial enterprises. Organizational structures, personnel management, evaluation, legal authority, introduction to budgeting and fiscal procedures. Prereq: 310 or consent of instructor.</td>
</tr>
<tr>
<td>440</td>
<td>Dimensions of Private and Commercial Recreation Businesses (3)</td>
<td>3</td>
<td>Nature and function of recreation in private, commercial, and industrial settings. Survey of development and management of commercial goods and services offered in leisure market. Factors influencing participation, management considerations, and research in professional recreation and tourism. Prereq: 110, junior standing, or consent of instructor.</td>
</tr>
<tr>
<td>450</td>
<td>Specialized Study in Leisure Education (1-6)</td>
<td>1-6</td>
<td>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.</td>
</tr>
<tr>
<td>500</td>
<td>Thesis (1-15)</td>
<td>1-15</td>
<td>P/NP only.</td>
</tr>
<tr>
<td>502</td>
<td>Registration for Use of Facilities (3-15)</td>
<td>3-15</td>
<td>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.</td>
</tr>
<tr>
<td>510</td>
<td>Perspectives and Trends in Leisure Studies and Services (3)</td>
<td>3</td>
<td>Basic role of 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. Prereq: Consent of instructor.</td>
</tr>
<tr>
<td>515</td>
<td>Philosophical and Conceptual Foundations of Leisure (3)</td>
<td>3</td>
<td>Description of leisure and recreation, nature of philosophy, concepts of leisure, recreation, play, work, and other, history of field, and relationship of ideas to contemporary society and to professional practice. Prereq: Consent of instructor.</td>
</tr>
<tr>
<td>520</td>
<td>Program Design and Evaluation in Therapeutic Recreation (3)</td>
<td>3</td>
<td>History, philosophy, nature, purpose, special populations served, programming process, professional aspects of therapeutic recreation. Basic overview of aspects of delivery systems. Prereq: Consent of instructor.</td>
</tr>
<tr>
<td>521</td>
<td>Facilitation Techniques in Therapeutic Recreation (3)</td>
<td>3</td>
<td>Role of therapeutic recreation in clinical and non-clinical settings; application of life-style planning, self-awareness, values distribution, and alertness training in therapeutic recreation, relationship of leisure education to therapeutic recreation. Prereq: 520 or consent of instructor.</td>
</tr>
<tr>
<td>522</td>
<td>Clinical Aspects in Therapeutic Recreation (3)</td>
<td>3</td>
<td>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 or consent of instructor.</td>
</tr>
<tr>
<td>540</td>
<td>Fiscal Policies for Recreation and Sports Related Organizations and Facilities (3)</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>541</td>
<td>Management and Operation of Recreation and Sport Related Facilities (3)</td>
<td>3</td>
<td>Research for making program and management decision, process of cost analysis, and basic design and maintenance of recreation and sport related facilities. Prereq: Consent of instructor. (Same as Sport Management 541.)</td>
</tr>
<tr>
<td>550</td>
<td>Graduate Internship (1-8)</td>
<td>1-8</td>
<td>Required of all graduate students. Minimum 100 clock hrs for each 2 hrs credit. Requires work experience, evaluation by agency and university and written paper.</td>
</tr>
<tr>
<td>551</td>
<td>Directed Study in Leisure &amp; Recreation (1-6)</td>
<td>1-6</td>
<td>Directed study of topics, issue, or concern. Designed to meet needs of individual students. May be repeated. Maximum 6 hrs.</td>
</tr>
<tr>
<td>552</td>
<td>Special Topics in Recreation &amp; Leisure Studies (1-6)</td>
<td>1-6</td>
<td>May be repeated. Maximum 6 hrs.</td>
</tr>
</tbody>
</table>

**Safety**

Graduate programs are available leading to the Master of Science with a major in Safety Education and Service (thesis and non-thesis options) and to the Specialist in Education with a major in Safety Education and Service. The M.S., with thesis and non-thesis options, requires completion of 30 semester hours. The Specialist in Education (Ed.S.) requires 30 semester hours beyond the M.S. An internship and research of a significant safety problem are included as professional development activities.

**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. and Ed.S. programs in Safety Education and Service are 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**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>441</td>
<td>Driver and Traffic Safety Education (4)</td>
<td>4</td>
<td>Preparation of traffic safety instructors for school, colleges, industry and commercial agencies. Students required to teach at least six two-week courses. Valid driver's license required. Prereq: Consent of instructor.</td>
</tr>
<tr>
<td>442</td>
<td>Advanced Driver &amp; Traffic Safety Education (3)</td>
<td>3</td>
<td>Development of competence in teaching of driver education through use of simulation, multimedia, and multipurpose driving range. Teaching skills and supervision. 2 hrs and 2 labs.</td>
</tr>
<tr>
<td>443</td>
<td>Sports &amp; Recreational Safety (3)</td>
<td>3</td>
<td>Accident prevention and injury control in sports activities; philosophy of sports safety; human environmental factors and interrelationship in sports injury and control, risk-taking and decision solution strategies; and contributions of sports medicine to safety. 3 hrs and 2 labs.</td>
</tr>
<tr>
<td>452</td>
<td>General Safety (3)</td>
<td>3</td>
<td>Principles, practices, and procedures in general safety. Safety problems in school, traffic, recreation, industry, and other public areas.</td>
</tr>
<tr>
<td>500</td>
<td>Thesis (1-15)</td>
<td>1-15</td>
<td>P/NP only.</td>
</tr>
<tr>
<td>502</td>
<td>Registration for Use of Facilities (3-15)</td>
<td>3-15</td>
<td>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.</td>
</tr>
<tr>
<td>532</td>
<td>Behavioral Problems in Safety Education &amp; Accident Prevention (3)</td>
<td>3</td>
<td>Problems of behavior, causes of accidents, and application of principles of psychology in development of safe behavior in all segments of environment.</td>
</tr>
<tr>
<td>553</td>
<td>Problems and Research in Accident Prevention (3)</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>534</td>
<td>Organization, Administration and Supervision of Safety Programs (3)</td>
<td>3</td>
<td>National and local level programs; administrative, instructional, and supervisory aspects. Implementation of relevant programs.</td>
</tr>
<tr>
<td>535</td>
<td>Emergency Management (3)</td>
<td>3</td>
<td>Civil and defense problems; tornadoes, floods, fires, mass civil disorders, and nuclear and personal disasters in alien countries.</td>
</tr>
<tr>
<td>573</td>
<td>Graduate Workshop in Safety (3)</td>
<td>3</td>
<td>Special safety education problems. For advanced graduate students, teachers, supervisors, and administrators. May be repeated. Maximum 12 hrs.</td>
</tr>
<tr>
<td>580</td>
<td>Special Topics (1-3)</td>
<td>1-3</td>
<td>Special topics in selected disciplinary or professional area of safety education/management. May be repeated. Maximum 12 hrs.</td>
</tr>
<tr>
<td>593</td>
<td>Directed Independent Study (1-3)</td>
<td>1-3</td>
<td>Individual identification and study of problems/inissue in safety. Extensive reading and critical analysis of safety literature. Specific proposal to instructor before registration. May be repeated. Maximum 12 hrs.</td>
</tr>
<tr>
<td>601</td>
<td>Internship/Research in Safety and Health (3-6)</td>
<td>3-6</td>
<td>Field experience. Significant problem identified, researched, and reported in acceptable form. May be repeated. Maximum 8 hrs. (Same as Health 601.)</td>
</tr>
</tbody>
</table>

**History**

(College of Arts and Sciences)

**MAJOR DEGREES**

<table>
<thead>
<tr>
<th>Degree</th>
<th>Program</th>
<th>Professors</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>History</td>
<td>M.A., Ph.D.</td>
<td>Russell Buhite, Head</td>
<td>Russell Buhite, Russell D.</td>
</tr>
<tr>
<td>History</td>
<td>Ph.D.</td>
<td>James C. Cobb, Ph.D., Georgia State University</td>
<td>Harold M. Klein, Ph.D., Emory University</td>
</tr>
<tr>
<td>History</td>
<td>Ph.D.</td>
<td>Arthur G. Haas, Ph.D., University of Chicago</td>
<td>Jonathan G. Utley, Ph.D.</td>
</tr>
<tr>
<td>History</td>
<td>Ph.D.</td>
<td>Russell Buhite, Russell D.</td>
<td>James C. Cobb, Ph.D., Georgia State University</td>
</tr>
<tr>
<td>History</td>
<td>Ph.D.</td>
<td>Casey M. Farris, Ph.D., Texas A&amp;M University</td>
<td>Christopher G. Farm, Ph.D., Temple University</td>
</tr>
<tr>
<td>History</td>
<td>Ph.D.</td>
<td>Charles O. Jackson, Ph.D., Drew University</td>
<td>Emory M. Kline, Ph.D., Emory University</td>
</tr>
<tr>
<td>History</td>
<td>Ph.D.</td>
<td>Emory M. Kline, Ph.D., Emory University</td>
<td>Charles O. Jackson, Ph.D., Drew University</td>
</tr>
<tr>
<td>History</td>
<td>Ph.D.</td>
<td>John R. Fink, Ph.D., Washington State University</td>
<td>Arthur G. Haas, Ph.D., University of Chicago</td>
</tr>
<tr>
<td>History</td>
<td>Ph.D.</td>
<td>Todd A. Gao, Ph.D., University of Arizona</td>
<td>Arthur G. Haas, Ph.D., University of Chicago</td>
</tr>
<tr>
<td>History</td>
<td>Ph.D.</td>
<td>Harold M. Klein, Ph.D., Emory University</td>
<td>Jonathan G. Utley, Ph.D.</td>
</tr>
</tbody>
</table>
Wheeler, W. Bruce, Ph.D. ................... Virginia

Associate Professors:
Becker, Susan D., Ph.D. .............. Case Western
Bing, J. Daniel, Ph.D. ................... Indiana
Bostedt, John, Ph.D. ................. Harvard
Brummett, R. (Lisien), Ph.D. .... Chicago
Dixon, Todd A., Ph.D. ............... Wisconsin
Fleming, Cynthia G., Ph.D. ........ Duke
Johnson, Charles W., Ph.D. ......... Michigan
Muldowny, John, Ph.D. .............. Yale
Pinckney, Paul J., Ph.D. ........... Vanderbilt

Assistant Professors:
Bast, Robert J., Ph.D. ............ Arizona
Bradley, Owen P., Ph.D. .......... Cornell
Burban, Thomas E., Ph.D. ....... Toronto
Haiken, Elizabeth, Ph.D. ......... California (Berkeley)

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. Detailed information 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 and subject).

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 examination within one week by a one-hour oral examination with the single grade of pass/fail given at the conclusion of the oral examination. No examination is given on the secondary field.

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 and subject).

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. (The 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 taken at UT Knoxville.)
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 two semesters, 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)
East Asia

Group II:
To be defined by the student's doctoral committee from within one of the following fields:
Unites 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

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 to Graduate Study in History (3) Assumptions and methods of historians. Required of all candidates for advanced degrees. F.

521 M.A. Readings (3) Directed readings in preparation for M.A. examinations. Open only to master's candidates in history. May be repeated. Maximum 6 hrs. S/NC only. E.


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
Holistic Teaching/Learning

(College of Education)

MAJORS

DEGREES

Curriculum and Instruction ... M.S., Ed.D., Ed. D.
Education ........................................ Ph.D.
Special Education ........................................ M.S.

L. Knight, Leader

Professors:

Alexander, J. Estill, (Liaison), Ed.D. ... Kentucky State
Davis, A. R., Ph.D. ......................... Ohio State
Hargis, Charles H. (Liaison),
Ed.D. ........................................... Colorado State
Hipple, Theodore W., Ph.D. .......... Illinois
Huff, P., Ph.D. ................................ Ohio State
Jost, Karl J., Ed.D. ................... Oklahoma
Knight, Lester N., Ph.D. .......... Texas
Kronick, Robert G., Ph.D. ........... Tennessee
McCoy, T. D. ................................ South Carolina
Rowell, C. Glennon, Ed.D. .......... George Peabody
Schindler, W. Jean, Ph.D. ........... Kent State
Turner, T. N., Ed.D. .................. Penn State
W Binding, Richard, Ed.D. ......... Wayne State
Woodside, M.R., Ed.D. ............... VPI

Associate Professors:

Chance, Charles A., Ph.D. .......... Ohio State
Hannum, Michael C., Ed.D. ........ Northern Colorado

Assistant Professors:

Barnes, Rhoda, Ph.D. California (Santa Barbara)
Hendrick, D. A., Ph.D. .......... Alabama
McLean, J.D., Ph.D. .............. Chicago

The Holistic Teaching/Learning unit offers graduate programs leading to the Master of Science degree with a major in Curriculum and Instruction, concentrations in elementary education, teaching science, education, social science education, elementary teaching and in secondary teaching; and a major in Special Education, concentration in general special education; the Specialist in Education and the Doctor of Education with a major in Curriculum and Instruction; and the Doctor of Philosophy with a major in Education. 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 social studies. The unit offers 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 more in line with how children learn and how language is central to the teaching/learning process. The role of the teacher in holistic teaching and learning becomes more of a facilitator of learning as opposed to a traditional role of teacher as the dispenser of content in the classroom. Central to the philosophy of holistic teaching and learning is knowing each individual child's style, abilities, and interests.

For further information, write the Holistic Teaching/Learning unit.

GRADUATE COURSES

419 Psychology and Education of Students with Mild Disabilities (6) Nature and characteristics of persons with moderate/severe educational disabilities appropriate for these persons. Prereq: Special Education Principles, Special Education Strategies, 422, and Admission to Teacher Education Program. Coreq: 420, F.

420 Field Experience in Modified Programs (3) Precursory to regular teaching program. Directed observation and teaching in schools with moderate/severe disabilities. Prereq: Special Education Principles and Special Education Strategies, Admission to Teacher Education and Curriculum and Instruction 422. Coreq: 420, S/N C only, F.

421 Elementary and Middle School Science and Social Studies Instruction (3) Methods and materials for teaching science and social studies. Development of functional relationships and entities of two fields. Not open to students with recent course in teaching science and/or social studies. Prereq: Admission to Teacher Education, F, Sp.

422 Elementary and Middle School Teaching Methods I (6) Methods and materials (knowledge base) for teaching reading, language arts, mathematics, science and social studies, content area and curriculum unit. Planning, individual teaching, evaluation, and language and concept development.

425 Language Arts/Instruction in Elementary and Middle Schools (3) Language and language development as applied to teaching of early literacy (listening-speaking) and aspects of literacy (reading-processes/reading-writing). Not open to students with recent course in language arts methods. Prereq: Admission to teacher education.

430 Elementary and Middle School Developmental Reading Instruction (3) Word recognition (including phonics), comprehension, evaluation, and materials. Not open to students with recent course in reading methods. Prereq: Admission to teacher education, F, Sp.

431 Field Experience in Comprehensive Programs (3) Prereq: Special Education Principles and Special Education Strategies, Admission to Teacher Education and Curriculum and Instruction 422. Coreq: 420, S/N C only.

432 Psychology 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.

434 Topics in Reading Education (1-6) Prereq: Admission to teacher education and course in reading education. May be repeated. Maximum 6 hrs, E.

454 Teaching 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.

465 Speech and Language Basis of Learning Disabilities in the Classroom (3) Normal communication development; understanding of speech and language impairments in school-age students; integration of oral and written communication skills into existing curriculum, especially for high incidence special education students.

470 Psychology of the Exceptional Child (3) Varieties of exceptional children: personal and social characteristics and educational needs. Implications of developmental variations for functioning as adults. Opportunity to expand study upon particular exceptionality. Enrollment limited to non-special education majors.

500 Thesis (1-15) P/N P only, E.
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during the summer 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 Elementary and Middle School Teaching Methods (3) Content area teaching and development of students to apply methods. Prereq: 422. Coreq: 575. E

506 Internships in Teaching in Special Education and Rehabilitation (3-15) Placement in professional settings for public schools or agencies under supervision of master practitioners. Enrollment limited to those in fifth-year program. S/NC only.

515 Seminar (1-3) Curriculum, instructional technology, elementary education, secondary education, or social foundations as related to goals of students. Programs may be repeated. Maximum 6 hrs. S/NC only. E

516 Seminar (1-3) Curriculum, instructional technology, elementary education, secondary education, or social foundations as related to goals of students. Programs may be repeated. Maximum 6 hrs. S/NC only. E

518 Educational Specialist Research and Thesis (3) May be repeated. S/NC only.

521 Teaching Social Studies in Elementary and Middle Schools (3) Planning and techniques. Trends in curriculum, development of concepts and generalizations, integration of social sciences. Prereq: Course in teaching of social studies or consent of instructor. Sp

523 Diagnosis and Correction of Children's Difficulties in Learning Mathematics (3) Children's difficulties in learning mathematics and procedures for helping teacher correct difficulties. Prereq: 522 or equivalent or consent of instructor. Sp


525 Strategies, Programs, and Materials for Teaching Elementary Social Studies (3) Analysis of new and innovative social studies program materials and techniques. Exploration of current trends in social studies education. Prereq: Previous course in teaching of social studies or consent of instructor. Sp

527 Elementary School Curriculum (3) Examination, evaluation, and application of curriculum design in elementary school teaching and issues which affect elementary education. Prereq: Consent of instructor. F, Su

528 Teaching 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

529 Practicum in Diagnosis and Remediation of Difficulties in Learning Mathematics (3) Assessment and practicum experience with children having difficulties in learning mathematics. Prereq: 523 or consent of instructor. Su

530 Teaching Reading in Elementary and Middle Schools (3) Trends in methods, materials, basic approaches, skill development and assessment procedures for teaching reading at elementary school level. Prereq: Course in teaching of reading or consent of instructor. F, Su

534 Seminar in Reading Education (1-6) May be repeated. Maximum 8 hrs. E

536 Psychology of Reading (3) Reading act, relationship between learning theory and reading, role or reading in child's overall development. Prereq: 500-level course in reading education or consent of instructor. F

537 Diagnosis and Correction of Classroom Reading Problems (3) Procedures, methodologies and materials for diagnosing and correcting classroom reading problems. Prereq: Course in reading education, or equivalent teaching experience, or consent of instructor. Sp, Su

538 Practicum in Diagnosis of Reading Problems (3) Theoretical and practical applications of specific reading diagnostic instruments. Testing of elementary, secondary school students, preparing case study reports, and conducting parent conferences. Prereq: Course in diagnosis and correction of classroom reading problems or consent of instructor. Sp

539 Practicum in Remediation of Reading Problems (3) Application of learning and teaching methodology in working with elementary and/or secondary school students on one-to-one or small group basis. Prereq: Course in diagnosis and correction of reading problems or consent of instructor. Sp

550 Assessment and Correction of Language Arts Difficulties (3) Procedures and materials for diagnosing and correcting language arts difficulties. Analysis of children's work. Prereq: At least one language arts course or consent of instructor. Su

553 Assessment of Exceptional Students (3) Current issues related to assessment; advanced study of evaluation models for special education; dynamic and other innovative assessment approaches; advanced study of application to educational programming; basic statistics and application in assessment. Sp

554 Developmental Reading Practicum (2) Diagnosing and teaching children having developmental and corrective reading needs. Prereq: Course in diagnosis and correction of reading problems or consent of instructor. May be repeated. Maximum 4 hrs. Sp

555 Characteristics of Affective/Motivational Functioning in Children with Disabilities (3) Definition, methods, identification and symptoms of children with affective/motivational disability. Prereq: Consent of instructor. Sp

556 Instructional Systems for Affective/Motivational Education for Children with Disabilities (3) Educational strategies and models of instruction; simulation, demonstration, and media. Teaching techniques, materials, and teacher/pupil/family interactions. Theoretical and applied forms of education through art, music, role play, puppetry, bibliotherapy, and group interactions. Prereq or coreq: 555 or consent of instructor. Sp

557 Psychology of Mental Retardation (3) Psychological, social, legal, and ethical issues related to mental retardation. Sp

562 Instructional Systems for the Mentally Retarded (3) Specific practical developmental behavioral strategies and techniques. Curricular development, techniques and evaluation. Educational needs of mentally retarded children and youth. Prereq or coreq: 561 or consent of instructor. Su

579 Special Topics (1-3) Prereq: Admission to graduate program. May be repeated. Maximum 9 hrs. S/NC or letter grade.

585 Teaching Secondary School Social Studies (3) Strategies, projects, materials, and programs in social studies. Prereq: Undergraduate course in teaching of social studies. F, Su

586 Seminar in Research Techniques in Special Education (3) Evaluation of appropriate research methodologies with handicapped populations. F


590 Application of Microcomputer Technology in Special Education and Vocational Rehabilitation (3) Application of microcomputer technology with all categories of exceptions and across all chronic and functional age ranges. Microcomputer-adaptive software, switch access, authoring systems, telecommunication, and strategies for cognitive development. Su

591 Clinical Studies (4) Relationship between education theory and application. Internship; research project, development of portfolio, and capstone experience. F

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

596 Clinical Experience in Assessment and Instruction (3) Academic remediation applied in lab/field setting: tasks related to teaching/assessment, preparation of lessons, and delivery of instruction. Coreq: 595. S/NC or letter grade. F

599 Seminar in Social Studies Education (3) Research, trends, and issues in secondary social studies. Su

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

602 Seminar in Reading Education (1-6) May be repeated. Maximum 8 hrs. E

603 Advanced Studies and Theoretical Models of Reading (3) Research on reading processes. Current theoretical models related to how learners process print. Prereq: 500-level courses in reading education or consent of instructor. Sp

605 Seminar in Curriculum and Instruction (1) 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) Internship with professional engaged in theoretically-based research: public school, institutions, agencies or universities. Prereq: Consent of instructor. S/NC only. E

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: public school, institutions, agencies or universities. Prereq: 9 hrs. in statistical 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. Needed research, 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 8 hrs. S/NC or letter grade.

689 Internship (1-3) Experiences in application of principles and practices of curriculum development and instructional improvement. Prereq: Program prerequisites and consent of instructor. May be repeated. Maximum 9 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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Home Economics Education

See Human Ecology
Human Ecology
(College of Human Ecology)

MAJOR DEGREE
Human Ecology ............................... M.S., Ph.D.

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

ADMISSION REQUIREMENTS
A completed file for review includes the
Graduate School application file, College of
Human Ecology application, Graduate Record
Examination (GRE) scores (330 at the General
section for the M.S. program in Human
Ecology, the Miller's Analogy Test (MAT) score
is acceptable), 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 MASTER'S PROGRAM
The Master's with a major in Human Ecology
is a college-wide, multidisciplinary program.
This degree provides a flexible graduate
program for students wishing to pursue in-depth
study across subject areas of human ecology.

THE DOCTORAL PROGRAM
Graduate study leading to the Doctor of
Philosophy 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
Textiles, Retailing, and Interior Design.

MINOR IN GERONTOLOGY
An interdepartmental/minor in gerontology
gives the graduate student an opportunity for
combining the knowledge and experience about
aging in American society with other
concentration areas.

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
departments is designed to integrate experiences
from different sources and to demonstrate the
multi-faceted nature of working within an aging
society.

Declarations of Minor
Prior to earning more than one-half the total
hours required for this minor, students must
complete a "Declaration of 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
from outside the major department. Coursework
must include the following:

1. 3 hours beyond the baccalaureate degree
2. 3 hours of Human Ecology coursework
3. 2 hours of an approved course in
4. A practicum requirement of 2 hours.
5. 2 hours of a course in the College of

Graduate Committee
At least one faculty member from the
Gerontology 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
list of qualified faculty.

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 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

CONCENTRATION IN CONSUMER ENVIRONMENTS
The consumer environments concentration is
designed to be most appropriate for students
with interests in retail and consumer sciences,
foodservice and lodging administration or
interior design.

Requirements are a minimum of 9 hours
including:

1. HRA 532, ID 510, and RCS 550 or 641
2. HRA 537 or RCS 590 or ID 590 (2 hours)
3. Minimum 9 hours of statistics and
research methods.

6. Six hours from RCS 511, 550, or 641, ID
575, 625, HRA 555, 610, 620.
7. Twenty-four hours of dissertation.
8. Electives for 34 hours approved by the
committee, including a minimum of 9 hours
required at the 500 level. (Students must take at
least 18 hours in one of three specialty areas:
foodservice and lodging administration, retail
and consumer sciences, or interior design.)
available to residents of Alabama, Arkansas, Kentucky, Mississippi, Virginia (concentration in health education only), 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 Microcomputer Research Applications in Human Ecology (3) Advanced microcomputer concepts and applications for research. Overview of statistical analysis software, computer graphics, computer-assisted design and national data base searches.

502 Registration for Use of Facilities (2-15) Required for the student not otherwise registered during any semester when student uses University facilities. 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 field. Examination of research, integrative frameworks, F, A

520 Directed Study in Human Ecology (1-3) Integrative topics. Prereq: At least 1 s.h. 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 Home Economics (1-6) Field based experiences. Prereq: Consent of instructor. E

530 College Teaching in Human Ecology (3) Instructional effectiveness, techniques, organization, and evaluation. Prereq: Consent of instructor, Sp

540 Curriculum in Home Economics (3) Program planning, design of instruction and development of teaching materials for home economics classroom. Prereq: 325. Coreq: 575, F

545 Evaluation in Home Economics Education (3) Assessment of programs and pupil progress; techniques, methods and purposes. Prereq: 540. Coreq: 575, F, Sp, A

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 professional development. Study and application of various approaches. Coreq: 575. F

575 Professional Internship in Teaching (1-3) Intensive teaching and teacher-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 36 hrs. S/N 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. S,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 other academic and professional fields. Basic biological and social sciences and historical and external to UTK. Prereq: Consent of instructor. May be repeated. Maximum 3 hrs. (Same as Counselor Education and Counseling Psychology 555, Exercise Science 555, Nursing 555, Public Health Education 555, Psychosocial Studies 555, Social Work 555, and Sociology 565.) S/N only.

591 Clinical Studies (4) Group and individual seminar activities during all-time internship. Application and evaluation of professional core competencies. Completion and presentation of portfolio and analysis of teaching project. Coreq: 575.

610 Professional Seminar in Human Ecology (3) Review of various approaches taken by different disciplines to study of ecology; ecological applications in human ecology; temporal/spatial properties of human ecosystems; model building/systems thinking and future thinking in human ecology; Sp

Human Resource Development

(Graduate College of Human Ecology)

MAJORS

Human Ecology ........................................ Ph.D.
Human Resource Development ..................... M.S., Ed.D.
Vocational-Technical Education .................... Ed.S.

DEGREES

Gregory C. Petty, Interim Head

Professors:
Campbell, C. P., Ed.D. ......................... Maryland
Cheek, Gerald D., Ph.D. ......................... Kansas State
Coxe, Carroll B. (Liaison), Ph.D. .............. Wisconsin
Craig, D. G., Ed.D. ............................... Cornell
Hanson, R. Ph.D. ............................... Purdue
Haskell, R. W., Ph.D. ........................... Purdue
Matthews, John I. (Emeritus), Ph.D. ....... Arizona State
Reed, J. L. (Emeritus), M.S. ....................... Oklahoma State
Wagener, G. A. (Emeritus), M.S. .............. Indiana

Associate Professors:
Ledford, B. J., Ed.D. ......................... Tennessee
Mann, E. C., Ed.D. ............................... Penn State
Petty, G. C., Ph.D. .............................. Missouri

Assistant Professors:
Pierce, R., Ph.D. ................................. Ohio State
Powell, Terrence L., M.S. ....................... Oklahoma

THE MASTER'S PROGRAM

The Department of Human Resource Development offers graduate programs leading to the Master of Science with a major in Human Resource Development. Two tracks are available. Track 1 is for students who are already certified to teach or those who are seeking a master's degree without certification. Track 2 is for students seeking initial licensure. Thesis and non-thesis options are available for both tracks.

Track 1 - Concentrations are available in business and marketing education, industrial education, instructional training, and vocational-technical education. The thesis option requires the completion of 36 semester hours including 6 hours of thesis. The non-thesis option requires the completion of 36 hours of coursework.

Track 2 - Concentrations are available in business and marketing education, and technology education. The non-thesis requirements are Human Ecology 574 and 591, 6 hours; for business and marketing education, 531 and 532, 6 hours; for technology education, 553 and 555, 6 hours; internship, 12 hours; and 12 hours of specialty courses as approved by the student's committee for a total of 42 hours. The thesis option requires 6 additional hours of thesis 500 for a total of 48 hours.

THE SPECIALIST PROGRAM

The Ed.D. program is a cooperative undertaking involving all vocational service areas. Concentrations are available in agricultural, business, marketing and distributive, home economics, industrial, and technical education, and in general vocational education. The degree requires a minimum of 60 hours of graduate study. Credit earned for the master's degree may meet program requirements in the courses which contribute to the program objectives of the candidate. A major core of studies offers advanced concepts in human resource development.

THE DOCTORAL PROGRAM

The comprehensive Ed.D. program in the department 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.

The minimum requirements in the doctoral program consist of the following: department specialization, 12 hours; departmental and electives, 21 hours; cognate field, 9 hours; professional education core, 9 hours; research techniques, 12 hours; and dissertation, 24 hours. A minimum of 90 hours above the basic doctoral degree is required.

The Doctor of Philosophy with a major in Human Ecology offers a concentration in human resource development.

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 Ed.D. program is available to residents of Kentucky and West Virginia.

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

GRADUATE COURSES

401 Utilization of Community Resources (3) Strategies for developing linkages between vocational education and private sector through advisory committees, councils, and work 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 needs. Principles of vocational education in business and marketing; curriculum implications; establishing, evaluating, and improving programs. F

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

435 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 Areas of Marketing (3) Marketing personnel development, operations, and management as affects instructional leadership program in marketing education. Prereq: 432. F, Su

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


458 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. F, Su
457 Adapting Vocational Instruction for Special Needs Learners (3) Modification of vocational-technical programs for special needs learners. Economic, social, educational, and legal considerations and provisions for providing relevant vocational-technical education for special needs learner.

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 while enrolled in a 3-hour graduate credit University facility 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 (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 procedures utilized in establishing criteria for trainee selection and placement in instructional programs and in institutional settings and educational training. Prereq: Consent of instructor. F, Su

509 Internship in Human Resource Development (3) Practical field experiences in selected settings under the supervision of the student's instructor and departmental representative. Prereq: Consent of instructor. May be repeated. Maximum 8 hrs. E

510 Foundations of Human Resource Development (3) Historical, philosophical, social, psychological, and educational 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, socioeconomic, cultural, and other handbooks of special students. Prereq: 9 hrs of graduate credit. F, Su

513 Special Topics in Human Resource Development (1-3) Specific objectives, activities, and evaluation. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E

514 Individual Study in Human Resource Development (3) Prereq: Consent of supervising instructor. Aproval form must be filed in office of department head. May be repeated. Maximum 8 hrs. E

515 Microcomputer Operations and Programming in Education (3) Operating procedures and BASIC programming for education and training applications. Hands-on experience in operating and programming microcomputers, practice with data input, output, and running educational programs using sequential data files. Prereq: Teaching, administrative, or related experience in education or training, or consent of instructor. E

516 Microcomputer Software Development (3) Advanced software design in BASIC; random access and binary files, search and sort algorithms, and bitmap graphics for educational environment. Hands-on learning and problem development. Prereq: 615 or consent of instructor. E

518 Education Specialist Research and Thesis (3) May be repeated. Maximum 9 hrs. P/NP only, E

530 Methods and Materials for VOE Programs (3) Development of instructional aids, recent developments and research, individualized instructional, and occupational clusters. Prereq: 510 or equivalent. Sp, Su

531 Organization and Supervision of VOE and Marketing Programs (3) Developing office and marketing occupations, guidelines in cooperative laboratory, and model offices. Trends in office and marketing education, physical facilities, state plans, instructor qualifications and advisory committees. Prereq: Consent of instructor. F, Su

532 Improvement of Instruction in Basic Business and Marketing Education (3) Issues, research findings, methods, and materials for improved instruction of both secondary and post-secondary levels. Prereq: 12 hrs of graduate credit. Sp, Su

533 Improvement of Instruction in Office Technology (3) Research, principles of learning issues, and materials for typing, word processing, business communications, and office procedures. Prereq: Consent of instructor. Su

534 Improvement of Instruction in Accounting and Data Processing (3) Principles of learning, issues, research findings in accounting, automated accounting and data processing at secondary and post-secondary levels. Prereq: Consent of instructor. F, Su

535 Curriculum in Business and Marketing Education (3) Curriculum designs in career, secondary, post-secondary education. Legislation, technology, social, economic and research results that affect business and marketing education. Prereq: Consent of instructor. Sp, Su

537 Measurement in Business and Marketing Education (3) Testing and evaluation of learner performance in business, and marketing education; teacher-made tests. Prereq: Consent of instructor. Sp, Su

540 Special Topics in Business and Marketing Education (1-3) Specific objectives, activities, and evaluations vary. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

541 Practicum in Business and Marketing Education (3) Practical updating and upgrading in non-traditional settings and marketing teachers. Prereq: 15 hrs of graduate credit. E

542 Problems in Business and Marketing Education (3) Selective research problems in teaching of business and marketing education and related areas. Prereq: Consent of instructor. F

550 Administration of Industrial Education Programs (3) Developing, staffing, and administering and evaluating the instructional and technical education programs in secondary and post-secondary school settings. Prereq: Consent of instructor. Sp, Su

551 Supervision of Industrial Education Programs (3) Techniques used to improve industrial education programs. Staff development, curriculum improvement, and program updating techniques. Prereq: 450 or equivalent. F, Su

552 History and Philosophy of Industrial Education (3) Social, political, and economic events that impact development of industrial education. Prereq: Consent of instructor. F, Su

553 Planning Technical Education Facilities (3) Preparation of educational specifications, site selection, and working relationships with other professionals involved in process of planning technical-education facilities. Prereq: Consent of instructor. F, Su

554 Technical Program Planning (3) Instructional systems attending to design, analysis, development, implementation, and evaluation of technical education. Prereq: Consent of instructor. Sp, Su

555 Curriculum Planning for Industrial Education Programs (3) Developing performance-based, criterion-referenced instructional programs. Prereq: 374 or 554 or consent of instructor. Sp, Su

556 Staff Development Programs (3) Strategies for assessing, planning, and implementing programs for professional development of vocational-technical personnel. Prereq: 551 or consent of instructor. F, Su

557 Advanced Methods of Teaching Technical Subjects (3) Progressive selection and effective application of innovative methods and teaching skillful and technical information. Diversifying and individualizing teaching of technical subjects. Prereq: 374 or 556. F, Su

558 Seminar in Industrial Education (1-3) Current issues, innovations, problems associated with technical programs. Prereq: 12 hrs of graduate courses. May be repeated. Maximum 6 hrs. F, Su

559 Evaluation of Technical Training Programs (3) Internal and external evaluation of training programs to maintain quality control and/or to justify revisions. Prereq: 455 and consent of instructor. F, Su

560 International Perspective of Workforce Training (3) Examination and comparison of workforce systems in highly industrialized countries. In-school training pro-grams, out-of-school training systems, update training of incumbent workers, retraining displaced workers, transfer of technologies, and role and responsibilities of businesses, private sector organizations/ agencies, and state and federal government agencies.

562 Grant Writing and Project Implementation (3) Writing grant proposals, negotiating with funding sources, implementing and updating projects, and closing out projects at end of funding support.

564 Self-Directed Work Teams (3) Theory and practice of implementing self-directed work teams, motivating employees, increasing employee productivity via teams and related issues.

571 Supervisory Skills for Improving Industrial Productivity (3) Philosophy of improving industrial productivity through quality and introduction to basic tools of statistical process control. Deming philosophy, control charts, and measurement as a tool for controlling quality and productivity.

572 Advanced Training Methods for Industrial Productivity (3) Techniques of training hourly workers in use of statistical process control tools. Techniques for involving hourly workers in quality assurance, inventory control, and productivity improvement.

576 Seminar in Grant Writing and Project Implementation (3) Writing, negotiating, and implementing funding sources, and managing grants. Prereq: 555 and consent of instructor. Sp, Su

590 Seminar in Supervision of Industrial Education Programs (3) Techniques utilized in planning, developing, and evaluating instructional programs. Prereq: 500-level planning course and consent of instructor. F, Su

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

601 Curriculum Planning in Human Resource Development (3) Curriculum theory, models, content, planning techniques and implementation strategies for graduate level human resource development programs. Prereq: 555 or equivalent. Sp, Su

602 Planning and Evaluation of Programs in Human Resource Development (3) Techniques utilized in planning and developing programs. Evaluation of training programs, and related issues. Prereq: 500-level planning course and consent of instructor. Sp, Su

604 Seminar in Human Resource Development (1) Required 2 consecutive semesters during doctoral residency. Prereq: 555 or equivalent. Sp, Su

605 Administration and Supervision of Human Resource Development (3) Leadership, policy, organization, planning, personnel, student development services, and budgeting related to vocational, technical, and professional-technical education. Prereq: Consent of instructor. F, Su

606 Advanced Training Methods for Industrial Productivity (3) Techniques of training hourly workers in use of statistical process control tools. Techniques for involving hourly workers in quality assurance, inventory control, and productivity improvement.

610 Research Development in Human Resource Development (3) Proposal development, theoretical design, sampling, analysis of statistical data, and implementation of research in human resource development. Prereq: 6 hrs of advanced statistics courses and consent of instructor. F, Su

611 Internship in Human Resource Development (3) Field experience in relevant organizations. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

613 Special Topics in Human Resource Development (3) Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E

616 Work Force Planning (3) Methods and procedures involved in planning, conducting, and analyzing data from national, regional, and community surveys. International manpower policies compared to U.S. policies. Prereq: Consent of instructor. F, Su

622 Seminar in Industrial Education (1-3) Current issues, innovations, programs associated with technical programs. Prereq: 12 hrs of advanced statistics. May be repeated. Maximum 6 hrs. Sp

Inclusive Early Childhood Education

(Majors in College of Education)

DEGREES

MAJORS

Curriculum and Instruction ... M.S., Ed.S., Ed.D.

Education ... Ph.D.

Special Education ... M.S.
G R A D U A T E C O U R S E S


454 Education of the Gifted and Talented Children (3) Orientation to psychometric and behavioral studies of giftedness. Analysis of past and present school practices in reference to curriculum and program implementation. 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

503 Problems In Lieu of Thesis (2-3) May be repeated. Maximum 9 hrs. S/NC only. E

504 Clinical Experience in Teaching an Exceptional Children (3-9) Placement in educational settings. May be repeated. Maximum 9 hrs. S/NC or letter grade. (Same as Rehabilitation and Deafness 504.)

506 Internships in Teaching in Special Education and Rehabilitation (3-15) Placement in professional settings in public and private agencies under supervision of master practitioners. Enrollment limited to those in fifth-year program. S/NC only.

515 Seminar (1-3) Curriculum, instructional technology, elementary education, secondary education, or social foundations as related to goals of students' programs. May be repeated. Maximum 6 hrs. S/NC only. E

516 Seminar (1-3) Curriculum, instructional technology, elementary education, secondary education, or social foundations as related to goals of students' programs. May be repeated. Maximum 6 hrs. S/NC only. E

518 Educational Specialist Research and Thesis (3) May be repeated. P/NP only. E

554 Assessment in Early Childhood Special Education (3) Development of knowledge and skills in appro-
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 561; 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 605 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-81) within two years of entry, 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.

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
Industrial Engineering

GRADUATE COURSES


401 Integrated Manufacturing Systems (3) NC and CNC machine tools, robotics and related materials handling systems, hand automation, alternative integrated manufacturing systems, and manufacturing information control systems. Prereq: 400.

402 Production System Planning and Control (3) Theory and application of forecasting systems, regression and time series analysis, and control of inventory models, development of safety stock. Coverage of all modules of Manufacturing Resource Planning (MRP) Systems: master production scheduling, resource requirements planning, bill of material and inventory file structures, material requirements planning, capacity planning, shop floor control. Overview of just-in-time inventory concepts and MRP's role in manufacturing automation. Prereq: 301.

403 Production Facilities Design and Material Handling (3) Design of production facilities: plant layout, analysis and planning for overall moving, packaging and storage of materials. Choice of layout and service areas. Design of facilities for such diverse groups as hospitals, banking, industry. Prereq: 302, 401.

405 Engineering Economy (3) Methods and problems in selection of engineering systems. Analysis and planning 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 as plan, cost trade off of float, multi-project control, computer applications, and PERT methods of handling uncertainty in activity time estimates.

414 Laboratory and Methodology in Human Factors Engineering (3) Project and laboratory-oriented investigation of human factors problems. Instrumentation and measurement of human capabilities and limitations, environmental factors that affect work, temperature, and time estimates.


422 Senior Industrial Engineering Problems Analysis (3) Application of industrial engineering to field as signments in local organizations, problem definitions, analysis and presentation. Prereq: 402, 403, and 405.


440 Total Quality Management (3) Philosophy of con trol improvement in organizations; management and implementation of integration and analysis of systems as compared to process analysis and improvement; flowcharts, pareto diagrams, cause and effect analysis and problem solving; collection and control of quality; 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 value. Lab. Prereq: Quality Control or consent of Instructor.

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

501 Design Project (1-3) Enrollment limited to industrial engineering students in research program. May be repeated. Maximum 6 hrs. S/NC only.

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May be repeated. S/NC only. E

510 Facilities Planning and Design (3) Modern materials handling techniques, computer-aided layout techniques, application of computer aided design models, and use of these to design manufacturing facility. Prereq: Production Facilities Design and Material Handling or consent of Instructor.

511 Information Systems II (3) Systems analysis and systems control concepts applied to systems of information. Role of IE in office and factory of future. Management support systems, decision support systems, and integrated support systems.

512 Production and Inventory Systems (3) Application of OR techniques to production and inventory systems. Deterministic and stochastic inventory models. Use of mathematical programming for product mix, process selection, blending and aggregate planning production planning. Application of simple and complex queuing models in manufacturing environment. Prereq: 402 or Engineering Management 537 or consent of instructor.

513 Decision Analysis (3) Application of decision analysis techniques to industrial engineering problems. Deterministic and statistical decision making; introduction to optimization theory. Prereq: Statistics 401 or equivalence. (Same as Engineering Management 537.)

514 Decision Analysis (3) Application of decision analysis techniques to industrial engineering problems. Deterministic and statistical decision making; introduction to optimization theory. Prereq: Statistics 401 or equivalence. (Same as Engineering Management 537.)

515 Reliability Engineering (3) Continuous random processes with applications to reliability of equipment and manufacturing systems. Failure densities and failure data analysis. Maintainability. Reliability-based criteria for product acceptance. Prereq: 402 or Engineering Management 537 or consent of instructor.

516 Advanced Industrial Engineering Economy (3) Application of advanced OR and engineering economic analysis in complex decision situations. Inflation and price changes; uncertainty evaluation using nonprobabilistic techniques; capital financing and project allocation; inventory models involving equipment replacement, investor-owned utilities, and public works projects; probabilistic risk analysis including computer simulation techniques, and decision making under uncertainty. Prereq: Probability and Statistics for Scientists and Engineers I and 405, or equivalent. (Same as Engineering Management 538.)

517 Probabilistic Engineering (3) Application of probabilistic models to deal with uncertainty. Prereq: Probability and Statistics for Scientists and Engineers I and 405, or equivalent. (Same as Engineering Management 538.)


520 Human Factors Engineering II (3) Design of man-machine interfaces and environment. Specific applica tion areas of experts systems engineering and special problem areas. Prereq: 519.

521 Human Factors Engineering Methodology (3) Background in methodology used by human factors for design of work, evaluation of human factors and support systems. Applied research techniques, questionnaire and survey design, critical incident techniques, consensus techniques (Delphi), accident investigation, behavioral and statistical systems in experimental design, and expert systems. Prereq: 520.

522 Optimization Methods in Industrial Engineering (3) Classical optimization theory, one-dimensional and multidimensional search techniques, Lagrangian relaxation, separable programming, linearization techniques, quadratic programming, and dynamic programming. Prereq: 391 or 537.

523 Linear Programming and Extensions (3) Simplex and revised simplex methods, duality, parametric and post-optimality analysis, use of LP software integer programming techniques, branch and bound and cutting plane network programming. Prereq: 501 or 537.


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, artificial intelligence in complex decision analyses. Prereq: 519, 523.


604 Advanced Topics in Optimization (3) Multi-stage optimization theory. State of the art techniques in applied to capital budgeting; advanced topics in multiple attribute decision analysis; Bayesian analysis of sequential decision making, artificial intelligence in complex decision analyses. Prereq: 519, 523.


691-92-93 Advanced Topics in Industrial Engineering (3,3,3) Forum to study individually or in groups. Prereq: Graduate standing and consent of instructor. May be repeated with consent of instructor.

Engineering Management

GRADUATE COURSES

501 Capstone Project (3-6) Application-oriented project to show competence in major academic area. Prereq: Enrollment in engineering management. May be repeated. Maximum 6 hrs. S/NC only.

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only.

516 Statistical Methods in Industrial Engineering (3) (Same as Industrial Engineering 516.)
Information Sciences

(Office of the Vice Chancellor for Academic Affairs)

Information Sciences ........................................ M.S.
José-Marie Griffiths, Director
Glenn E. Estes, Assistant Director

MAJOR

Economics .......................................................... B.S.
Finance ............................................................... B.S.
Management ........................................................ B.S.

DEGREE

B.S. ...................................................................... 4 years

Professors:
Estes, Glenn E. (Liaison), M.L.S. ............ Kent State
Pemberton, J. Michael, Ph.D. ............... University of Cincinnati
Pollard, Richard, Ph.D. ....................... University of Texas
Robinson, William C., Ph.D. .............. University of Pittsburgh
Sinkankas, George M., Ph.D. ............. University of Michigan
Wilson, P., Ph.D. .............................. University of Michigan

Associate Professors:
Fisher, Patricia L., Ph.D. ...................... Florida State
Gould, D. L., Ph.D. ............................. University of California
Robinson, W. C., Ph.D. ..................... University of Michigan

Assistant Professor:
Whitney, Gretchen, Ph.D. ................. Michigan State

The program of study includes a graduate sequence of 36 semester hours in the core curriculum required of all students: Economic principles of information systems, and 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. 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 the ethical and practical implications of the use of information resources 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 as 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 and quantitative 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 in the 50th percentile or above on the verbal portion of the GRE.

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 both options requiring a total of 21 hours. A minimum of 6 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. Upon completion of the program, all students are subject to a final examination. For students who elect the thesis option, the examination will be a defense of the thesis.

Students who elect the non-thesis option will be given a written comprehensive examination.

Core Curriculum

The core curriculum is a 16 semester hour sequence of six courses required of all students: 490, 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 18 hours (530, 540, 550, 555, 560, 565) of required courses and 9 hours of elective courses, one selected from each of these groups: Group A (534, 555, 566, 592); Group B (531, 532, 533, 537, 538); Group C (582, 583, 584).

Electronic Publishing: The concentration includes 18 hours (537, 551, 563, 565, 585, 587) of required courses and 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, 558, 586, Journalism 460 or 535 or 580); standards and technical aspects (567, 583, 584, 589, 595); policy and technology aspects (598, 599, Communications 550 or 556).

Information Systems and Technology: The concentration includes 18 hours (540, 583, 584 or 586, 587, 588, 589) 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, 589, one elective) are common and 6 hours are taken in the specialization (public library: 554, 592; school library: 475, 551).

FINANCIAL ASSISTANCE OPPORTUNITIES
Employment with the University of Tennessee Libraries may prove a work-study opportunity for selected students who wish to obtain experience in academic librarianship while pursuing the degree. Such students usually work at least 20 hours each week and thus may extend the period required for the degree. Similar opportunities exist with some other libraries and information agencies in the Knoxville area.

Work opportunities in a scientific-technical environment are available through subcontracts with Oak Ridge National Laboratory and the Department of Energy.

A limited number of graduate teaching assistantships are available through the school. Assistantships of this type carry a waiver of tuition and fees as well as a stipend and require that recipients work 10 hours per week in their 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, and 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 bookmarking.
450 Writing About Science, Technology and Medicine (3) SAMU 499 (Same as Journalism 499).
475 Utilization of Instructional Media (3) Same as Education in the Sciences, Mathematics, Research and Technology 475.) E
485 Electronic Communications and Information Resources on Internet (3) Exploration of worldwide information and communication resources including e-mail, gopher, Archie, Veronica, WAIS, WWW, and newsgroups.
490 Information Environment (3) Generation, production, management, dissemination, and use of information.
500 Thesis (1-15) P/NP only. E
502 Registration and Use of Facilities (3-15) Requisite 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 Electronic Information and Communications Laboratory (1) Methods for creating and managing information in electronic form. Communication of electronic information in networked environment. Location and use of electronic information resources. For GSI's, graduate students only; must be completed satisfactorily in first semester. S/NC only. E
590 Studies in Information Science (variable credit) Courses designed for advanced students. May be repeated. S/NC only. E
592 Advanced Cataloging and Classification (3) Cata
ing 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
593 Abstracting and Indexing (3) Philosophies, standards, and procedures for manual and automated document indexing, back-of-the-book indexing, vocabulary control, thesaurus construction, and abstracting.
594 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 meta-databases, full-text, numeric, bibliographic, F, Sp, Su, A
595 Information Separation and Retrieval (3) Separation and retrieval for information access and retrieval. Features and techniques for retrieval systems versus personal use. F
531 Sources and Services for the Social Sciences (3) Information sources in political science, sociology, psychology, geography, history, anthropology, business, and education. F
532 Sources and Services for Science Engineering (3) Information sources in engineering, physical and life sciences. Sp
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. F
534 Government Information Sources (3) Selection, acquisition, organization, and utilization of government information in variety of forms and media: legislative, judicial and executive branches of federal, state, local, and international government and intergovernmental agencies.
535 Advanced Information Retrieval (3) Bibliographic, non-bibliographic, full-text databases, e.g., non-bibliographic formula and structure databases, content-page/full-text databases, patents, document delivery services, evaluation, and testing.
536 Creation and Distribution of Information and Knowledge Resources (3) Historial, political, and societal dimensions of creation, dissemination, growth, 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 information industry; products and services, standards, enabling technologies, choice of distribution media, entrepreneurial opportunities. Legal, ethical, and quality concerns.
538 Economics of Information (3) Costing and pricing of information; value of information and value added services; content analysis and tradeoffs; policy issues related to economic aspects of information exchange and transfer.
539 Information Policy (3) Requisite of information policy development and creation of exchange and information; review of key national and international policy areas relevant to information creation, production, and distribution; development of information policy for organizations. Sp
540 Research Methods (3) Research methods in a variety of information environments; primary and secondary research, research project design; research results interpretation; analysis of published research; techniques supporting research process. E
541 Management of Information Organizations (3) Supervisory and management concepts, standards, and techniques applicable to information professional work in libraries, archives, records management, and other information organizations.
542 School Library Media Centers (3) Planning, implementing, and evaluating school library programs. Curriculum development, role of technology, life-based management, relationships with district and state services.
543 Information Centers in Higher Education (3) Development, mission, trends, issues, users, services, and environment of campus information centers including libraries and alternative information resource centers and library-computer center models.
544 Specialized Information Agencies (3) Development and present status, scope and objectives. Administrative and organizational problems and techniques.
545 Public Library Management and Services (3) Development, roles, political environment, governance, organization, fiscal management, services, marketing, and performance evaluation.
546 Government Information Services (3) Selection, acquisition, organization, and utilization of government information in a variety of forms and media: legislative, judicial and executive branches of federal, state, local, and international government and intergovernmental agencies.
547 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; evaluation of collections; selecting items to meet particular needs. F, Sp, Su, A
548 Contemporary Book Publishing (3) Creation, design, production, marketing, and distribution; various types of publishers.
549 Serials (3) Serials collections; selection, acquisition, ordering, preservation, use and public services. Su, A
550 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 functional elements of record systems, archival programs, management information systems and technologies within various types of organizations. Sp


566 Environmental Scanning for Information Professionals (3) Principles and practice of environmental scanning; information evaluation and synthesis; role of strategic information in modern organization. F

567 Information Network Applications (3) Scholarship and communication with 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. F

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. Pre-req: 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 infometrics; relationships with other disciplines. F,Sp,Su,A

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 control systems. Planning and implementation. F

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, relational and non-relational systems, database administration and evaluation. Design and implementation of application using database management system. Sp

585 Information Technologies (3) Evolution, trends, capabilities, and limitations 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 hypertext. F

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 humans. Basic psychological phenomena of human cognition, memory, problem solving, and language and how these processes relate to and condition interaction between humans and interactive computer systems. Sp

590 Problems in Information Sciences (3-6) Prereq: Consent of Instructor. May be repeated. Maximum 6 hrs.

591 Supervised Readings in Information Sciences (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. F,Sp

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 30 cumulative QPA. Written consent of advisor and approval of practicum coordinator. May be repeated. Maximum 6 hours. E

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. Prereq: Maximum 6 hrs.

451 Black African Politics (3) (Same as Political Science 452.)

461 African Prehistory (3) (Same as Anthropology 461.)


483 African-American Women in American Society (3) Historical and contemporary socio-economic-political factors in African American society as related to Black women. (Same as Women's Studies 483.)

Cinema Studies

GRADUATE COURSES

420 French Cinema (3) (Same as French 420.)

421 Topics in Italian Literature and Cinema (3) (Same as Italian 421)

486 Special Topics in Film (3) (Same as English 489.)

Comparative Literature

GRADUATE COURSES

491-02 Special Topics in Comparative Literature (3,3) Content varies. May be repeated. Maximum 6 hrs.

402 Latin American Studies Seminar (3) Selected topics. 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, 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.)

426 Methods of Historical Linguistics (3) (Same as German 426, French 426, Russian 426, and Spanish 426.)

429 Romance Linguistics (3) (Same as French 429 and Spanish 429.)


431,432 Structure of the German Language (3) (Same as German 431,432)

433 History of the German Language (3) (Same as German 433)

471 Sociolinguistics (3) (Same as English 471 and Sociology 471)

472 American English (3) (Same as English 472)

474 Teaching English as a Second or Foreign Language I (3) (Same as English 474)

475 Teaching English as a Second or Foreign Language II (3) (Same as English 475)

485 Special Topics in Language (3) (Same as English 485)
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.)

Women’s Studies

GRADUATE COURSES
400 Topics in Women’s Studies (3) Content varies. May be repeated.
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.)
486 Rhetoric of the Woman’s Rights Movement to 1930 (3) (Same as Speech Communication 486.)
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.)

Journalism

(College of Communications)

MAJORS

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

James A. Crook, Director

Professors:
Adams, 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
Crook, James A., Ph.D. ............... Iowa State
Everett, George A., Ph.D. .......... Iowa
Haskins, Jack B. (Emeritus), Ph.D. ...... Minnesota
Lane, John L. (Emeritus), M.A. ......... Iowa
Leiter, B. Kelly (Emeritus), Ph.D. .... Southern Illinois
Littmann, Mark, Ph.D. ............... Northwestern
Miller, M. Mark, Ph.D. ............... Michigan State
Singletary, Michael W., Ph.D. . Southern Illinois
Teefer, Dwight, Jr., Ph.D. ............ Wisconsin
Tucker, Willis C. (Emeritus), M.S. .... Kentucky

Associate Professors:
Caldwell, C. Edward, Ph.D. ....... North Carolina
Heller, Robert B., M.A. ........... Syracuse
Lucarelli, Susan M., Ph.D. .......... Tennessee
Morroh, Jerry L., Ph.D. .......... Toledo

Assistant Professor:
Foley, Daniel, M.S. ................. Northwestern

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.

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 throughout world. Print and broadcast systems in terms of relevant social, political, economic, and cultural factors. Relation of communication practices to international affairs and understanding. Sp

412 Opinion Writing (3) Analysis of editorial positions, practices, and pages. Writing of editorials and columns for newspapers, magazines, and company publications, rhetorical devices and use of logic. Prereq: Communications 200, or consent of instructor.

414 Magazine Article Writing (3) Techniques of writing in-depth articles of mass circulation and specialized magazines. Organizing and presents material, problems in specialized areas: business, science, agriculture, humanities. Prereq: Communications 200, or consent of instructor.

416 Issues in Journalism (3) Topics vary. Prereq: of instructor. May be repeated. Maximum 6 hrs.

420 Print Media Management (3) Current business practice among print media, especially newspapers. Problems in management and production and outlook for new technologies. Prereq: 6 hrs mathematics and/or accounting and senior standing. Sp

430 Public Affairs Reporting (3) Reporting and writing about courts, government, and public agencies. Event and issue-oriented journalism of public and public affairs. Prereq: 300, E

431 Advanced Editing (3) Sensitivity to language and editing skills. Headline writing, layout, and production. Prereq: 203.

444 Journalism as Literature (3) Study of writers from 17th century to modern era whose works have endured as both journalism and literature. Emerging genre called literary journalism; means of cultural reporting with personal narrative style. Prereq: Consent of instructor.

450 Writing About Science, Technology, and Medicine (3) Writing workshop to analyze examples of successful scientific writing and write series of articles for general public based on scientific journals, news conferences, technical meetings, and interviews. Prereq: Consent of instructor. (Same as Information Sciences 450.)

451 Environmental Reporting (3) Writing for news media on environmental issues such as pollution, water pollution, air pollution, allergies, nuclear power, fossil fuel power, and solid wastes. Presentations from and interviews of experts in environmental science and reporting. Prereq: 600, or consent of instructor.

455 Issues in Science Communications (3) Topics vary. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

456 Writing Science as a Literature (3) Survey of important scientific writing for general public across spectrum of science, engineering, and medicine. Works by authors such as Arthur C. Clarke, Stephen J. Gould, and Richard Selzer. Analysis of scientific writing. Prereq: Consent of instructor.

460 Mass Communications History (3) Development of press and role of mass communications in American history. Newspapers, radio, television, and magazines. F

470 Public Relations Campaigns (3) Planning, conducting, and evaluating of public relations campaigns. Oral and written presentation of public relations projects from inception to completion. Extensive out-of-class work. Prereq: Consent of instructor.

480 Journalism in the High School (3) Functions and methods of high school publications. Problems related to staff selection, content of publications, copy, layout, typography, printing, advertising, and business. Planning course outlines and curricula for journalism mass media studies. Su


516 Seminar in Journalism Issues (3) Topics vary. May be repeated. Maximum 6 hrs.

520 Press-Government Relations (3) Development of adversary relationship between journalists and government officials. Legal and ethical basis for open reporting of government. Use of press by candidates and incumbents. F

535 Publications Management (3) Development of management, production, market analyses, and design. Techniques of writing, editing, and presenting comprehensive articles and other material, and specialized magazines. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

550 Writing and Editing Projects (3) Specialized writing or editing interests: agriculture, politics, labor, finance, science, technical general publications. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

571 Seminar in Public Relations (3) Development and management of production in communication between institutions and organizations and their publics. Measurement and evaluation of effectiveness of communications programs. Prereq: 470 or consent of instructor.

580 Seminar in Visual Communication (3) Behavioral aspects of communication with images. Theories of psychological effect in color, shape, texture, and other design elements. Prereq: 203 or Advertising 350 or Broadcast Design 430 or equivalent.

590 Communications and International Development (3) Development of communications and development of nations. Role of communications media in developing nations. “Third World” regions of globe. Communications as facilitator of international cooperation. F

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.

Language, Communication, and Humanities Education

(College of Education)

MAJORS

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

Patricia Davis-Wiley, Leader

Professors:
Christensen, Mark A. (Emeritus), Ph.D. . Kansas
Davis-Wiley, Patricia D., Ed.D. ......... Houston
Hull, H. N., Ed.D. . . . . . . . . . . . . Peabody

Associate Professors:
Hodge, R. L., Ph.D. ................. Texas
Ryan, Thomas K., Ed.D. ............ Bail State
Watkins, J. Paul, M.S. ............ Tennessee

The Language, Communication, and Humanities Education unit offers graduate programs leading to the degrees of Master of
Science with a major in Curriculum and Instruction, concentrations in art education, English education, foreign language education, reading education, and secondary teaching; the Specialist in Education, and the Doctor of Education with a major in Curriculum and Instruction; and the Doctor of Philosophy with a major in Education. The unit also offers programs of study leading to teaching licensure in art, English, as a second language, foreign language, speech communications, and theatre. See Education under Fields of study for full description of all degree requirements.

For further information, write the unit leader.

Art Education

GRADUATE COURSES

510 History and Philosophy of Art Education (3) United States from 1800’s to present. Prereq: Consent of instructor.

520 Studies in Art Education (3) Issues and topics current to the field of art education. Prereq: Consent of instructor.

530 Production and Critical Analysis of Art (3) Relationship of production and critical analysis of works of art to discipline-based art education.

540 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.

589 Special Topics in Art Education (3-6) Prereq: Consent of instructor. May be repeated. Maximum 9 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. Prereq: Comprehensive foreign language requirements.

459 Teaching English in the Secondary School (3) Techniques of teaching composition, literature, and language. 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.

481 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.

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. Prereq: Completion of all course work. 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 and writing and reading of poetry. Review of texts and materials.

509 Teaching Composition in the Secondary School (3) Teaching narrative, description, exposition, and argumentation; writing process and marking of student papers.

510 Teaching Fiction in the Secondary School (3) Teaching of novels and short stories.

513 Seminar (1-3) Curriculum, instructional technology, elementary education, secondary education, or social foundations as related to goals of students' programs. May be repeated. Maximum 6 hrs. S/NC only. E

516 Seminar (1-3) Curriculum, instructional technology, elementary education, secondary education, or social foundations as related to goals of students' programs. May be repeated. Maximum 6 hrs. S/NC only. E

518 Educational Specialist Research and Thesis (3) Prereq: Consent of instructor. May be repeated. P/NP only. E

533 Reading in Community College: Research and Theory (3) Analysis of synthetic classroom 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. Prereq: EIS certification. Prereq: Consent of instructor.

578 Teaching English as a Second Language (3) Instructional methods: utilization of assessment procedures to diagnose English linguistic proficiency, materials for non-native speaker in K-12 classroom. Required for Tennessee ESL (K-12) licensure. Prereq: 587 or consent of instructor.

587 Teaching Foreign Languages in Secondary Schools (3) Advanced instructional techniques and evaluation procedures; materials selection; studies in trend, issues, and research in modern foreign languages and literature. Prereq: Consent of instructor.

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.

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, acting and writing of plays, reading of scripts.

598 Developing Speaking and Listening Skills, Grades 7-12 (3) Teaching approaches to monaural and group communication, critical analysis of public address and listening. Review of tests and materials.

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

601 Studies in English Education (3) Issues and research in teaching of English.

604 Seminar in Curriculum and Instruction (1) Requisite 2 consecutive semesters. S/NC only. E

605 Organizing and Administering Reading Programs (3) Analyzing programs, instruction, learning, and materials components into classroom, school and system programs. Prereq: 2 500-level courses in reading education or consent of instructor. Su

678 Advanced Studies in English as a Second Language (3) Research, curriculum, assessment, trends and issues in English as a second language. Prereq: 578 or consent of instructor.

687 Advanced Studies in Foreign Language Education (3) Research, curricula, assessment, trends and issues in foreign language education. Prereq: 578 or consent of instructor.

699 Internship (1-3) Experiences in application of principles and practices of curriculum development and instructional improvement. Prereq: Program prerequisites and consent of instructor. May be repeated. Maximum 9 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

Large Animal Clinical Sciences

See College of Veterinary Medicine and Comparative and Experimental Medicine

Law

(College of Law)

MAJOR

DEGREES

Law .......................... J.D., J.D.-MBA, J.D.-M.P.A.

Richard S. Wirtz, Dean

Professors:

Best, Reba, M.L.S. ................................ Florida
Blaze, Douglas A., J.D. ............................ Georgetown
Cohen, Neil P., LL.M. .............................. Harvard
Cook, Joseph G., LL.M. .......................... Yale
Dessent, Lawrence J., J.D. ....................... Harvard
Gray, R. Macdonald (Emeritus), LL.M. .............................. George Washington
Hardin, Patrick, J.D. ..................................... Chicago
Hess, Amy M., J.D. .............................. Virginia
Jones, Durward S. (Emeritus), J.D. .................................. North Carolina
King, Joseph H., J.D. .............................. Pennsylvania
Lacey, Forrest W. (Emeritus), S.J.D. ....................... Michigan
Leininger, Frederic S., LL.B. ...................... Duke
Lloyd, Robert M., J.D. ............................ Michigan
Miller, Charles H. (Emeritus), J.D. .................. Duke
Overtvo, Elvin E., (Emeritus), S.J.D. ............... Harvard
Phillips, Jerry J., J.D. ................................ Yale
Picquet, Cherlyn, M.S.L.S. .......................... Tennessee
Rivkin, Dean H., J.D. .............................. Vanderbilt
Sewell, Toxey H., (Emeritus), LL.M. ..................... George Washington
Shobisi, John L., J.D. ............................. Michigan
Wirtz, Richard S., J.D. .............................. Stanford

Associate Professors:

Aarons, Dwight, J.D. .............................. UCLA
Anderson, Gary L., LL.M. ........................... Harvard
Ansley, Frances Lee, LL.M. ....................... Harvard
Beinuma, William J., J.D. ....................... Miami
Black, Jerry P., Jr., J.D. ............................. Vanderbilt
Bunker, Mary Garrett, J.D. ........................... George Washington
Cornett, Judy M., J.D. .............................. Tennessee
Davies, Thomas Y., J.D. .......................... Northwestern
Gray, Grayfred B., J.D. ............................. Vanderbilt
Kennedy, Deverea A., LL.M. ........................... Temple
Leatherman, Don A., LL.M. ....................... New York
Parker, Carol M., J.D. .............................. Illinois
Concentration in Business Transactions

Students interested in a concentration in business transactions must complete all of the following law courses:

- 826 Introduction to Business Transactions
- 827 Business Associations
- 971 Income Taxation of Entities
- 940 Land Finance Law

Grade Requirements

A grade of 0.9 or below is considered a failure. Grades are on a numerical basis from 0.0 to 4.0. A grade of 2.0 or above is considered a satisfactory performance.

Credit Hour Requirements

Students must complete a minimum of 9 semester hours of credit toward the J.D. degree for acceptance into the graduate business program. Approval is required for credit in courses of either a graduate business 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 a graduate business course or in approved coursework will be included in the computation of the student's grade average or class standing in the college where such grades are so converted.

Admission

Applicants for the J.D.-M.B.A. program must make separate application to, and be independently accepted by, the College of Law for the J.D. degree and the School of Business Administration for the MBA 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 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 entering the last 28 semester hours required for the J.D. degree.

Curriculum

A dual degree candidate must satisfy the graduation requirements of both colleges. Dual degree students will be awarded a grade of Satisfactory for a graduate business course in which the student has earned a 2.3 grade or higher and a No Credit for any lower grade. The College of Business Administration will award a grade of Satisfactory for a College of 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 college 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.

Non-Law Elective Course Credit

Students enrolled in the J.D.-M.B.A. degree program may not receive credit toward the J.D. degree for courses taken in other departments of the University except for those taken in conjunction with the dual program, as stated in the front section of this catalog as well as the requirements for this college.

DUAL J.D.-M.P.A. PROGRAM

The College of Law and the Department of Political Science in the College of Arts and Sciences offer a coordinated dual degree program leading to the conferral of both the Doctor of Jurisprudence and the Master of Public Administration degrees. A student pursuing the dual degree program must complete a minimum of 9 semester hours of credit toward the J.D. degree and the last 16 hours of credit toward the M.P.A. degree. The College of Law will award a grade of Satisfactory for a graduate business 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 college 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.

Concentration in Business Transactions

Students interested in a concentration in business transactions must complete all of the following law courses:

- 826 Introduction to Business Transactions
- 827 Business Associations
- 971 Income Taxation of Entities
- 940 Land Finance Law

Will not be included in the computation of the student's grade average or class standing in the college where 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 College of 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 college 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.

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Non-Law Elective Course Credit

Students enrolled in the J.D.-M.B.A. degree program may not receive credit toward the J.D. degree for courses taken in other departments of the University except for those taken in conjunction with the dual program, as stated in the front section of this catalog as well as the requirements for this college.
TAKING LAW COURSES
conversion.

of Law and the Department of Political
Science, Awarding of Grades
dual program.

for both degrees will not receive credit
toward the graduate degree. The
Registrar of the University shall show the actual
record on the transcript. If a student earns
 Graduate student must register for the law
program, students will spend one academic year
Candidates, but an internship is not required.

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 converted to either Satisfactory or No Credit
and will not be computed in determining a
student’s GPA or class standing. The College of
Law will award a grade of Satisfactory for an
approved 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 2.0 or higher and a grade of No
Credit for any lower grade. The official academic
record of the student’s academic career is filed
with 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 8 semester hours of law courses and
receive credit toward the graduate degree. The
graduate student must register for the law
course during regular registration at the College
of Law requesting an S/NC grade only. I f a 2.0
or above is earned in a law course, an S will be
recorded on the transcript. If a student earns
below a 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 average. Law
courses may be taken for credit only by
students enrolled in a graduate degree program.

Different courses are offered concurrently in the
Dual J.D.-MBA 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 GPA
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,
satisfying proper court (jurisdiction and venue), ascer-
taining applicable law, and federal and state practice.

802 Civil Procedure II (3) Pleading, joinder of claims and
defendants, discovery, trials, verdicts, judgments and ap-

803 Contracts I (3) Basic agreement process and legal
protection afforded contracts; offer and acceptance,
consideration and other bases for enforcing promises;
the Statute of Frauds, unconscionability and other con-
trols of promissory liability. Introduction to relevant por-
tions 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; impossibility and frustration
of purpose; remedies; third party beneficiaries; assumps-
ion and delegation. Considerable coverage of Article
2 of the Uniform Commercial Code with respect to
remedies, anticipatory repudiation, impracticability and
good faith.

805 Legal Process I (3) Lawyer-like use of cases and
statutes in preparation for and analysis. Examination
and synthesis of common law decisions; statutory inter-
prediction; fundamentals of expository legal writing
and legal research.

806 Legal Process II (3) Continuation of Legal Process
I. Formal legal writing, appellate procedure, and oral
advocacy.

807 Torts I (3) Intentional torts, including battery,
assault, false imprisonment, infliction of emotional distress,
conversion and theft; privileges and defenses to
intentional torts; negligence, including standard of care and
proof of negligence; immunity and limitations on
duties; cause in fact, and proximate cause.

808 Torts II (3) Defense, including contributory negli-
gence, assumption of risk, comparative negligence, and
statutes of limitations; vicarious liability; strict liability;
nuisance; products liability; settlement; problems of
recovery for personal injury; law reform; deter-
ation of privacy, and wrongful legal proceedings;
miasurable injury, false falsehood, misappropria-
tion of commercial secrets, and interference with con-
tact; constitutional torts.

809 Criminal Law (3) Substantive aspects of criminal
law; general principles applicable to all criminal conduct;
specific analysis of particular crimes; defenses to crimes.

810 Property (4) Introductory course treating issues of
ownership of real and personal property; title to the areas of landlord
and tenant relations; estates in land and future interests;
co-ownership and marital property; real estate sales agree-
ments and conveyances; title assurance and recording statutes;
servitudes; and selected aspects of nuisance law,
eminent domain and zoning.

812 Constitutional Law I (3) Judicial review, limits on
judicial power; national legislative power; regulation
of commerce; power to tax and spend; other sources of
national power; separation of powers; checks and
balances of power; checks on delegation of power; inter-
governmental immunities.

813 Evidence (4) Rules regulating introduction and
exclusion of oral, written and demonstrative evidence at
trial and on other proceedings, including relevancy, com-
petence, impeachment, hearsay, privilege, expert test-
macy, authentication, and judicial notice.

814 Legal Profession (3) Legal, professional and ethi-
cal standards applicable to lawyers.

816 Computer-Assisted Legal Research (3) Intro-
duction to major computerized legal data base retrieval
systems and legal libraries. Emphasis on print and
N.W. Offereed periodically throughout the year. May be
taken beginning spring of first year after completion of first quarter of appellate brief
in Legal Process II. Must be taken prior to
end of second year of law study. Prereq: Completion of
first draft of appellate brief in 806. S/NC only.

818 Income Tax I (4) What is income; whose income is
it; when is it income; how is it taxed (capital gains and
losses, maximum and minimum tax); deductions and
credits; rates (corporate, estate, and trust).

821 Administrative Law (3) Administrative agency de-
cisions, processing processes and judicial review of adminis-
trative decisions; procedural standards for informal and
formal administrative adjudication and rule-making (at-
tention to federal Administrative Procedure Act; consti-
tutionality of agency action; procedural standards and
requirements; and availability, scope and timing of judicial review
of agency actions.

822 Legislation (3) Interpretation and drafting of stat-
utes, legislative process, and legislative power; compar-
ison of judicial views on legislative process with both
realities of legislative process and applicable constitu-
tional principles.

824 Local Government (3) Distribution of power be-	ween state and local governmental units; sources of
authority for limitations on local government operations;
creation of local boundaries; home rule; problems cre-
ated by fragmentation of local government units; financ-
ing of local services; influence of federal programs on
local government finance and decision-making.

826 Introduction to Business Transactions (2) Non-
technical introduction to accounting, finance, and the
functional relationships among the various actors in business
transactions. Analysis of the bases for transactions
with view toward needs of business clients.

827 Business Associations (4) Legal problems associated
with formation, operation, and dissolution of unincorpo-
rated and incorporated business enterprises. Topics includ-
includes responsibilities, duties and duties of firm members (principals and agents);
partners and limited partners; and corporate sharehold-
gers, directors and officers), and others with whom these
members interact in connection with firm’s business.

828 Advanced Business Associations (2) Selected topics
from law of business associations. Prereq: 827.
May be repeated.

830 Securities Regulation (3) Basic structure of federal
securities laws. Legal problems associated with raising of
capital by new and growing enterprises; debt and equity
transactions by promoters, officers, directors and other
insiders; regulation of public offerings of securities;
applicability of securities transaction laws to
acquisitions by business firms; and provision of legal and other professional services in
connection with securities transactions.

832 Business Planning Seminar (2) Selected topics on
capital raising and tax aspects of business planning
in various industries. Prereq: completion of spring
seminar in the first year.

833 Representing Enterprises (3-5) Capstone course
in concentration in business transactions. Simulated
business transactions and completion of major planning
drafting project. Translations vary for new business
creation in industries. Emphasis on real estate projec-
project, various financing transactions and
secure reorganization. Prereq: Completion of all
courses for concentration.

834 Antitrust (3) Federal antitrust laws; monopolization,
price-fixing, group boycotts, and anticompetitive prac-
tices generally; government enforcement techniques and
private treble damage suits.

840 Commercial Law I (3) Basic coverage of most sig-
ificant provisions of Uniform Commercial Code; security
interests in personal property (Art. 9 of U.C.C. and
relevant Bankruptcy Code provisions); commercial pa-
paper; including checks, notes and other negotiable instru-
ments (Arts. 3 and 4 of U.C.C.); presentment; and
coverage of portions of Art. 2 of U.C.C. not covered
in Contracts.

841 Commercial Finance Seminar (2) Practicalexpe-
tial experience in large and medium-sized business transactions.
Planning of financing transactions and negotiating and
drafting documents. Financing techniques: equipment
leasing and matched fund lending, current issues in
commercial financing, and insurance (normally covered in

842 Contract Drafting Seminar (2) Practical funda-
mentals of drafting contracts of different types.

843 Debtor-Creditor Law (3) Enforcement of judg-
ments; bankruptcy and its alternatives for business and
consumer debtor; emphasis on Federal Bankruptcy
Code.

846 Constitutional Law II (3) First Amendment rights
to freedom of religion, expression, association and press;

122 Law
464 Criminal Rights Actions (3) Litigation to vindicate constitutional rights in private actions against the government and its officials, as well as rights protected by other civil rights and civil liberties laws and regulations. Prereq: 42U.S.C. sec. 1983; actions against federal government officials under the Eleventh Amendment; institutional and individual immunities; relationship between state and federal courts in civil rights actions; and remedies for violations of constitutional and other civil rights.

465 Discrimination and the Law (3) Comparison of race, sex and other invidious discriminatory practices as they affect political participation, education, employment, housing and other civil and economic activities; legislative, judicial, and executive responses; voluntary measures; and self-imposed sanctions. Prereq: 324.

851 Constitutional Law Seminar (2) Current constitutional law problems.

854 Criminal Procedure I (3) Police practices and constitutional rights of persons charged, with offenses; arrest; search and seizure; identification; interrogations and confessions; electronic eavesdropping; and right to counsel.

855 Criminal Procedure II (3) Pre- and post-trial procedures in a criminal case: pretrial hearings and discovery; jury selection; sentencing; post-conviction relief. Prereq: 854.

856 Family Law (3) Survey of laws affecting formal and informal family relationships: premarital disputes; ante-nuptial contracts; creation of common law and formal marriage; legal effects of marriage; support obligations within family and third parties; dissolution, alimony, legitimacy, and property settlements; child custody and child support; abortion; illegitimacy.

863 Children and the Law (3) Legal relationship between children and their parents and the state: parental prerogatives and children's rights; rights of illegitimates; adoption; temporary and permanent removal of children from their parents by the state; juvenile court procedures.

855 Environmental Law and Policy (3) Study, through methods of public policy analysis, of regulatory and market mechanisms to solve environmental problems; environmental litigation; clear air act; clean water act; national environmental policy act; and selected regulatory issues. Prereq: 940.

856 Environmental Law Seminar (2) Selected topics in environmental law.

869 Natural Resources Law (3) Nature of interests; conveyancing; royalties; grants and reservations, leases, and taxation of natural resources.

873 American Legal History (3) Selected topics in American legal history.

875 Empirical Studies of Legal Institutions (3) Social, economic, and organizational factors that affect behavior of clients, lawyers, judges and other actors in legal institutions. Empirical studies of subjects: social structure and organization of bar; factors that affect filing, processing and disposition of claims in civil justice system; and factors that affect process of case dispositions in criminal prosecutions; plea bargaining process. Factors that sometimes cause "law in action" to operate differently than "law on the books".

877 Jurisprudence (3) Critical or comprehensive 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, use of economics in legal decision making and legal criticism.
Leadership Studies

(College of Education)

MAJORS

DEGREES

College Student Personnel .............. M.S.
Education ......................... Ph.D.
Leadership Studies in Education ........ M.S., Ed.S., Ed.D.

Grady Bogue, Leader

Professors:
Bogue, Grady, Ed.D. ........... Memphis State
Harris, G.W., Jr., Ph.D. ....... Michigan
Lovell, J.T. (Emeritus), Ed.D. ......... Florida
Molinis, Malcolm C., Jr., Ph.D. ...... Florida
Roney, Robert K. (Emeritus), Ed.D. .. Tennessee
Stollar, Dewey H. (Emeritus), Ph.D. .................. Ohio
Trusty, Francis M. (Emeritus), Ed.D. ....... Stanford
Ubben, Gerald C., Ph.D. ............... Minnesota
Venditti, Fred P. (Emeritus), Ed.D. .......... Northern Colorado

Associate Professors:
Brockett, Ralph G., Ph.D. .......... Syracuse
Connelly, Mary Jane (Laison), Ed.D. ... VPI
Husen, Peter M., Ed.D. ............... Stanford
Mertz, Norma T., Ed.D. ............... Columbia

Assistant Professor:
Aper, Jeffrey P., Ph.D. ............... VPI

The Leadership Studies unit offers graduate programs leading to the Master of Science with majors in Leadership Studies in Education, concentrations in adult education and in educational administration and supervision, and College Student Personnel; the Specialist in Education with a major in Leadership Studies in Education, concentration in educational administration and supervision; the Doctor of Education with a major in Leadership Studies in Education, concentrations in adult education, educational administration and supervision, and college teaching; the concentration for practicing administrators focuses on k-12 administrators currently in the field. For additional information, contact the unit leader.

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.

Adult Education

GRADUATE COURSES

509 Internship in Adult Education (3) Practical field experiences in selected settings under supervision of practitioner and departmental representative. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

513 Special Topics in Adult Education (1-3) Specific objectives, activities, and evaluation. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E

514 Individual Study in Adult Education (3) Prereq: Consent of supervising instructor. Approval form must be filed in office of unit head. May be repeated. Maximum 6 hrs. E

520 Survey of Adult Education (3) Historical development, philosophies of adult education agencies, associations, programs, issues, and literature illustrating process of adult education and diversity of continuing education. Prereq: Consent of instructor. F, Su

521 Program Development and Operation in Adult Education (3) Theories and methods from research to practice in planning and operating adult education programs. Prereq: Consent of instructor. F, Su

522 Adult Development (3) Changes in characteristics of adults over life span and implications for adult education. Prereq: Consent of instructor. F, Su

523 Post-Secondary Education for Adults (3) History, evolution, philosophy, structure and functions of post-secondary, sub-university institutions, their programs and clientele. Prereq: Consent of instructor. Sp, Su

524 Continuing Professional Education (3) Theories and concepts supporting design and management of educational programs for adults in professions. Prereq: 520 or equivalent. Sp

526 Characteristics of Adult Learners (3) Key characteristics of adult learners, and applications to teaching and learning contexts.

527 Controversies in Adult Education (3) Controversies confronting field of adult education; development of critical analysis skills by looking at controversies from different perspectives.

620 Seminar in Adult Education (3) Issues in adult education, theories and concepts, philosophical positions, research trends and methodologies. Prereq: 510 or equivalent. F, Su

621 Advanced Seminar in Program Planning (3) Conceptual principles, and theories related to program planning in adult education. Prereq: 521 or equivalent. Sp, Su

622 Advanced Seminar in Adult Development (3) Adult development research. Designing research for studies of life cycle. Prereq: 522 or equivalent. Sp, Su

626 Adult Problem Solving and Learning (3) Contemporary research and theoretical aspects of adult problem solving and learning. Prereq: 522 or equivalent. F, Su

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 and inter-group skills, conflict management, 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 background to read and understand technical professional literature. Intro-
529 Politics of Education and Educational Environments (3) School/community relations in political context of modern complex society. Administrator and supervisory competencies: political, social, ethnic, cultural, and racial environments in which schools operate. Prereq: M.S. introductory core or consent of instructor. F.Su

535 Administrative Applications of Micro Computers (3) DOS, word processing, data based management, spread sheets, and computer communications. Review and development of specific administrative applications: scheduling, attendance, 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 administrative 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 operation of quality educational environments. M.S. Introductory core or consent of instructor. F.Su

548 Introductory Supervision and Personnel (3) Basic supervision and personnel concepts and related competencies; building (or micro-organizational) level; interviewing, personnel planning, collecting and maintaining employee information, supervision of instructional and non-instructional personnel, work evaluation, and staff development. Prereq: Introductory M.S. core or consent of instructor. F.Su

553 Strategies of Educational Planning (3) Processes for improving decision-making function through use of both quantitative and qualitative planning techniques. Policy analysis, CPM, PERT, Delphi. 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. F.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 585. Prereq: 21 hrs in educational administration and supervision or consent of instructor. E

582 Educational Leadership and District-Level (3) Role of central school 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

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/N or letter grade. E

595 Elementary Principals Seminar (1-3) For in-service training of elementary school administrators. Development, planning, 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/N or letter grade. F.Su

596 Middle School Principals Seminar (1-3) For in-service training of middle school administrators. Development, 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/N or letter grade. F.Su

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/N or letter grade. E

665 Advanced Seminar in Administrative Theory (2) Interdisciplinary seminar. Readings selected by faculty for research and scholarly value from early to current classic theoretical studies and current periodical literature in educational administration. Required of Ph.D. students in Education. Prereq: Doctoral student in Education.

610 Internship in Educational Administration (3) Opportunity for doctoral students and advanced graduate students to gain experience in performance of critical tasks of educational administration under supervision of practitioner and University, release finances. May be repeated at discretion of student's committee. Maximum 12 hrs. S/N or letter grade 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

619 Research Methods (3) Overview of descriptive and experimental research methods, sampling, 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 processes. Political analysis of operation of public school systems and higher education institutions. Interdisciplinary discussions of community power structures and special interest groups. Prereq: 619 or consent of instructor. F

644 Educational Finance and Business Management (3) Conceptual, organizational, and personnel concepts and related competencies; building (or micro-organizational) level; interviewing, personnel planning, collecting and maintaining employee information, supervision of instructional and non-instructional personnel, work evaluation, and staff development. Prereq: Introductory M.S. core or consent of instructor. F.Su

655 State-Federal Relations in Education (3) Interrelationships of federal, state, and local responsibilities and organization for education by analysis of traditional, legal, fiscal and functional aspects of educational partnership. Funding partnerships; discussion of grant proposes and interorganizational development processes. S

656 Legal Foundations of Public Education (3) School law: constitutional foundations as they relate to public education at state and local levels. F.Su


670 Values and Ethics in Educational Leadership (3) Examination of ethical dimensions of work of educational administrators; assistance to current and prospective administrators to deal with moral issues and principled problems. Prereq: 619 or consent of instructor. F.Su

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. F.Su

690 Special Topics (1-3) May be repeated. E

Higher Education

GRADUATE COURSES

530 Special Topics (1-3) May be repeated. E

542 The College Student and the Court (3) Legal precedent affecting student personnel services in public higher education. Student discipline, housing, drug, organizations, activities fees, tuition and related federal regulations. F

543 American Higher Education in Transition (3) History, philosophy, purposes, functions, organizations and programs in American higher education. F

570 Introduction to Student Personnel Work in Higher Education (3) Historical, philosophical and organizational perspective. Functional areas comprising field and major issues. F

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 and evaluation assessment techniques. Sp

599 Practicum in College Student Personnel (1-6) Prereq: Consent of instructor. May be repeated. S/N or letter grade. E

619 Administration and Governance of Higher Education (3) Central concepts and processes 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 termination, religion, tort liability, administrative law, academic due process and affirmative action in employment. Sp

664 Cognitive and Instructional Development (3) Cognitive and instructional development theories: cognitive psychology, individual differences, and learning outcomes. Prereq: Consent of instructor. F.Su

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/N or letter grade. E

698 Seminar in Higher Education (3) Analysis of administrative and organizational structure, theory and practice in management of American colleges and universities. Prereq: 543 or consent of instructor. Su

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/N or letter grade. E


518 Educational Specialist Research and Thesis (3) May be repeated. P/NP only. E

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

693 Independent Study (1-3) May be repeated. S/N or letter grade. E
Life Sciences
(College of Arts and Sciences)

MAJOR DEGREES
Life Sciences ............................................. M.S., Ph.D.

Howard I. Adler (Liaison), Chair

Coordinating Council:
Becker, Jeff M., Cellular, Molecular and Developmental Biology
Richard S. Saudargas, Ethology
Schwarz, O. J., Plant Physiology and Genetics
Dougall, D. K., Biotechnology
Farkas, W. R., Environmental Toxicology
Vaughan, Gerald, Physiology

The programs leading to the M.S. and Ph.D. degrees in Life Sciences are interdepartmental and intercollegiate programs which augment the programs of individual departments. The Life Sciences Council supports studies and research in the following concentrations: physiology; biotechnology (M. S. only); cellular, molecular and developmental biology; environmental toxicology; physiology; and plant physiology and genetics. Students interested in any of these areas should contact either the chair of the department or the director of the area of interest. Each program is overseen by a committee and may have unique admission and graduation 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. Coursework including a year of calculus (differential and integral), one year of chemistry, and a year of physics. Specific course deficiencies may be corrected during the first year.

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 coursework numbered above 500, 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
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 formal 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 511; Microbiology 410; Botany 451; Chemical Engineering 475; and Zoology 507.

Cellular, Molecular and Developmental Biology
The interdepartmental program in cellular, molecular and developmental biology includes research in structural or functional aspects of cells or subcellular components, or the interactions between cells. Required courses are Life Sciences 511, 512, 531, and 532.

Environmental Toxicology
The toxicology program provides intensive training in basic toxicological principles and techniques. Courses and research expose trainees to mechanisms of intended and unintended interactions between living systems and potentially toxic agents from the point of view of biochemistry, physiology, ecology, public health, environmental law and regulation, pest management, pollution control and repair, and testing and residue analysis of toxicants. Required courses are Biochemistry 561, 562, 604; and Life Sciences 610.

Ethology
Ethology is the naturalist study of normally occurring animal and human behavior. The program provides intensive training in basic ethology with specialized studies available in the development, evolution, and physiology of behavior; comparative psychology; human ethology; and behavioral ecology and sociobiology. Required courses for the master's are Psychology/Zoology 450, 459; Zoology 524, 583; Statistics 531-32; and Zoology/Psychology 516.

Ph.D. requirements are the same as for the master's with the additional requirements of one additional statistics course and six semester hours of courses numbered above 600 approved by student's committee.

Physiology
The interdepartmental program in physiology includes research in the areas of cellular, comparative, developmental, exercise, muscle, neurophysiology, regulatory, or reproductive. Required courses are Zoology 520, 521; Human Anatomy, Comparative Vertebrate Biology, 420; Biochemistry 410; four 600-level semesters; and a statistics sequence. 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 511, 512; Plant and Soil Science 471 or Zoology 560; Plant and Soil Science 55; 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/N 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) Specializes in biotechnology; cellular, molecular, and developmental biology; environmental toxicology; physiology; plant, physiology and genetics; and physics. May be repeated. Maximum 6 hrs.

511 Advanced Cellular Biology (3) Cell structures and functions at molecular and supramolecular level. Membrane structure, function, and biogenesis; cellular communication; receptors and membrane flow; growth regulation and oncogenes; plant cell structure and function; contractility and mobility; mitosis and meiosis; blood and immune cells.

512 Advanced Molecular Biology (4) (Same as Biochemistry 512.)

525 Research Practicum in Life Sciences (1-3) Individual sections for each of biotechnology; cellular, molecular and developmental biology; environmental toxicology; ethology; plant physiology and genetics; and physics. May be repeated. Maximum 6 hrs.

529 Biotechnology Practicum Co-operative Experience (2) Work experience in commercial organization for students undertaking non-thesis option of biotechnology concentration. Evaluation by supervisor and written report by student. May be repeated. Maximum 4 hrs.

531 Biotechnology Laboratory (3) Growth of microorganisms, analysis of extracellular and intracellular components.

532 Biotechnology Laboratory (3) Pilot scale yeast cultivation, enzyme isolation, purification and characterization. Application of purified enzymes to food production fermentations and fermentation processes control.

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

610 Advanced Topics in Life Sciences (1-3) Topics vary. May be repeated. Maximum 6 hrs.

Logistics
See Marketing, Logistics and Transportation

Management
(College of Business Administration)

MAJOR DEGREES
Business Administration ......................... MBA, Ph.D.
Oscar Fowler, Head

Professors:
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, organization 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 configurations; organization design; social influences on organization 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 only by prearrangement 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 systems.

551 Management of New Ventures (3) Integration of various functional disciplines and their application to general management of ventures formed both within larger corporations and independently. Preparation of a venture plan, case analysis.

567-68 Proseminar in Industrial/Organizational Psychology (3, 3) Readings 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 international business firms and impact of internal and external factors on managerial decisions.

581 Environmental Management (3) Managerial framework 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 analysis of current issues, concepts, and practices. Consent of instructor. May be repeated. (Same as Psychology 567.)

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. Research proposal.

610 Seminar in Advanced Organization Theory (3) Analysis of functioning of complex organizations. Classical and systems models, organization growth and change, organizational effectiveness and design of complex organizations.

611 Seminar in Strategic Management I (3) Analysis of research 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. Understanding evolution 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 625.)

626 Seminar in Industrial Psychology (3) In-depth analysis of current issues and problems; performance appraisal/criterion 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 methods: advanced quantitative psychometrics and employee selection. Prereq: 567, 568, consent of instructor. May be repeated. (Same as Psychology 632.)

638 Current Topics in Industrial/Organizational Psychology (1, 1-3) Readings in industrial and organizational psychology. Available only by prearrangement with supervising faculty member. May be repeated. Maximum 6 hrs. S/NC or letter grade.

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.)
Supporting areas are available in other departments of the College of Business Administration (excluding statistics) as well as in computer science, public administration, ecology, and other areas, subject to approval by the Management Science Committee.

Admissions Requirements
The master's program requires three applicant recommendation forms and the GRE or GMAT. Applications are encouraged from all majors, but mathematics background equivalent of 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 one semester for full-time students. However, students may start the program in any semester and may pursue an M.S. degree in Management Science on a part-time basis.

Course Requirements

Hours
Core Requirements 14 Management Science 531, 532, 533, 534 Statistics 563 Applied specialization area 9 (approved by advisor) Statistics elective—500 level or above (approved by advisor) or Mathematics—400 level or above (approved by advisor) Electives selected from mathematics, statistics, computer science, and/or management science area 9 TOTAL 38

A thesis option is available to qualified students which substitutes 6 hours of thesis credit for the following 9 hours of course work: Management Science 534, 3 hours in the applied concentration area and 6 hours of electives in any area. 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. For example, an undergraduate mathematics major with a strong background may be allowed to take 6 additional hours of electives in place of the mathematics requirements. On the other hand, a student lacking experience in rigorous senior-level mathematics courses will be asked to take such courses to fulfill the 6-hour mathematics requirement. The total course load will remain 38 hours for all non-thesis students and 36 hours for all thesis students; however, the number of hours of electives can be reasonably expected to vary between 6 and 12 as a function of prior background.

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. The candidate may choose from the business functional areas (accounting, finance, marketing, management, and transportation and logistics) or other disciplines, (e.g., computer science, forestry, ecology, and public administration);
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 taken for graduate credit (exclusive of thesis or dissertation) is required. Some of this may be the coursework from a master's program although a master's is not a prerequisite for the doctorate. The candidate must complete a minimum of 24 semester hours at the University of Tennessee, Knoxville, at least 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.

Master of 12 to 14 semester hours in mathematics coursework must be demonstrated by passing a written qualifying examination. Topics normally include numerical analysis, either Mathematics 471, 472, 453, and 571, or 571-572, and real analysis, Mathematics 445-446. Other options may be approved. In exceptional circumstances, the faculty will consider waiving the mathematics and/or statistics qualifying examinations.

These requirements generally are completed by the end of the first year of the program. There is no foreign language requirement.

Comprehensive Examination
Prior to admission to candidacy for the degree, and normally after completion of the second year of the program, the student must pass a written comprehensive examination covering the theory of deterministic and stochastic management science models. Topics included in this examination are determined on an individual basis. Students will be expected to demonstrate an integrative ability that goes beyond simple mastery of course content.

Research and Dissertation
The student must complete 24 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 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 semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. SNC only. E
532 Stochastic Models in Management Science (3) Discrete-time Markov chains, Poisson processes, continuous-time Markov chains, renewal theory, and queuing theory. Prereq: Statistics 563 and Mathematical Analysis or consent of instructor. Sp
533 Computational Mathematical Programming (3) Advanced modeling, computational and reporting techniques in practical mathematical programming. Prereq: 531 and proficiency in PASCAL.
534 Application of Management Science Methods (3) Application of methods from 531 and 532 to real world problems. Exposure to existing problem in industry or elsewhere.
581 Special Topics in Management Science (3) Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.
Marketing, Logistics and Transportation

College of Business Administration

MAJOR DEGREES

Business Administration............. MBA, Ph.D.

David W. Schumann, Head

Professors:

Barnaby, D. J., Ph.D. .................. Purdue
Cadotte, E. R., Ph.D. .................. Ohio State
Davis, F. W., Jr., Ph.D. ............... Michigan State
Dicer, G. N., DBA ...................... Indiana
Frye, J. L. (Emeritus), Ph.D. .......... Florida
Hendrix, F. L. (Emeritus), Ph.D. ..... North Carolina
Langley, C. J., Jr., Ph.D. ............. Penn State
Mentzer, J. T., Ph.D. .................. Michigan State
Mundy, R. A., Ph.D. ................. Penn State
Patton, E. P., Ph.D. ................. North Carolina
Woodruff, R. B., DBA ............... North Carolina

Associate Professors:

Foggin, J. H. (Liaison), DBA .......... Indiana
Gardial, S. F., Ph.D. ................. Houston
Reizenstein, R. C., 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
Holcomb, M. C., Ph.D. .............. Tennessee
Johnston, T. C., Ph.D. .............. California
Moon, M. A., Ph.D. ................. North Carolina
Song, X. M., Ph.D. ................. Virginia

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, 502, 503, and 504. For management—511 and 512.

Ph.D. Concentration: Logistics and Transportation

Minimum course requirements for logistics and transportation—12 hours to include 601, 602, 603. From marketing—12 hours from among the following courses: 601, 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 not be used toward degree requirements. May be repeated. S/NC only. E

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, psychological, 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 analysis 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 merit of research project. Prereq: Business Administration 504 and 505 or consent of instructor.

506 Marketing Strategy (3) Integration of concepts and analytical skills from each component area of marketing to formulate cohesive, well-organized marketing programs. Social, psychological, and demographic factors that affect consumer product, brand, and patronage decisions. Prereq: Business Administration 504 and 505 or consent of instructor.

511 MBA Marketing Concentration (6) Determination of customer value. Principles of consumer behavior, marketing research, and building customer value. Prereq: Business Administration 504 and 505 or consent of instructor.

512 MBA Marketing Concentration II (6) Delivery of customer value. Communication of customer value, marketing strategy, and providing customer responsive organizations. Prereq: Business Administration 504 and 505 or consent of instructor.

550 Market Opportunity Analysis for New Ventures (3) Concepts for understanding coverage of new ventures. MOA and various information sources and procedures; identify and analyze sales opportunities in markets for new product or service. Prereq: Consent of instructor.

593 Independent Study (3) Directed research and study. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

599 Special Topics Seminar (3) Topics vary; nonbusiness marketing applications, macroenvironmental issues, market segmentation, international marketing, services marketing, marketing channels, and related issues. Prereq: Consent of instructor. May be repeated. Maximum 8 hrs.

Logistics and Transportation

GRADUATE COURSES

501 Survey of Logistics and Transportation (3) U.S. logistics and transportation: physical, economic, social, and political environment; financing, managing, maintaining, and enhancing U.S. transportation infrastructure.

504 Analytical Study for Marketing Decisions (3) Major determinants of opportunity in markets, framework for finding markets and analyzing them for opportunity, application of market opportunity analysis 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 merit of research project. Prereq: Business Administration 504 and 505 or consent of instructor.

506 Marketing Strategy (3) Integration of concepts and analytical skills from each component area of marketing to formulate cohesive, well-organized marketing programs. Social, psychological, and demographic factors that affect consumer product, brand, and patronage decisions. Prereq: Business Administration 504 and 505 or consent of instructor.

511 MBA Marketing Concentration (6) Determination of customer value. Principles of consumer behavior, marketing research, and building customer value. Prereq: Business Administration 504 and 505 or consent of instructor.

512 MBA Marketing Concentration II (6) Delivery of customer value. Communication of customer value, marketing strategy, and providing customer responsive organizations. Prereq: Business Administration 504 and 505 or consent of instructor.

550 Market Opportunity Analysis for New Ventures (3) Concepts for understanding coverage of new ventures. MOA and various information sources and procedures; identify and analyze sales opportunities in markets for new product or service. Prereq: Consent of instructor.

593 Independent Study (3) Directed research and study. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

599 Special Topics Seminar (3) Topics vary; nonbusiness marketing applications, macroenvironmental issues, market segmentation, international marketing, services marketing, marketing channels, and related issues. Prereq: Consent of instructor. May be repeated. Maximum 8 hrs.

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

601 Marketing Theory (3) Nature and scope of marketing, role of theory development and theory testing important to marketing research.

602 Research Methods (3) Research process: problem formulation, research and experimental design, measurement and implementation of results. Decision: experimental design, survey research, and measurement.

603 Marketing Thought (3) Marketing literature across number of research areas. Evaluate individual works, determine state of research in each area, and identify areas that merit further study.

604 Seminar in Buyer Behavior Research (3) Behavioral study of people in their roles as buyers and users of goods and services both individual and group processes.

605 Research Methods (3) Analytical study for marketing—research and role of reductive methods. Models and model building in marketing—consideration of decision theory, linear programming, simulation and other mathematical representations of marketing phenomena.

606 Special Topics (3) Topics vary: marketing strategy, advanced consumer behavior, influence and persuasion theory and strategy, pricing issues, international marketing issues, and nonprofit organization marketing issues.
Materials Science and Engineering

(College of Engineering)

MAJORS DEGREES

Metallurgical Engineering M.S., Ph.D.
Polymers Engineering M.S., Ph.D.

Joseph E. Spruiell, Head

Professors:
Bogue, Donald C., Ph.D. Delaware
Borie, Bernard S., Ph.D. MIT
Brooks, C. R., Ph.D. Tennessee
Buchanan, Raymond A., Ph.D. Vanderbilt
Clark, Edward S., Ph.D. California
Fellers, J. F., Ph.D. Akron
Liew, P. K., Ph.D. Northwestern
Lowndes, Douglas 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
Stansbury, E. E. (Emeritus), Ph.D. Cincinnati

Associate Professors:
Becker, William T., Ph.D. Illinois
Benson, R. S., Ph.D. Florida State
Meek, Thomas T., Ph.D. Ohio State

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.

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. 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 requirement is 21 hours in the Department of Materials Science and Engineering and up to 12 hours in other engineering or science courses. The candidate's degree program must be approved by the faculty committee.
2. Satisfactory completion of a critical review of the literature in an area related to metallurgical, polymer or materials engineering (580).
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.

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 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 Arkansas, 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 II (3) Description of stress and strain; linear elastic constitutive equations, isotropic and anisotropic moduli in various materials; yield criteria; brittle fracture, crazing; plastic strain constitutive equations, forming operations and limits criteria.
425 Fracture-Safe Design (3) Fracture mechanics; design and failure analysis of machine elements; fatigue behavior; stress concentration; stress singularity; fracture toughness; fracture criteria; plastic zone evaluation; location of cracks.
470 Environmental Degradation of Materials (3) Mechanisms, measurement techniques and control of environmental degradation processes in metals, polymers, ceramics and composites; materials selection and design considerations.
475 Fracture-Safe Design (3) (Same as Engineering Science and Mechanics 425.)
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
503 Graduate Seminar in Metallurgical Engineering (1) Prereq: Admission to graduate program. May be repeated. S/NC only. E
504 Graduate Seminar in Polymer Engineering (1) Prereq: Admission to graduate program. May be repeated. S/NC only. E
505 Engineering Analysis (3) (Same as Chemical Engineering 505.)
522 Defects in Crystals (3) Analytical and experimental analysis of defect interactions in solids. Prereq: 421 or consent of instructor.
523 Plastic Deformation of Metals (3) Geometry and mechanisms of single crystal plastic deformation; slip, twinning, and cleavage, work hardening, effect of temperature, loading rate effects; effect of ordering and solid solution alloying; polycrystalline behavior in terms of single crystal deformation mechanisms; texture formation. Prereq: 301, 320 or consent of instructor.
524 Metallurgical Thermodynamics (3) Applications of chemical thermodynamics to metallurgical problems: refining, oxidation, surface treatments, alloy systems. Prereq: 570 or equivalent.
525-26 Welding Metallurgy (3,3) Welding processes; physical metallurgy of welding; phase transformations; heat flow; residual stresses; theories of hot cracking, cold cracking and porosity formation; applications to process utilization.
529 Diffusion in Solids (3) Phenomenology and atomic mechanisms of diffusion in solid state; Solution and applications of diffusion equations; random walk problem and mechanisms of diffusion; diffusion in dilute and concentrated alloys; Kissinger effect; high diffusion paths.
530 Phase Transformations in Metallic Materials (3) Thermodynamics of phase equilibria, theory of nucleation in solids; kinetics and morphology of diffusion controlled growth; kinetics of interface controlled phase transformations; crystallography and kinetics of martensitic transformations.
531 Advanced Corrosion (3) Analyses of corrosion processes in terms of polarization measurements and Pourbaix diagrams; influence of environment and mechanical factors contributing to pitting, crevice, fretting, wear, fatigue and stress corrosion. Prereq: 470 or consent of instructor.
540 Basic Polymer Chemistry (3) Synthesis, reactions and degradation of polymers; molecular characterization; solution methods and spectroscopy. Prereq: Semester of organic chemistry and thermodynamics or equivalent.
541 Fluid Mechanics and Polymer Processing (3) Navier-Stokes equations and illustrative problems; applications; chemical reaction, polymer engineering, packed and fluidized beds, multiphase systems. Basic concepts in rheology: applications in polymer processing; free extrusion, fiber spinning, injection molding. (Same as Chemical Engineering 541.)
542 Further Topics in Polymer Processing (3) Description and analysis of selected polymer processing operations. Prereq: 541.
543 Basic Polymer Physics (3) Essential structure-property relations in materials. Physical structure of polymers; Mechanical, electrical and thermal properties. Coreq: 540.
544 Polymer Solution Thermodynamics and Characterization (3) Theories of solutions, statistical thermodynamics. Characterization, treatment of chromatography, viscosity, light scattering, and spectroscopic pressure. Prereq: Undergraduate physical chemistry.
546 Mechanical Properties of Solid Polymers (3) Types of mechanical behavior; Hookean and rubber elasticity; plastic deformation; fracture; linear viscoelasticity; dynamic mechanical behavior and testing; loss tangent; experimental methods. Introduction to mechanical properties of polymeric composites.
549-50 Laboratory Methods in Polymer Engineering (1,1) Basic experimental techniques and instrumentation associated with characterization x-ray and light scattering, calorimetry, rheometry, mechanical properties of solid polymers, polymer processing operations. Coreq: 540 or consent of instructor.
560 Principles of Ceramic Processing (3) Treatment of ceramic raw materials preparation and characterization; powder consolidation: drying, firing, sintering techniques, mechanisms and kinetics. Prereq: 560 or equivalent.
561 Inorganic Glass Forming Systems (3) Physical and chemical nature of inorganic glasses; structural theories of glass formation; major glass forming systems; silica, other oxide glasses, nitrile glasses, water glasses, and chalcogenide glasses. Prereq: 360; Chemistry 371.
562 Experimental Materials of Composite Materials (3) (Same as Engineering Science and Mechanics 562.)
571 Electron Microscopy (3) Operation of electron microscope; kinematical and dynamical diffraction theories; structure determination; analysis of defects defects. Prereq: 304 or equivalent.
572 X-Ray Diffraction (3) Symmetry of crystals, space group theory, reciprocal lattice and application to definition of structures; refinement of single crystal x-ray techniques; introduction to crystal structure determination: characterization of orientation; application to inorganic, metallic and polymer structures.
573 Biomaterials Analysis and Development (3) Physical-property limitations of current surgical implant materials and methods of improvement; resistance to corrosion and mechanical damage; detrimental effects of specific metal ions; development of new biomaterials and new materials processing techniques. Prereq: 470, 474 or consent of instructor.
574 Formability of Materials (3) Modeling and analysis of finite plastic strain with application to primary and secondary forming operations; crystalline and noncrystalline materials; flow localization, instability, predictive testing. Prereq: Consent of instructor.
576-77 Special Topics in Materials Science and Engineering (3,3) Topics of current significance and interest. Prereq: Consent of instructor. May be repeated.
580 Technical Review and Assessment (3) Preparation of critical review literature in area related to materials science and engineering; Must be taken by students in non-thesis option. Prereq: Consent of faculty committee.
600 Doctoral Research and Dissertation (3-15) P/NP only. E
621-22 Theoretical Metallurgy (3,3) Topics in solid state physics as applied to metallurgy: introduction to quantum theory, specific heats, electron theory of solids, electrical and thermal conductivity, magnetic properties, theories of alloy formation. Prereq: Consent of instructor.
623-24 Solidification and Crystal Growth (3,3) Theories of solidification, fluid flow effects, magnetohydrodynamics of incompressible fluids, growth stability theory, thermodynamic applications, rapid solidification theory, metastability. Prereq: Consent of instructor.
641 Advanced Rheology and Viscoelastic Theory (3) Continuum mechanics, formulation of viscoelastic theories for describing deformation and flow of polymeric materials. Application to polymer processing problems. Recommended for MS candidates working in rheological areas. Prereq: 641.
642 Advanced Topics in Polymer Processing (3) Application of rheological theories of behavior and of structure development to analysis of polymer processing operations. Prereq: 541. (Same as Chemical Engineering 642.)
643 Phase Transformations in Polymers (3) Glass transition and glassy state; annealing of polymeric glasses; crystallization of polymers, nucleation, growth and morphology; secondary nucleation theory; solidification of copolymers; crystallization under stress. Prereq: 543.
671 Quantitative Microscopy (3) Principal acoustic, optical, x-ray, neutron, and field-ion techniques for examination of microstructures of materials. Prereq: 405.
676 Advanced Topics in Materials Science and Engineering (3) Latest developments and/or advanced special topics. Prereq: Consent of instructor. May be repeated.
678 Seminar in Recent Advances in Materials Science and Engineering (3) Directed and independent study of advanced topics. Prereq: Consent of instructor. May be repeated.

Mathematics

DEGREES

MAJOR

Mathematics ..................................... M.M., M.S., Ph.D.

John B. Conway, Head

Professors:
Alexiades, V., Ph.D. ............................... Delaware
Aliakos, N., Ph.D. ................................. Brown
Anderson, D. F., Ph.D. ............................ Chicago
Baker, G. A., Ph.D. ............................... Cornell
Bradley, John S. (Emeritus), Ph.D. ............ Iowa
Carruth, J. H., Ph.D. .............................. Louisiana State
Clark, C. E., Ph.D. ................................. Louisiana State
Conway, J. B., Ph.D. .............................. Louisiana State
Daverman, Robert J., Ph.D. .................... Wisconsin
Dessart, Donald J., Ph.D. ....................... Maryland
Dobbs, E. D., Ph.D. ............................... Cornell
Dyjak, J., Ph.D. .................................... Warsaw
Frandsen, Henry, Ph.D. ........................... Illinois
Gross, L. J., Ph.D. ................................. Cornell
Hallam, T. G., Ph.D. .............................. Missouri
Hinton, D. B., Ph.D. ............................... Tennessee
Husch, L. S., Ph.D. ................................. Florida State
Johansson, K. Ph.D. .............................. Bielefeld
Jordan, G. Samuel, Ph.D. ....................... Wisconsin
Karakashian, O. Ph.D. ............................ Harvard
Kupershmidt, B. A. (UTS), Ph.D. ............... MIT
Lenhart, S., Ph.D. ................................. Kentucky
McConnell, R. M., Ph.D. ........................... Duke
Mathews, H. T., Ph.D. ............................. Tulane
Miller, D. D. (Emeritus), Ph.D. ................ Michigan
Rajput, B. S., Ph.D. ............................... Illinois
Reddy, K. C. (UTS), Ph.D. ....................... Indian IT
Rosinski, J., Ph.D. ................................. Wroclaw
Schaefere, P. W., Ph.D. ............................ Maryland
Sartib, Steve, Ph.D. ............................... Cornell
Simpson, H., Ph.D. ............................... Cal Tech
Son, K., Ph.D. .................................... Oregon State
Soni, R. P., Ph.D. ................................. Oregon State
Stallman, F. W. (Emeritus), Ph.D. .............. Illinois
Stephenson, K. R., Ph.D. ........................... Wisconsin
Sundberg, C., Ph.D. ............................... Wisconsin
Thistlethwaite, M. B., Ph.D. ................... Manchester
Wade, W. R., Ph.D. ............................... California (Riverside)
Wagner, C. G., Ph.D. .............................. Duke

Associate Professors:
Kimble, K. R. (UTS), Ph.D. ....................... Ohio State
Kuo, Y., Ph.D. .................................... Cincinnati
Mulay, S., Ph.D. ................................. Purdue
Richter, Stefan (Liaison), Ph.D. ................. Michigan
Row, W. H., Jr., Ph.D. ............................ Wisconsin
Smith, J., Ph.D. ................................. California
THE DOCTORAL PROGRAM

For the Ph.D. program in Mathematics, the student must meet the following four requirements in addition to those of The Graduate School:

1. Satisfy either the standard program or the interdisciplinary mathematical ecology concentration. A student intending to work 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 constancy of the latter option have not been violated. A student's status after electing such 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 specialty examination only twice.

4. Pass a one-year, 600-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 a 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 these subjects and by earning grades of B+ or better each semester in the courses associated with two additional subjects. The three subjects selected for written examinations must be from Groups I, II, and III. At least two groups must be represented in the three written examinations. At least three groups must be represented in the five 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 their requirements.

c. A student may take a collection of written examinations a maximum of 3 times, but no one failing examinations, counting possible repetitions, will be permitted to take another examination. An exception is that a student who does not have a master's degree in mathematics and who has been enrolled in a UTK graduate program in mathematics no longer than one year may take written examinations at one time during that year without having that sitting for the examinations or any incurred failure(s) count toward the limits imposed above.

d. At least two examinations must be taken and at least one must be passed before the start of a student's fourth year. Three examinations must be passed before the start of a student's fifth year.

"In lieu of earning a grade of B+ or better each semester in a sequence from Group I, II, or III, a student may demonstrate proficiency in that subject by passing the associated written examination. For this purpose, only one examination is permitted for each of up to two subjects, and this use of a written examination must be declared before the examination is taken so that the grade will be recorded as such if the student fails the examination. Failure of a written examination will not be recorded."

Mathematical Ecology Concentration

The student must pass written examinations in three subjects:


2. A subject from Groups I, II, and III of the standard program.

3. A subject represented by a year-long graduate-level sequence from outside the Department of Mathematics. The sequence must be approved in advance by the mathematical ecology faculty and by the departmental Graduate Committee. At least one member of the mathematical ecology faculty must be involved in the grading of the examination. The examination in this subject may be taken only twice.

The student also must earn grades of B+ or better each semester in the courses associated with two additional subjects. The student's five subjects selected for written examinations must be from Groups I, II, and III, as listed in the standard program. This requirement may not be satisfied with courses from outside the department. At least one of the subjects used to meet this requirement or the written examination subject in 2. must be from Groups I and II.

Except for the privilege of utilizing as a Group IV course a course from outside the department, this concentration is subject to the constraints and privileges specified in the standard program, including the restrictions on related subjects, the conditions a. through d. placed on the taking of written examinations, and the option to pass a written examination in lieu of earning a grade of B+ or better each semester in a sequence from Group I, II or III.

461 Topology (3) Topology of line and plane, separation properties, compactness, connectedness, continuity, functions, homeomorphisms, and topology of invariants. Prereq: 341 or consent of instructor.

471 Numerical Analysis (3) Computation, instabilities, and condition of approximations by polynomials and piecewise polynomials. Quadrature and numerical solutions of initial and boundary value problems of ordinary differential equations, stiff systems. Prereq: Numerical Algorithms I or consent of instructor. (Same as Computer Science 471.)


490 Readings in Mathematics (1-3) Open to superior students with consent of department head. Independent study with faculty guidance. Prereq: Consent of faculty mentor to supervise independent work. May be repeated. Maximum 9 hrs.

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 faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/N only. E

504 Discrete Mathematics for Teachers (3) Mathematical logic and methods of argument, sets, functions and relations, combinatorics. Normally first graduate course for students seeking M.S. 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 Analysis for Teachers (3) Development of differential and integral calculus, proofs of basic theorems. For students in Master of Mathematics program and for students in graduate programs in College of Education. May not apply toward M.S. degree in mathematics. Prereq: 1 yr calculus or equivalent.

506 Algebra for Teachers (3) Algebraic structures: integral domains and fields and their application to enumeration of discrete structures. Coreq: 505.

507 Probability and Statistics for Teachers (3) Probability models, discrete random variables, binomial, hypergeometric, and Poisson distributions. Continuous random variables. Normal distributions. Sampling theory, 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.

508 Statistics (3) Pertinent facts from measure theory, definition of abstract probability spaces; Kolmogorov's existence theorem; sequence of independent random variables and laws of large numbers; general theory of distributions of random vectors and their characteristic functions; weak convergence, weak compactness and Levy's continuity theorem in Euclidean spaces; infinitely divisible distributions and central limit problems; general concepts of conditional expectation, martingales, Doob's martingale and optional sampling theorem. Prereq: 445-46. Recommended prerequisite: 423.

527 Stochastic Modeling (3) Models in probability applied to real world situations; queuing theory; branching processes; Monte Carlo simulation. Prereq: 445-46 and consent of instructor. May not apply toward M.S. degree in mathematics.


537-38 Mathematical Principles of Continuum Mechanics (3,3) Conservation principles, equations of equilibrium for fluid and solid bodies, constitutive relations and stress, convexity properties, bifurcation phenomena, existence theory. Prereq: 431, 435, 446 or 448, or consent of instructor.

539 Seminar in Differential Equations (1-3) Prereq: Consent of Instructor. May be repeated. Maximum 12 hrs.


543 Complex Analysis (3,3) Theory of complex functions. Cauchy's theorem, Laurent series, maximum
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) May be repeated. Maximum 12 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.


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 interests and preparation of students. Prereq: 531-32 or consent of instructor. May be repeated with consent of department. Maximum 12 hrs.


649 Seminar in Analysis (1-3) Prereq: Consent of instructor. 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: 581-52 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.


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.

681-82 Advanced Mathematical Ecology (3,3) Selected topics in theoretical and applied mathematical ecology: population, community, ecosystem ecology, demography, epidemiology, environmental changes, and resource management. Prereq: 581-52. May be repeated.

Mechanical and Aerospace Engineering (College of Engineering)

MAJORS

DEGREES

Aerospace Engineering ................................................. M.S., Ph.D.

Mechanical Engineering .............................................. M.S., Ph.D.

A. J. Edmondson, Acting Head

Professors:

Armilli, R. V., Ph.D. ................................................. VPI

Braun, G. W. (Emeritus) (UTSI), Ph.D. ......................... Gottingen

Collins, Frank G. (UTSI), Ph.D., PE, Ph.D. ..................... California

Crawford, R. A. (UTSI), Ph.D. ..................................... Tennessee

Edmondson, A. J., Ph.D., PE, Ph.D. ............................. Texas A&M

Fiandro, Gary A. (Boiling Chair in Space Propulsion) (UTSI), Ph.D. ............................... Caltech

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. ............................... Clemson

Johnson, W. S., PE, Ph.D. ........................................... Tennessee

Krane, R. J., Ph.D. .................................................... Oklahoma

Liston, Hardy, Jr. (Emeritus), M.E.A. .............................. George Washington

Lo, C. F. (UTSI), Ph.D. .............................................. Cornell

Maxwell, R. L. (Emeritus), Ph.D. ................................. Case Western

Milligan, Mancil W., Ph.D., PE, Ph.D. ............................ Tennessee

Newman, M. K. (Emeritus) (UTSI), Ph.D., PE, Ph.D. ....... Georgia Tech

Parang, M., Ph.D. .................................................... Columbia

Pitts, Donald R. (Assistant, Ph.D.) ............................ NC State

Peters, C. E. (UTSI), D.A.S. ........................................ Brussells

Propulsion (UTSI), Ph.D. ........................................... Case Western

Schafer, Charles F. (UTSI), Ph.D. ................................. Kentucky

Smith, G. V., PE, Ph.D. .............................................. Penn State

Speckhart, Frank H., PE, Ph.D. ................................. Georgia Tech
Graduate programs with majors in Mechanical Engineering or Aerospace Engineering are available that lead to the degrees of Master of Science and Doctor of Philosophy with concentrations in energy conversion and utilization, propulsion, heat transfer and fluid mechanics, thermodynamics, and space engineering (UTSI only). In addition, Mechanical Engineering offers concentrations in gasdynamics, machine design and dynamics, power generation, and stress analysis; Aerospace Engineering offers structures and stress analysis, aerodynamics and gasdynamics, flight mechanics, and aeroacoustics. Each student must satisfactorily complete a program of study that has been approved by the student's committee. Specific program requirements are given below.

THE MASTER'S PROGRAM

Entry 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. Three program options are available.

Thesis Option
The requirements of this option are that the student must satisfactorily complete a program of study that includes:
1. A minimum of 24 semester hours of coursework that includes at least 12 semester hours of graduate (500 level or above) courses in the department with at least 6 semester hours in the major and normally 6 semester hours of coursework (400 level or above) in mathematics. No more than 3 semester hours of graduate coursework may be below the 500 level.
2. Six semester hours of thesis.
3. Participation in the departmental seminar program.
4. Submission and defense of a written thesis that demonstrates the ability to conduct research and report on an independent investigation.
5. Passing a final examination on all work submitted for the degree.

Course Option
This option is restricted to those students who have had the equivalent of a thesis experience or, at the time of completion of the degree requirements, have had at least three years of full-time engineering experience since receiving the Bachelor of Science degree. The evaluation of the work experience and the final selection of the student's program of study are left to the student's committee. The requirements of this option are that the student must satisfactorily complete a program of study that includes:
1. A minimum of 30 semester hours of coursework that includes at least 18 semester hours of graduate (500 level or above) courses in the department with at least 12 semester hours in the major and normally 6 semester hours of coursework (400 level or above) in mathematics. No more than 3 semester hours of engineering coursework may be below the 500 level.
2. Participation in the departmental seminar program.
3. Passing a comprehensive written and oral final examination on all coursework submitted for the degree. The student's committee will be of sufficient size to include all of the study areas reflected in the course program.

Problems Option
The requirements of this option are that the student must satisfactorily complete a program of study that includes:
1. A minimum of 24 semester hours of coursework that includes at least 12 semester hours of graduate (500 level or above) courses in the department with at least 6 semester hours in the major and normally 6 semester hours of coursework (400 level or above) in mathematics. No more than 3 semester hours of engineering coursework may be below the 500 level.
2. A minimum of 6 semester hours in 590 Selected Engineering Problems. A written report must be presented for each problem investigated.
3. Participation in the departmental seminar program.
4. Passing a comprehensive written final examination on all coursework submitted for the degree and an oral examination on all work (including problems).

THE DOCTORAL PROGRAM

Admission into the doctoral program will be granted to those applicants who have demonstrated superior achievement in their engineering background.

The student must satisfactorily complete an approved program of study that includes a minimum of 72 semester hours credit beyond the Bachelor's degree, exclusive of credit for the M.S. theses or problems, including:
1. Twenty-four semester hours in doctoral dissertation.
2. A minimum of 12 semester hours of graduate credit in mathematics in courses numbered 400 or above with a minimum of 6 semester hours numbered 500 or above.
3. A minimum of 24 semester hours in the department in courses numbered 500 and above, with at least 12 of these semester hours in the major. A minimum of 9 semester hours of courses is required at the 600 level. These are exclusive of thesis, problems, or dissertation credit. The student's advisory committee can approve a student's petition to replace one 600-level course with one or more 500-level courses (s) that are more appropriate.
4. Participation in the departmental seminar program.
5. The passing of a written and oral comprehensive examination is required as well as a successful defense of the dissertation.

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

GRADUATE CREDIT FOR UNDERGRADUATE COURSES
Senior (400-level) mechanical and aerospace engineering courses may be taken for graduate credit by non-mechanical or non-aerospace engineering majors, if approved by the student's major department. Mechanical or aerospace engineering majors may not normally use more than one 400-level engineering course to meet their advanced degree requirements. Non-mechanical or non-aerospace engineering graduate students should consult with instructors regarding prerequisites for undergraduate courses.

Mechanical Engineering

NOTE: Not all the courses listed below are available at both the UT Knoxville and the UTSI campuses.

GRADUATE COURSES

422 Environmental Noise (3) Basic principles of acoustics: measurements and control of noise in industrial and community environments. Prereq: Senior standing in engineering or consent of instructor.

451 Systems and Controls (3) Analytical models of physical systems comprised of combinations of mechanical, fluid, electrical, and thermal components; feedback control systems, transient and frequency response, stability analysis; non-linear 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 system. 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 thermal-fluid system. Participation in team design effort; design report. Prereq: 332, 344. F

486 Machines Design II (3) Application of strength and properties of materials, design factors, theories of failure to design of mechanical elements. Mini design experiences. Prereq: Materials Science and Engineering 301, Engineering Science and Mechanics 321. F,Sp

471 Refrigeration and Air Conditioning (3) Vapor compression and absorption cycles; heat pump systems; psychrometric processes; 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 and design. (2nd low and economic analysis. Prereq: 332, 344, F, Sp.


494-95 Selected Topics in Mechanical Engineering (1-4, 1-4) Problems and topics related to developments and practice in mechanical engineering. Prereq: Consent of instructor. E.

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


507 Application of Numerical Linear Algebra in Systems and Control Engineering (3) (Same as Chemical Engineering 507 and Electrical and Computer Engineering 507.)

508 Computational Mechanics (3) (Same as Engineering Science and Mechanics 551.)

509 Computational Mechanics Laboratory (1) (Same as Engineering Science and Mechanics 559.)


514 Phase Change Heat Transfer (3) Mechanisms and modeling of nucleate, transition and film boiling processes; critical heat flux; forced convection boiling and condensation; dry-out; pool boiling; condensation processes; heterogeneous nucleation; dropwise and filmwise condensation; flow condensation; liquid-solid phase change processes; one and two phase flows; mathematical modeling. Prereq: 344, 511.

516 Computational Fluid-Thermal Analysis (3) (Same as Engineering Science and Mechanics 552.)

521-22 Thermodynamics I and II (3,3) Macroscopic thermodynamics, including First and Second Law analysis, availability, phase and chemical equilibrium criteria, combustion, gas mixtures and properties relations, determination of equilibrium conditions for steam, water, ideal. rocket structure, spectroscopic data, kinetic theory, statistical mechanics, quantum physics. Schroedinger equation. Prereq: 332, 344.

523 Special Topics in Thermodynamics (3) Application of thermodynamics to topics of current interest in mechanical engineering. Prereq: Consent of instructor.

525 Combustion and Chemically Reacting Flows I (3) Fundamentals: thermochemistry, chemical kinetics and conservation equations; phenomenological approach to laminar flames; diffusion and premixed flame theory; single droplet combustion; deflagration and detonation theory; stabilization of combustion waves in laminar streams; flammability limits of premixed laminar flames; introduction to turbulent flames. Prereq: 522, 531, or consent of instructor.

526 Combustion and Chemically Reacting Flows II (3) Advanced topics: phenomenological approaches to turbulent flames; fundamentals of turbulent flow; application of probability density functions to turbulent flames; turbulent reacting flows with premixed and/or non-premixed reactants; spray combustion modes; fluidized bed combustion; chemically reacting boundary layer flow; gas turbine and/or rocket motor combustion; furnaces; introduction to supersonic combustion and hypersonic flows. Prereq: 525.


551-52 Mechanical Engineering Design (3,3) Design of mechanical engineering devices and systems. Prereq: Consent of instructor.

553 Development of Superior Products and Processes (3) Case studies of latest techniques of superior product and process development practiced in industry. Case studies of product or process yielding superior performance. Prereq: B.S. in Engineering or consent of instructor.


565 Computational Solid Mechanics (3) (Same as Engineering Science and Mechanics 553.)

560 Computer Aided Mechanical Design (3) Applications of matrices and computational techniques in static and dynamic analysis and re-design of complex three-dimensional, statistically heterogeneous mechanical structures. Prereq: 559 or consent of instructor.

567 Dynamics of Machinery (3) Kinematics and kinetics: fixed, moving and rotating coordinate systems; linear and angular momentum; energy methods; computational techniques derived from Lagrangian mechanics; variable mass; rigid body dynamics. Prereq: 383, 391.

559 Vibrations (3) Free and forced vibration of single and multiple degree of freedom systems, linear and nonlinear. Prereq: Undergraduate vibrations course.


575 Applied Artificial Intelligence (3) (Same as Nuclear Engineering 575 and Engineering Science and Mechanics 575.)

576 Expert Systems in Engineering (3) (Same as Nuclear Engineering 576 and Engineering Science and Mechanics 576.)

577 Neural Networks in Engineering (3) (Same as Nuclear Engineering 577 and Engineering Science and Mechanics 577.)
interaction of thermal radiation with conduction and convec-
tion heat transfer. Prereq: 511, 512.

513 Experimental Methods in Fluid Mechanics (3)
Experimental techniques with laboratory experiments; representative experiments: hot wire anemometry and
boundary layer measurements. Prereq: 422 or Mechanical Engineering 531.

Aerospace Engineering

NOTE: Not all the courses listed below are available at
both the UT Knoxville and the UT Space campuses.

GRADUATE COURSES

422 Aerodynamics (3) Theory and design of aero-
dynamic bodies for desired characteristics. Potential
flow theory, viscous effects, compressibility effects. Sub-
sonic, transonic, and supersonic airfoils. Prereq: 370.

423 Viscous Flow (3) Boundary layer theory; laminar
and turbulent flow, compressibility effects; numerical
solution methods. Prereq: 422 or Heat Transfer or con-
sent of instructor. Sp

424 Astronautics (3) Propulsion, trajectories, guidance,
control, and atmospheric reentry of space vehicles.
Prereq: 362; Mechanical Engineering 392. Sp

425 Propulsion (3) Principles of propulsion devices:
turbojet, ramjet and rocket engines. Prereq: 351. F

426 Introduction to Aerospace Design (3) Design
process, safety, reliability, patents, product liability,
economic analysis, optimization, design standards,

429 Aerospace System Design (4) Synthesis and
design of complete aerospace system, economic and
technical aspects. Participation in team design effort,
formal presentations and design report. Prereq: 425, 426. Sp

449 Aerospace Engineering Laboratory (3) Designing,
conducting, and reporting results of experimental ex-
ercises. Test standards and specifications. Analysis of
data and formation of conclusions. Prereq: 345, 351, 3 labs. F

495 Selected Topics in Aerospace Science (1-4)
Current problems and topics in aerospace science.
Prereq: Consent of instructor. Sp

500 Thesis (1-15) PNP 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

511 Inviscid Flow (3) Kinematics and dynamics of
inertial fluids; good flow about bodies of conformal map-
ping. Prereq: 422 or Mechanical Engineering 531. Math-
ematics 425 or equivalent.

512 Viscous Flow (3) Equations of viscous fluid flow;
laminar and turbulent flow; transition; separation;
boundary layer theory; exact and approximate solutions.
Prereq: Mechanical Engineering 531 or equivalent.

513 Experimental Methods in Fluid Mechanics (3)
Experimental techniques with laboratory experiments;
representative experiments: hot wire anemometry and
turbulence measurements, flow visualization, wind tun-
el testing, experiments with supersonic flow, experi-
ments, boundary layer measurements. Prereq: 423 or Mechanical Engineering 531.

515-16 Air Vehicle Aerodynamics and Performance
(3,3) Application of aerodynamic principles to air ve-
cicles to provide estimates of performance, stability, and
control characteristics for subsonic to hypersonic speeds.
Prereq: 511. F

521-22 Aerodynamics of Compressible Fluids (3,3)
One-dimensional internal and external flow; waves, small
perturbation theory; slender body theory; similarity rules;
method of characteristics. Prereq: 512, 515 for 516.

527-28 Aerospace Ground Test Facilities (3,3) At-
mospheric models and similarity considerations, aero-
dynamic test facilities: continuous and intermittent wind
wheels and ballistic ranges; propulsion test facilities or
air breathing and ram jet engines; space environment
and space vehicle test facilities. Prereq: 512 and 521;
Mechanical Engineering 513 and 522.

529 Rarefied Gas Dynamics (3) Binary elastic colli-
sions; kinetic theory; flow regimes; Boltzmann and model
equations, transfer equation, gas-surface interactions;
boundary conditions, free molecule, slip and transi-
tion flow; Monte Carlo simulation; experimental tech-
niques. Introduction to hypersonic real gas flows.

531 Magnetohydrodynamics (3) Electromagnetic fluid
theory; chemical kinetics; thermodynamic and thermo-
physical properties of gas plasmas; governing equations
and applications. Prereq: 422 and Mathematics 471.

532 Introduction to Turbulence (3) Microscopic ef-
facts, analogies, statistical treatment, correlation func-
tions, energy spectra, diffusion, application of turbulent
jets and pipe flow. Prereq: 511-12.

534 Atmospheric Entry (3) Reentry trajectories; lift
and drag during reentry; vehicle motion and stability during
reentry, aerodynamic heating and heat protection sys-

544 Transonic Flow (3) Nature of flow at transonic
speeds; small disturbance theory; shock wave prop-
ties; shock-free flows; strong viscous interaction phe-
nomena. Boundary layer theory. Prereq: 422 or Mathemat-
ics 471.

551Aeroelastic Phenomena (3) Principles of mechan-
ics applicable to aerospace vehicles. Equations of motion,
multi body problems, and trajectory analysis. Prereq:
Mathematics 471.

554-55 Aerospace Vehicle Stability and Control (3,3)
Statistical and dynamic longitudinal directional and lateral
stability and control. Coupled modes. Motion with free
and fixed flight control surfaces. Automatic control sys-
tems. Prereq: 423, 551.

556 Vertical or Short Take Off and Landing Aircraft
(3) Performance, stability, control of rotary wing, tilt wing,
vedored lift and jet and vertically lift aircraft. Vertical
and transition flight modes. High lift airfoil. Automatic
controls. Simulation facilities and test techniques. Prereq:
511.

557 Aerospace Vehicle Flutter and Vibration (3)
Aerelastic phenomena. Structural and aerodynamic
operators. Stability criteria for airfoils operating in oscil-
lating stream. Techniques for flutter analysis. Prereq:
551.

558 Aerelasticity (3) Dynamics of elastic structures
under aerodynamic loading. Self-excited instability. Deri-
vation of aerodynamic operator, forced response, static
and dynamic Eigenvalues of simplified structures. Appli-
cations to typical systems. Prereq: 422, 472.

561 Fundamentals of Acoustics (3) Generation,
propagation and absorption of sound in static and mov-
ing media. Prereq: Consent of instructor.

564 Spacecraft Attitude Dynamics and Control (3)
Rotational attitude dynamics of space vehicles. Gyro-
sopic instruments; passive and active attitude control
devices. Linear control theory and attitude stabilization.
Prereq: 551, Mathematics 471.

571 Space Engineering: Satellite Technology (3)
Satellite technology, spacecraft design, spacecraft systems and launch-
ing, spacecraft structure, power systems, attitude control
system, telemetry/tracking and command, and commu-
nications systems, spacecraft testing, reliability, and ap-
plication of satellites (communication, remote sensing, Earth
observation, and future applications). Prereq: 425, Mathema-
tics 471, 404.

586 Measurement Science I (3) Same as Nuclear
Engineering 588, Civil Engineering 588, Engineering
Science and Mechanics 588, and Mechanical Engineering 588.

590 Selected Engineering Problems (2-6) Enrollment
limited to students in programs problem. Prereq: Con-
sent of advisor.

595 Seminar (1) (All phases of aerospace engineering,
reports on current research at UTC. May be repeated.
S/NC only.

598 Special Topics in Aerospace Engineering (1-3)
May be repeated. Maximum 6 hrs.

600 Doctoral Research and Dissertation (3-15) PNP
only. E

631 Magnetohydrodynamics (3) Electromagnetic field
equations, motions of a single charged particle, statistical
description of plasma, Boltzmann and magnetohydro-
dynamic equations. Prereq: 512. Mechanical Engineering
513 or equivalent.

632 Magnetohydrodynamics II (3) Alfvén and shock
waves, exact solution for magnetohydrodynamic chan-
nel flow, one-dimensional model of channel flow, engi-
nerial applications of magnetohydrodynamics, propul-
sion, and power generation. Prereq: 631 and Mathemat-
ics 562.

641-42 Physical Gas Dynamics (3,3) High speed, high
temperature gas flow from molecular point of view.
Kinetic theory, statistical mechanics, equilibrium flow,
viscous and chemical rate processes, nonequilib-
rium vibrational and chemical flow, nonequilibrium ki-
netic theory, flow with transitional equilibrium.
Prereq: 522, Mechanical Engineering 522.

645 Theory of Turbulence (3) (Same as Engineering
Science and Mechanics 645.)

651-62 Advanced Aerodynamics (3,3) Subsonic, tran-
sonic, supersonic, and hypersonic flows treated in gen-
eralized and unified manner with combined viscous/
inviscid effects. Relationships among various regimes of
fluid flows. Fundamental assumptions, approximations of
approximations and consequences. Foundations of gas
dynamics, applications to airplanes, rockets, ground test-
ing and jet propulsion. Discussion of special topics
according to interest of students. Prereq: 511, 522.

681 Advanced Viscous Flow Theory (3) Critical
review of significance to governing equations. Nature of bound-
ary layer approximation as singular perturbation
problem. Uniqueness and existence of solutions. Applica-
tions of group theory. Special problem areas of interest to
students. Prereq: 512, continuum mechanics, and Mathe-
matics 562.

690 Advanced Topics in Aerospace Engineering (3)
Prereq: Consent of instructor. May be repeated. Maxi-
mum 9 hrs.

Medical Biology

See College of Veterinary Medicine and
Comparative and Experimental Medicine

Metallurgical
Engineering

See Materials Science and Engineering
Microbiology

(College of Arts and Sciences and College of Veterinary Medicine)

MAJOR DEGREES
Microbiology................................M.S., Ph.D.
Veterinary Medicine........................D.V.M.

Dwayne Savage, Head

Professors:
Beck, Raymond W. (Emeritus), Ph.D........Cincinnati
Becker, Jeffrey M., Ph.D...........................Cincinnati
Montie, T. C., Ph.D................................Maryland
Moore, R. N., Ph.D...............................California
Riggsby, W. Stuart (Liaison), Ph.D............Yale
Beck, Raymond W. (Emeritus), Ph.D........Wisconsin
Sayler, Gary S., Ph.D..............................Idaho
Savage, Dwayne C., Ph.D......................California
Riggsby, W. Stuart (Liaison), Ph.D............Yale

Assistant Professor:
Hacker, David, Ph.D............................Michigan State
Lampson, Bert C., Ph.D...........................Missouri
Villafane, Robert J., Ph.D.....................NYU
Zaghouani, Habib, Ph.D........................Paris

Microbiology

The Department of Microbiology offers both the M.S. and Ph.D. Students have the option of selecting from a variety of graduate research programs. For a departmental brochure, contact the department head.

ADMISSION REQUIREMENTS

Students are expected to have completed an undergraduate program with a 3.0 or better GPA on a 4.0 system. Included in the undergraduate course credits should be (1) a full year of general biological science, (2) one year of calculus, (3) two years of chemistry, including one year of organic, (4) one year of physics, and (5) an introductory course in microbiology. In many cases, deficiencies in requirements may be removed by taking appropriate courses during the first year of graduate study. The department also requires the general portion of the Graduate Record Examination. A satisfactory score on each part is 550 or higher with rare exceptions. Three letters of recommendation should be submitted by current or former faculty members.

Each new graduate student meets with an advisory committee chaired by the departmental Director of Graduate Studies to plan a program of study for the first or two semesters until a research advisor is selected. All first-year students participate in a laboratory rotation program during the first semester of study. This program allows the student to adjust smoothly to the research programs of the department, to develop a background of research procedures and concepts, and to facilitate the selection of a research professor. Usually the student selects a research professor toward the end of the laboratory rotation period. The major professor assists in the selection of and carrying out of a suitable research program and in the naming of a thesis or dissertation committee.

THE MASTER'S PROGRAM

The program leading to the M.S. is designed to provide the student with broad basic knowledge, to permit 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 of instruction, including 6 thesis credits; (2) a 3.0 GPA in all courses taken for graduate credit; (3) a 3.0 GPA in courses taken in the department; (4) a complete course sequence in biochemistry or molecular biology; (5) presentation of a research thesis and its oral defense.

THE DOCTORAL PROGRAM

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 oral and written communication of the results of research to the scientific community, and to train effective teachers. Students may enter the program after receiving either a bachelor's or master's degree. Students who enter with a bachelor's degree usually receive the Ph.D. after four or five years; those with the master's degree usually take three to 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 semesters 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, rickettsia, chlamydia and fungi. Prereq: Introduction to Microbiology. Sp
429 Medical Microbiology Laboratory (2) Laboratory exercises designed to accompany 420. Prereq: Introduction to Microbiology Laboratory. Coreq. 420. Sp
430 Immunology (3) Principles of immunology and immunity; immunoglobulin structure and theories of formation and diversity; complement, hypersensitivities, cell cooperation and recognition in immune mechanisms; soluble factors. Prereq: Biology 220. (Same as Zoology 430.) F
439 Immunology Laboratory (2) Laboratory exercises designed to accompany 430. Coreq. Coreq. (Same as Zoology 439.) F
449 Virology Laboratory (1) Laboratory procedures for isolation, handling, and culturing of animal viruses. Prereq: 310. Coreq: 440. Sp
470 Microbial Ecology (3) Physiological diversity and taxonomy of microorganisms from natural environments. Functional role of microorganisms in natural and simulated 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/N only. E
570 Applied and Environmental Microbiology (3) Topics in applied and environmental microbiology that treat physiology, metabolism, and genetics of microorganisms; fermentations and natural and simulated ecosystems. Prereq: 470 or consent of instructor.
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.
594 Selected Topics in Microbiological Research (2-4) Literature surveys and discussions of selected topics. Prereq: Graduate standing. May be repeated. Maximum 6 hrs. S/N only. E
595 General Seminar (1) Lectures and seminars by invited speakers, faculty, and graduate students. May be repeated. Maximum 18 hrs. S/N only. E
596 Laboratory Rotation (1) Familiarization with research areas in department through series of rotations in laboratories of individual faculty members. May be repeated. Maximum 3 hrs. S/N only.
600 Doctoral Research and Dissertation (3-15) P/NP only. E
601 Journal Club in Microbial Physiology (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/N only. E
602 Journal Club in Microbial Pathogenesis (3) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/N only. E
603 Journal Club in Immunology (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/N only. E
604 Journal Club in Virology (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/N only. E
605 Journal Club in Microbial Genetics (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/N only. E
610 Topics in Microbial Physiology (1-3) Prereq: 410 or consent of instructor. May be repeated. Maximum 12 hrs.
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: 440 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 Advanced Topics in Microbial and Molecular Genetics (3) Prereq: 411 or consent of instructor. May be repeated. Maximum 12 hrs.
670 Advanced Topics in Environmental Microbiology (1-15) Prereq: 570 or consent of instructor. May be repeated. Maximum 12 hrs.
The Department of Music offers the Master of Music degree with concentrations in accompanying, choral conducting, composition, instrumental conducting, jazz, music education, musicology, performance (organ, piano, strings, voice, winds, and percussion), piano pedagogy and literature, sacred music, string pedagogy, and theory.

Applicants must have completed an undergraduate degree approximately equivalent in music requirements to those required in degrees conferred by UT Knoxville, appropriate to the applicant's prospective area of concentration on the master's level.

Applicants who plan to pursue the concentration in performance or music education are required to audition before the appropriate area faculty committee. Applicants for admission to the program in composition must submit scores and tape recordings of representative works.

Applicants for the concentration in jazz must audition in jazz improvisation and jazz piano proficiency and interview with members of the faculty in this area. Other applicants are required to have an interview with members of the faculty of the prospective area of concentration.

All 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.

THE MASTER'S PROGRAM

A minimum of 30-33 semester hours of coursework is required for the Master of Music degree. These hours are specifically distributed according to the area of concentration. All concentrations require coursework in music history/literature and music theory and allow for elective courses. Specific curricula are available from the department.

The graduate recital is given in lieu of thesis by students with concentrations in performance, pedagogy, and accompanying. A performance project is given in lieu of thesis by students with concentrations in choral conducting, instrumental conducting, and sacred music. A thesis is required of students in composition, musicology, and theory. All concentrations require a written and oral final examination.

Concentration in Music Education

The concentration in music education is designed for persons who hold a Bachelor's degree in Music or Music Education and certification to teach music in public schools. Students seeking initial certification should consult the requirements for the Master of Science degree in the College of Education.

The program requires 510 and 520; 9 hours of music education electives at the 500 level; 6 hours of Thesis 500; 6 hours of 500-level courses in music theory or history; 2 hours of applied music at either the 400 or 500 level; and 2 hours of music ensemble at the 500 level; and 3 hours of electives at the 500 level.

A three credit research problem and three extra hours coursework in Music Education may be substituted for Thesis. If a larger thesis problem is desired, the thesis credit may be increased to 9 hours, and 3 hours of Music Education electives may be dropped.

Diagnostic tests in theory, ear training, and music history will be required.

Music 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 undergraduate facilities. May be repeated. BC 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 research report writing. Application of knowledge 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 music 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 investigations and individual reporting of pertinent topics and issues in music education. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

590 Special Topics in Music Education (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

593 Special Problems in Music Education (3) 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. Maximum 12 hrs.

505 Studio Orchestra (1) May be repeated. Maximum 12 hrs.

506 Trombone Choir (1) May be repeated. Maximum 12 hrs.

510 Percussion Ensemble (1) May be repeated. Maximum 12 hrs.

511 Marimba Choir (1) May be repeated. Maximum 12 hrs.

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.

564 Varsity Band (1) May be repeated.

566 Laboratory Band (1) May be repeated.

576 Symphony Orchestra (1) May be repeated.

580 Concert Choir (1) May be repeated.

583 Men's Chorale (1) May be repeated.

586 Women's Chorale (1) May be repeated.

599 Accompanying (1) May be repeated.
Music General

GRADUATE COURSES

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

501 Graduate Recital (2)

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 Lecture Recital (2)

521 Special Topics in Performance (1-3) Prerequisite: Consent of department head.

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.

561 Church Music Performance Project (1-2) May be repeated. Maximum 6 hrs.

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.

430 Symphonic Literature (3) Literature for orchestra from Baroque to present, evolution of symphony.

440 Music of North America (3) Folk and art music of U.S. and Canada from colonial times to present.

450 Composer Seminar (3) Life and works of single composer. Subjects vary.

460 Music Aesthetics (3) Nature of music and musical experience, sense perception and emotions, music, and role of artist in society. Aesthetic viewpoint of individuals and historical eras through selected writings.

480 Music in Christian Worship (3) Hymnody, liturgies, and liturgical music.

490 Church Music Methods and Administration (3)

510 Music Bibliography (2) Bibliographic methodology in music.

520 Music Research (1) Principles of research methodology applied to writing of research proposal and project.

530 Music in the Middle Ages (3) Gregorian and medieval chant; secular monophony, and rise of polyphony.

540 Music in the Renaissance (3) From 1400 to 1600. Mass, motet, chanson, madrigal, and other vocal and instrumental forms and genres.

550 Music in the Baroque Period (3) From c. 1600 to 1750; rise of opera and oratorio; sacred and secular cantatas, instrumental forms, performance practice.

560 Music in the Classic Period (3) Evolution of classical style from pre-classic music to music of Haydn, Mozart, and early Beethoven.

570 Music in the Romantic Period (3) Nineteenth-century musical styles from Beethoven to post-romanticists.

580 Music in the Twentieth Century (3) From 1900, Debussy, to present, Stockhausen and others.

590 World Music (3) Attitudes and techniques of ethnomusicology. Survey of world music cultures. Interview and transcription projects.

593 Independent Study (1-15) See College of Arts and Sciences. Prerequisite: Consent of department head.

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. Prerequisite: Music Education 920 or equivalent.

570 Advanced Suzuki Pedagogy (2) Study of psychology, procedures and literature utilized by Shinichi Suzuki in Japan. Prerequisite: 495 or consent of instructor. May be repeated. Maximum 4 hrs.

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. Prerequisite: 490 or equivalent.

Music Jazz

GRADUATE COURSES

410 Advanced Improvisation (3) Further development of individual skills and solving individual problems in jazz improvisation. Prerequisite: 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. Prerequisite: Studio music and jazz major or consent of instructor.

520 Seminar in Jazz (3) Topics vary.

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)

450 Percussion (1-4)

455 Voice (1-4)

460 Violin (1-4)

465 Viola (1-4)

470 Cello (1-4)

475 String Bass (1-4)

476 Electric Bass (1-4)

479 Guitar (1-4)

480 Piano (1-4)

485 Harpsichord (1-4)

490 Organ (1-4)

494 Composition (1-3)

495 Composition with Electronic Media (1-3)

496 Composition for Media (2)

499 Improvisation (1-2) May not be used toward applied music requirement.

503 Flute (1-4)

505 Oboe (1-4)

510 Bassoon (1-4)

515 Clarinet (1-4)

520 Saxophone (1-4)

525 Horn (1-4)

530 Trumpet (1-4)

535 Trombone (1-4)

540 Baritone (1-4)

545 Tuba (1-4)

550 Percussion (1-4)

551 Accompanying and Coaching (1-4)

555 Voice (1-4)

560 Violin (1-4)

565 Viola (1-4)

570 Cello (1-4)

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)

594 Composition (1-3)

595 Composition with Electronic Media (1-3)

599 Improvisation (1-4)
Music Theory

GRADUATE COURSES

430-440 Counterpoint I-II (3,3) 430-Study of species counterpoint in modal and tonal styles, works of Palestrina and J.S. Bach. Prereq: 220, 440-Writing of contrapuntal forms of 18th century and fugue, analysis of works from 18th through 20th centuries. Prereq: 430.

450 Choral Arranging (2) Analysis of scores and writing of arrangements for choirs. Prereqs: 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 atonal 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 language, 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.

530Opera 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 8 hrs.

550 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 technique; development of choral rehearsal skills. Prereq: Consent of instructor.

594 Project in Choral Conducting Performance (1-3) Public performance, critical documents; 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.

Nuclear Engineering

(College of Engineering)

MAJOR

Nuclear Engineering M.S., Ph.D.

Professors:

Thomas W. Kerlin, Head

Dodd, H. L., Ph.D. Tennessee
Kerlin, T. W. (Liaison), Ph.D. Tennessee
Mihalczewski, J., Ph.D. Pennsylvania State
Miller, L. F., Ph.D. Texas A&M
Perez, R. B., Ph.D. Madrid
Stevens, P. N., Ph.D. Northwestern
Uhrig, R. E. (Distinguished Prof.), PE, Ph.D.
Upadhyaya, B. R., Ph.D. California

Associate Professors:

Groer, G. R., Ph.D. Vienna
Katz, E. M., Ph.D. Tennessee
Scott, T. H., Ph.D. Florida

Assistant Professor:

Ruggles, A. E., Ph.D. Rensselaer

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 fusion energy or solar 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 project approved by the graduate committee.

Thesis - The student performs independent research on a topic approved by the graduate committee. He/she submits a thesis on this research. The student then must pass an oral examination on the thesis and all graduate coursework. The student must enroll for at least six semester hours of NE 600 (Thesis).

Engineering Practice - The student performs independent research on two or 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 45 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.

3. A minimum of 30 semester hours in nuclear engineering courses numbered 500 and above (or the equivalent), with at least 9 semester hours of 600-level courses. Course may be 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 specified 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 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—coursework and the dissertation.

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 Nuclear Engineering is available to residents of the states of Alabama, Kentucky, and Mississippi. The M.S. program is available to residents of the states of South Carolina or Virginia (concentration in radiological engineering only). Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE CREDIT FOR UNDERGRADUATE COURSES

400-level courses in nuclear engineering may be used for graduate credit. However, students must complete at least two-thirds of the minimum required hours (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, critical load experiment, control rod calibration, statistical weight, shielding, xenon poisoning, dynamics and controls experiments. Prereq: Nuclear Engineering Laboratory or equivalent. Coreq. 471, 405.

404 Nuclear Fuel Management (3) Variety of topics relative to nuclear fuels. Mining and milling, fuel fabrication, in-core fuel management, reprocessing and waste disposal. Economic and regulatory issues. Prereq. 470.

405 Reactor Dynamics, Control and Safety (3) Reactor models, transient analysis, safety analysis, control systems and safety systems. Prereq. 470.

406 Radiation Shielding (3) Types of radiation sources, fundamentals of gamma ray and neutron attenuation, biological effects, approximate methods of shield design, ducting, and Monte Carlo. Prereq: Physics 232.

421 Introduction to Nuclear Criticality Safety (3) Fundamentals of nuclear criticality safety; criticality accidents; safety standards, overview of experiments, computational methods, and reactor locations. 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 Radioactivity and Dosimetry Laboratory (3) Measurements of radioactivity in various materials. Characterization of radiation fields, radiochemical techniques, alpha and beta spectroscopy; radiation dosimetry.

463 Introduction to Fusion Energy I (3) (Same as Electrical and Computer Engineering 463.)

464 Introduction to Fusion Energy II (3) (Same as Electrical and Computer Engineering 464.)

470 Nuclear Reactor Theory I (3) Fundamentals of reactor physics: nuclear fission, nuclear reactions, kinetics, reactor kinetics, reactor systems and nuclear data. Analytical and numerical techniques applicable to general criticality problems, eigenvalue searches, perturbation methods, Monte Carlo techniques, and group diffusion equations. Prereq: introduction to Nuclear Engineering.

471 Nuclear Reactor Theory II (3) Thermal spectrum computational methods: heterogeneous effects in fast and thermal spectra; considerations in reactor core design; equations that define the thermal and nuclear reaction variables; power distribution calculations and reactivity control methods. Prereq. 470.

494 Special Topics in Nuclear Engineering (3) Problems related to recent developments and practice. Prereq. Senior standing and consent of Instructor. May be repeated. Maximum 6 hrs.

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 faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

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 differential conservation equations for mass, energy, and momentum; exact and approximate solutions of equations of motion; boundary layer analysis; numerical analysis of fluid flow and heat transfer.

521 Nuclear Systems Dynamics and Control (3) Introduction to state variable methods for system dynamics and control and analysis and application of these methods to nuclear plant dynamics, simulation and control problems.


541 Reactor Fuel Management (3) Topics relative to core fuel management. Applicable topics to reactor physics, fuel depletion, isotopic inventories, reactivity control and numerical methods. Prereq. 401.


543 Selected Topics in Nuclear Criticality Safety (3) Criticality safety computational and experimental methods for enrichment, fabrication, storage, reprocessing, and transport applications; overview of safety practices and regulatory requirements. Prereq. 421 or consent of instructor.

550 Nuclear Instrumentation (3) Physics and electronics associated with radiation detection, methods of data analysis, applicability of particular instrumentation. Methods and fundamentals of nuclear instrumentation operation.

551 Radiation Protection (3) Interactions of photons, neutrons, beta particles, and heavy charged particles with matter; mechanisms of energy loss; methods of radiation detection, internal and external radiation dosimetry; chemical and biological effects of radiation; regulations and standards. Prereq. Introduction to Nuclear Engineering and Differential Equations I or II.

552 Radiation Monitoring and Dose Assessment (3) Methods for area work and environmental monitoring; dose assessment; pathways analysis; risk projections and regulations. Prereq. 551.

561 Plasma Diagnostics I (3) (Same as Electrical and Computer Engineering 561.)


572 Nuclear System Design (3) Design and analysis of a nuclear system, interface with non-nuclear aspects of system design: system reliability and economics, class project. Prereq. 571 or consent of instructor.

575 Applied Artificial Intelligence (3) Symbolic methods for artifical intelligence techniques and applications on artificial intelligence techniques and applications on artificial intelligence problems. Prereq. Consent of Instructor. (Same as Engineering Science and Mechanics 575 and Mechanical Engineering 575.)

576 Expert Systems in Engineering (3) Application of expert systems in engineering: logic and rationale, developing expert systems, programming, advanced topics. Prereq. 575 or consent of instructor. (Same as Engineering Science and Mechanics 576 and Mechanical Engineering 576.)

577 Neural Networks in Engineering (3) Network technology for intelligent systems; rationale for neural networks, structure of neural computing systems, programming. Prereq. Consent of instructor. (Same as Engineering Science and Mechanics 577 and Mechanical Engineering 577.)

578 Fuzzy Systems in Engineering (3) Fuzzy numbers, fuzzy environment, uncertainty and randomness, approximate reasoning, fuzzy models and structures, decision process in fuzzy environment, fuzzy computing, fuzzy logic controllers, fuzzy expert systems and other engineering applications. (Same as Engineering Science and Mechanics 578.)

581 Reactor Shielding (3) Application of analytic/deterministic solutions of Boltzmann transport equation to shield design problems. Spherical harmonics, moment method, discrete ordinates, adjoint calculations, coupled analysis, and test reactor shield design. Prereq. 495 or equivalent.

582 Monte Carlo (3) Analysis of radiation transport problems in radiation shielding by Monte Carlo method. Description of MORSE code. Random sampling, evaluation of integrals, analog particle transport, techniques of variance reduction; forward and adjoint methods of analysis, importance function blasing, splitting/window survival biasing and contribution theory. Prereq. 581.

585 Process System Reliability and Safety (3) Qualitative and quantitative techniques for assessing and improving process systems. Overview of methods and safety; Fault tree analysis and associated dependent failure analysis. (Same as Chemical Engineering 585.)


587 Measurement Science II (3) Modern industrial measurement systems, advanced topics in measurement. Prereq. 586. (Same as Aviation Systems 587 and Engineering Science and Mechanics 588.)

597 Special Topics in Nuclear Engineering (3) Lectures and recitation on recent advances in nuclear engineering. Prereq. Consent of instructor. May be repeated with consent of department.

598 Nuclear Engineering Practice (3-9) Experience in solving and reporting on engineering problems. Prereq. Approval of department. May be repeated limited to alternative plan students. S/NC 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. 572.

621 Selected Topics in Radiation Protection (3) Prereq. 551, 552. May be repeated with consent of department.


571 Advanced Topics in Applied Artificial Intelligence (3) Recent advances in engineering applications of artificial intelligence. Prereq. 577. (Same as Engineering Science and Mechanics 571 and Mechanical Engineering 571.)

579 Special Topics in Nuclear Engineering (3) Investigations of new developments. Prereq. Consent of instructor.
Nursing

(College of Nursing)

MAJOR

Nursing ........................................... M.S.N., Ph.D.

Joan E. Uhl, Dean

Mildred M. Fenske, Associate Dean for Academic Programs

Sandia Thomas, Director of Ph.D. Program

Inez Tuck, Director of MSN Program

6

Professors:

Allgood, Martha R., Ph.D. ............. New York

Goodfellow, Delo H., Ph.D. ............ Peabody

Mozingo, Johnnie N., Ph.D. .......... Walden

Thomas, Sandra P., Ph.D. .......... Tennessee

Uhl, Joan, Ph.D. .......... Tennessee

Associate Professors:

Bowen, Sheila, Ph.D. ................. Tennessee

Davis, Mitzi, Ph.D. .......... Tennessee

Droppinian, Patricia G., Ph.D. ....... Tennessee

Dyer, Theresa, Ed.D. ............. Tennessee

Fenske, Mildred M. (Liaison), Ph.D. .... Vanderbilt

Jolly, Mary, Ed.D. ............ Kentucky

McGuire, Sandra, Ed.D. .......... Tennessee

Modrinc-McCarthy, Mary Anna, Ph.D. .... Utah

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. ................. Tennessee

Johnson, Kathleen P., M.S.N. ........ Tennessee

Evans, Ginger W., M.S.N. .......... Tennessee

Evans, Maude M., M.S.N. .......... Tennessee

Helton, Sally M., M.S.N. .......... Tennessee

Kollar, Mary, Ph.D. .......... Tennessee

Phillips, Kenneth D., Ph.D. .......... Tennessee

Pierce, Margaret, M.S.N. .......... Tennessee

Pulley, 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, parent-child nursing, mental health nursing, family nurse practitioner, and nursing administration.

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 15.

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 distributed as follows:

Core (12 credits)

500-04 Holistic Nursing

510 Theoretical Foundations of Nursing

520 Nursing Resource Management

Research (9-12 credits)

--- Graduate level statistics course

501 Nursing Research: Methods, Design & Analysis

500 Thesis

OR

580 Nursing Project

OR

582 Supervised Research

Concentration (12 credits)—choose one

530-31 Adult Health Nursing I,II

540-41 Family Nurse Practitioner I,II

550-51 Parent-Child Nursing I,II

560-61 Mental Health Nursing I,II

590-91 Nursing Administration I,II

Elective (3 credits)—waived for those who choose thesis option

Students who enter the program as non-RNs must complete the following undergraduate nursing courses in addition to meeting the requirements listed above:

701 Clinical Pharmacology

304 Introduction to Professional Nursing

304 Nursing Assessment and Health Promotion

306 Health Deviation Concepts I

311 Acute Care Nursing

316 Health Deviation Concepts II

324 Nursing of Children and Adults

414 Community Mental Health Nursing

415 Family/Community Health Nursing

Registered nurses whose bachelor’s degrees are not in nursing must have complete courses in chemistry, nutrition, microbiology, anatomy, and physiology plus 12 hours of behavioral science courses. They must also complete 304, 305, 313, 315, and 403 and complete or successfully challenge the following:

301 Clinical Pharmacology

306 Health Deviation Concepts I

316 Health Deviation Concepts II

325 Nursing of Children and Adults

402 Family Health Nursing Theory

412 Psychosocial Long Term Nursing Theory

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 for any course is found to be unsatisfactory, the student will receive a grade of "F" for the course.

2. If a student achieves a final grade of "D" or "F" for any required undergraduate or graduate nursing course, he or she will not be permitted to repeat the course and will be required to withdraw from the program.

3. If the clinical performance of any student is characterized by unethical, unprofessional or unsafe behavior, or behavior that places the client in jeopardy, the student will be required to withdraw from the program.

THE DOCTORAL PROGRAM

The College of Nursing offers a doctoral program leading to the Doctor of Philosophy degree with a major in Nursing. This is a unified program offered jointly with The University of Tennessee, Knoxville College of Nursing. Students may complete all or part of the program at either site. The dissertation must be completed in its entirety at one site.

The doctoral program prepares nursing scholars capable of integrating research, theory, and practice into their roles as researchers, educators, and/or administrators. Specifically, the graduate of this program should be able to:

1. Analyze, test, refine, and expand the theoretical basis of nursing practice.

2. Conduct nursing research that generates knowledge and advances nursing as a discipline.

3. Provide leadership as nurse researchers, educators, and/or administrators in current and emerging health care settings.

4. Collaborate with members of other disciplines in health-related research of mutual concern.

5. Analyze, develop, and recommend health care policy at various levels.

Admission Requirements

1. Meet requirements for admission to The Graduate School.

2. Hold a master's degree in nursing from a program accredited by the National League for
Nursing. Some outstanding applicants who are prepared at the bachelor's level in nursing may be considered. In such cases, graduate level courses in nursing theory, concentration specialty, and/or research will be integrated into the formal program of doctoral degree requirements.

3. Have a minimum cumulative grade-point average of 3.3 on a 4.0 scale for previous college work.

4. Have a cumulative score of at least 1000 on the verbal and quantitative sections of the Graduate Record Examination.

5. Have successfully completed a basic statistics course and graduate nursing theory and research courses prior to enrollment in nursing doctoral level courses.

6. Have TOEFL scores of at least 550 if native language is not English.

7. Complete Graduate Program Data Form, College of Nursing.

8. Submit Graduate School Rating Forms from three colleagues and officials who have supervised applicant's professional work.

9. Submit a sample of scholarly writing (e.g., thesis, published paper).

10. Submit an essay describing personal and professional aspirations.

11. Submit Graduate Application for Admission, academic transcript(s), Graduate Record Examination scores, and, if required, TOEFL scores to the Graduate School. Submit three Graduate School Rating Forms, sample of scholarly writing, and Graduate Program Data Form with essay to the Director of the PhD program prior to February 15.

12. Schedule a personal interview with the College of Nursing PhD Student Admissions Committee prior to March 15 of the year preceding Fall admission.

Program Requirements

The following courses are required for all students:

- 620 Directed Research 3
- 601-6 Theory Analysis & Construction I, II 6
- 605-6 Nursing Research Seminar 4
- 607 Qualitative Nursing Research 3
- 608 Quantitative Nursing Research 3
- 610 Nursing Science Seminar 2
- 611 Advanced Nursing Seminar 2
- 614 Nursing Pec oriop 3

--- Statistics 3
--- Ethics 12

600 Dissertation 24
TOTAL 68

Possible cognate areas include, but are not limited to, anthropology, child and family studies, psychology, education, management, medical ethics, public health, social work, philosophy, and statistics.

Doctoral Committee

Early in the student's program, a nursing faculty advisor will be selected by the student in consultation with the program director. The advisor will chair the student's comprehensive examination committee which consists of the faculty teaching core courses and one representative from the cognate area. The student then selects the dissertation committee. Five faculty holding the rank of assistant professor or above comprise the committee, three of whom (including the chair) must be approved by the Graduate Council to direct doctoral dissertations. At least two members of the committee must be from an academic unit other than nursing.

MINOR IN GERONTOLOGY

Graduate students in the College of Nursing may pursue a specialized minor in gerontology. This interdepartmental interdisciplinary minor gives the student an opportunity for combining 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 certain states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The Ph.D. program in Nursing is available to residents of the states of Alabama or Arkansas. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

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<tr>
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<td>500</td>
<td>Thesis (1-15)</td>
<td>P/NF only, E</td>
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<tr>
<td>501</td>
<td>Nursing Research: Methods, Design, and Analysis (3)</td>
<td></td>
</tr>
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<td>502</td>
<td>Registration for Use of Facilities (3-15)</td>
<td>Required for the student not otherwise registered during any semester. Classes use University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only.</td>
</tr>
<tr>
<td>504</td>
<td>Holistic Nursing: Illness (3)</td>
<td>Exploration, analysis, and application of principles of illness to nursing of clients with acute and chronic pathophysiological disease; mind-body influences and interactions. Prerequisite: Nursing Assessment and Wellness Promotion and Physiological Principles or equivalents.</td>
</tr>
<tr>
<td>505</td>
<td>Advanced Clinical Pharmacology (3)</td>
<td>Pharmacological agent presentation to treat common, recurrent, and chronic health problems; indications, contraindications, side and interactive effects of commonly prescribed drugs. Prerequisite: 501 or equivalent or consent of instructor.</td>
</tr>
<tr>
<td>510</td>
<td>Theoretical Foundations of Nursing (3)</td>
<td>Historical evolution of nursing science; examination and critical analysis of nursing's metaparadigm and selected conceptual models, philosophies, and theories; contemporary nursing research.</td>
</tr>
<tr>
<td>520</td>
<td>Nursing Resource Management (3)</td>
<td>Organizational, conflict management, decision-making, leadership, professional development, and implementation of nursing theory, principles, and concepts usable to advanced clinical nursing practice.</td>
</tr>
<tr>
<td>530</td>
<td>Adult Health Nursing I (6)</td>
<td>Exploration and application of advanced nursing, physiological, developmental, and psychosocial theories to nursing care and management of clients and their families who are experiencing episodes of acute and chronic illnesses and related crises; role of clinical nurse specialist in helping clients and families achieve optimal wellness. Prerequisite: 504. Prerequisites: 501, 520. 2 hrs and 4 labs.</td>
</tr>
<tr>
<td>531</td>
<td>Adult Health Nursing II (6)</td>
<td>Further emphasis on role of clinical nurse specialist in providing and managing nursing care for acutely and chronically ill adults across life span; exploration, analysis, and application of selected advanced management, supervisory, organizational, and leadership theories; application of health related concepts and research to implementation of clinical nurse specialist role. Prerequisites: 530. 2 hrs and 4 labs.</td>
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</tbody>
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550 Parent Child Nursing I (6) | Exploration and application of selected advanced nursing, physiological, psychological, developmental, environmental, cultural, and other theories, principles, and concepts to child-bearing or child-rearing families in acute care or community settings; family wellness; interventions designed to recognize and respond to threats to wellness of mothers, neonates, children, and adolescents. |

551 Parent Child Nursing II (6) | Continuation of 550. Seminar and clinical practicum: designed to facilitate further development of specialized knowledge and skills used for advanced practice. Role refinement of clinical nurse specialist or nurse practitioner in management of women and child-bearing or child-rearing families in community, hospital, or other health care settings. |

557 Nurse Midwifery Seminar I (6) | Exploration of art and science of midwifery, nature and scope of midwifery practice, professional and ethical issues in advanced practice. Prerequisites: 501, 510. |

558 Nurse Midwifery Seminar II (6) | Exploration of psychological, developmental, and sociocultural theories as related to individuals and family patterns of illness and wellness. Role of nurse-midwife in advanced practice promoting optimal wellness within clients and community. |

560 Mental Health Nursing I (6) | Exploration and application of advanced theories of therapeutic nursing intervention to clients experiencing mental health problems. Options for clinical practice with clients of various age groups in acute care or community settings. Prerequisite: 504. Prerequisites: 501, 520. 2 hrs and 4 labs. |

561 Mental Health Nursing II (6) | Continuation of 560. Groups and families with mental health problems. Seminar and clinical practicum designed to focus on advanced practice and development of specialized knowledge and skills. Prerequisites: 560. 2 hrs and 4 labs. |

566 Teaching Practicum (1-6) | Individually designed teaching experience in collegiate nursing program or nursing practice setting. Objectives are determined by student and faculty. Prerequisite: 504. Consent of instructor: S/NC or letter grade. |

566 Educational Principles and Strategies (3) | Exploration and analyses of selected education, curriculum, teaching-learning, measurement, and evaluation principles.
ciples and theories as applied to instruction of under-
graduate nursing students, staff development, and pat-
tient education of an instructor.

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) Research culminating in scholar-
ly paper. Student initiated project with faculty permis-
sion. Small research utilization project, pilot study, or "state of the science" project in clinical area. Original research projects may require human subject approval in prior semester or extension to two semesters. Prereq: Consent of instructor, 501, 510. May be repeated. Maximum 6 hrs. E

582 Supervised Research (3) Supervised research culminating in scholarly paper. Experiential learning of research process. Participation in on-going faculty re-
search project resulting in a 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 opportu-
nities for advanced nursing practice. Objectives to be developed collaboratively by student and faculty. Prereq: Enrollment in or completion of graduate level courses in clinical nursing. Maximum 9 hrs. S/NC or letter grade. E


590 Nursing Administration I (6) Exploration, analysis and selection of selected organizational, management, and leadership theories and financial principles to deliver-
ner of nursing services. Structure, functions, organization, behavior, and adaptive processes of health care organizations. Prereq: 504, 591 or coreq: 501, 520, 2 hrs and 4 labs. Sp

591 Nursing Administration II (6) Continuation of 590. Utilization of financial and human resources, problem identification, and organizational development with appli-
cation to mid-level and top-level nursing administration positions. Prereq: 550, 2 hrs and 4 labs. F

593 Independent Study (1-3) Prereq: Consent of in-
structor. May be repeated. Maximum 6 hrs. E

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

601-02 Theory Analysis and Construction I, II (3.3) Nursing theory analysis of analysis of health and nursing theories; theory building from existing knowledge. Prereq: 510 or equivalent or consent of instructor. F, Sp

605-06 Nursing Research Seminar (2.2) Selected topics pertaining to dissertation proposal process, research experience, and defense. Prereq: Completion of core courses. F, Sp

607 Qualitative Nursing Research (3) Exploration and analysis of philosophical bases, theoretical implications, methods, and data analyses of qualitative nursing research. F, Sp

608 Quantitative Nursing Research (3) Exploration and analysis of philosophical bases, theoretical implications, methods, and data analyses of quantitative nurs-
ing research. Prereq or coreq: Graduate level statistics course. F

609 Research Practicum (1-3) Supervised individual or group research experience under guidance of faculty. Prereq: Consent of instructor. May be repeated. Max-
imum 12 hrs. S/NC or letter grade. E

610 Nursing Science Seminar (2) Critical Analysis and synthesis of literature in selected focus area within nursing science. Prereq: Admission to doctoral program in nursing or consent of instructor. Sp

611 Advanced Nursing Seminar (2) Exploration of historical and current issues of interest to doctoral prepared nurses. F

612 Health and Nursing Policy/Planning (3) Policies affecting nursing education and practice; health policies and political processes; interactions between health professionals, consumer groups, and government in health policy development and health planning activities. Sp

613 Nursing Management of Complex Systems (3) Contempory organizational and management theories and techniques needed for effective administrative leadership in nursing education, practice, research, and entrepreneurial settings. F

614 Nursing Preceptorship (3) Individually-designed practicum, field, or internship opportunities in a variety of administrative, educational, or clinical practice settings. Prereq: 600, 600, 601, 602, 607, 608, 610. F

620 Directed Research (3) Exploration of theoretical considerations and research methodologies in nursing research with completion of study under faculty guid-
cance. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. Sp

NUTRITION

(College of Human Ecology)

MAJORS

Nutrition .................................................. M.S.
Foodservice and Lodging Administration .... M.S.
Human Ecology ........................................ Ph.D.

Michael B. Zemel, Head

Professors:

- Beauchene, Roy E. (Emeritus), Ph.D.
- Carruth, Betty Ruth, Ph.D.
- Schaich, Dileen S., Ph.D.
- Skinner, Jean D., Ph.D.
- Smith, John T. (Emeritus), Ph.D.
- Zemel, Michael (Liaison), Ph.D.

Associate Professors:

- Allam, Youssri, Ph.D.
- Bailey, James W., Ph.D.
- Brooks, M. D. (Memphis), M.S.
- Costello, Carol, Ph.D.
- Haughton, B., Ed.D.
- Stevens, Fete, Ph.D.

Assistant Professors:

- Bittle, Joyce (Memphis), Ph.D.
- Chenchereck, Janet (Memphis), M.S.
- McGrath, M. (Liaison), Ed.D.
- Mousetid, Naima, Ph.D.
- Powell, J. A., (Memphis), M.P.H.
- Whelan, Jay, Ph.D.
- Young, Catherine A., J.D.
- Zemel, Paula, Ph.D.

Instructor:

- Jones, K., MBA

Masters of Science programs are available in Nutrition and in Foodservice and Lodging Administration. Attendance at HRA 537 (Foodservice and Lodging Administration) or NTR 540 (Nutrition) is required every semester.

THE MASTER'S PROGRAM

Students may choose a thesis or non-thesis option in Nutrition or Foodservice and Lodging Administration. Attendance at HRA 537 (Foodservice and Lodging Administration) or NTR 540 (Nutrition) is required every semester.

NUTRITION

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 nutrition must take 511, 512, 513, 514, 515, 514 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 and 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 nutrition must take 511, 512, 513, 514, 515, 514 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.

Foodservice and Lodging Administration

Thesis Option: The program consists of a minimum of 33 hours with at least 16 hours of coursework in the department. HRA 537, 548, NTR 541, and 3 hours of graduate-level statistics are required. Six hours of Thesis 500 are required. Six hours outside the department are recommended. A minimum of 22 hours at the 500 and 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. HRA 537, 546, NTR 541 and 3 hours of graduate-level statistics are required. Six hours in one area outside the
Nutrition

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<td>502 Advanced Functional Nutrition (3)</td>
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<td>Lecture/discussion format</td>
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<td>Proposal accepted for study by student with guidance of faculty member</td>
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<td>506 Seminar in Foodservice and Lodging Administration (1)</td>
<td>May be repeated</td>
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<td>507 Advanced Hotel Administration (3)</td>
<td>Strategic management of hotel organizations</td>
<td>F, A</td>
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<td>508 Field Experience (3-9)</td>
<td>Experience in food-related industry or agency under supervision of faculty member</td>
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<td>510 Directed Study in Nutrition (1-3)</td>
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<tr>
<td>511 Advanced Physiological Chemistry (4)</td>
<td>Bioenergetics, flux control and hormonal interrelationships</td>
<td>F</td>
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<tr>
<td>512 Human Nutrition (3)</td>
<td>Advances in carbohydrates, proteins, fats, minerals, and vitamins</td>
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<td>Orientation to community; assessment of nutrition problems, needs, and resources</td>
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<td>Nutritional problems of adults: nutritional requirements, dietary intakes; effects of nutrition on biological aging</td>
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<td>524 Seminar in Nutrition (1)</td>
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<tr>
<td>525 Research Methods (1)</td>
<td>Basic principles of planning, conducting, and interpreting nutrition and foodservice systems administration research</td>
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<td>526 Advanced Nutrition Survey Methods (2)</td>
<td>Project for assessment of food consumption, nutrient intake, nutritional status, and sociocultural economic parameters in populations</td>
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Hotel and Restaurant Administration

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<tr>
<td>532 Advanced Marketing Management (3)</td>
<td>Financial planning, operations and evaluation techniques used in foodservice and lodging management</td>
<td>Fa, A</td>
</tr>
<tr>
<td>533 Advanced Food Production and Delivery Systems (3)</td>
<td>Strategic management of food production and delivery systems; application of quantitative methods and models to optimize decisions</td>
<td>Fa, A</td>
</tr>
<tr>
<td>534 Special Topics in Foodservice and Lodging Administration (1-3)</td>
<td>Lecture/discussion format</td>
<td>Fa, A</td>
</tr>
<tr>
<td>535 Directed Study in Foodservice and Lodging Administration (1-3)</td>
<td>Proposal accepted for study by student with guidance of faculty member</td>
<td>F, A</td>
</tr>
<tr>
<td>536 Seminar in Foodservice and Lodging Administration (1)</td>
<td>May be repeated</td>
<td>E</td>
</tr>
<tr>
<td>537 Advanced Hotel Administration (3)</td>
<td>Strategic management of hotel organizations</td>
<td>F, A</td>
</tr>
<tr>
<td>538 Experimental Study of Quantity Food Production (3)</td>
<td>Design and preparation of food products applicable to foodservice and lodging industry</td>
<td>Fa, A</td>
</tr>
<tr>
<td>539 Directed Study in Nutrition (1-3)</td>
<td>Advanced study in nutrition</td>
<td>E</td>
</tr>
<tr>
<td>540 Seminar in Nutrition (1)</td>
<td>May be repeated</td>
<td>E</td>
</tr>
<tr>
<td>541 Food Production and Delivery Systems (3)</td>
<td>Strategic management of food production and delivery systems; application of quantitative methods and models to optimize decisions</td>
<td>Fa, A</td>
</tr>
<tr>
<td>542 Directed Study in Nutrition (1-3)</td>
<td>Advanced study in nutrition</td>
<td>E</td>
</tr>
<tr>
<td>543 Advanced Financial Management (3)</td>
<td>Financial planning, operations and evaluation techniques used in foodservice and lodging management</td>
<td>Fa, A</td>
</tr>
<tr>
<td>544 Experimental Study of Quantity Food Production (3)</td>
<td>Design and preparation of food products applicable to foodservice and lodging industry</td>
<td>Fa, A</td>
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</table>
Ornamental Horticulture and Landscape Design

(College of Agricultural Sciences and Natural Resources)

MAJOR DEGREE

Ornamental Horticulture and Landscape Design .................................................. M.S.

G. Douglas Crater, Head

Professors:

Callahan, L. M., Ph.D. ....................... Rutgers
Crater, G. Douglas, Ph.D. .................. Ohio State
Graham, E. T., Ph.D. ...................... Penn State
Grashoff, Peter M. (Racheff Chair), Ph.D. ......................................................... Australian National
Ph.D. ............................................ Iowa State
McDaniel, G. L., Ph.D. ....................,.......Rutgers
Williams, Don B., Ph.D. .................. Penn State

Associate Professors:

Augé, Robert M., Ph.D. ...................... Washington State
Day, J. W., Ph.D. ............................ Mississippi State
Rogers, S. M., M.L.A. ........................ Penn State
Trigiano, R., Ph.D. ........................... NC State
Witte, Willard T. (Liaison), Ph.D. ...... Maryland

Assistant Professor:

Starman, Terri W., Ph.D. .................. Texas A&M

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, histology and stress physiology of ornamentals.

For admission, the student must have a B.S. in ornamental horticulture, horticulture, 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 30 hours can be below the 500 level. The academic program must be approved by the master's committee which may require additional coursework if the student's progress or background indicates such need.

3. All students are required to include 510 Research Methods and 2 hours of 590 Seminar 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, exclusive of Thesis 500.

5. 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 590 Seminar 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.

5. Final comprehensive written and oral examinations shall be taken upon completion of no fewer than 32 hours of approved graduate work.

GRADUATE COURSES

410 Nursery Management and Production (3) Modern management methods as applied to retail and wholesale nurseries and landscape contracting firms. Methods of producing liners, container and field-grown woody ornamental plants. Prereq: 220, 330, and Plant and Soil Science 210, or consent of instructor. 2 hrs and 1 lab. Sp

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: 8-9 hr labs. Sp

440 Advanced Turfgrass Management (4) Principles and scientific basis of turfgrass culture; adaptation, ecology, physiology, soil fertility, and grass nutrition, climatic influences on grass culture; physiology of clipping and watering; management design, construction, and management of golf courses; and physiological influences of pest infestation and control measures. Prereq: 340 or consent of instructor: 3 hrs and 1 lab. Sp

451 Plant Tissue Culture (3) (Same as Botany 451.)

460 Professional Practices in Landscape Construction and Management (2) Professionalism, salesmanship, proposal writing, estimating, specification, and contract management in landscape design and construction. Interaction with industry representatives through special presentations. Prereq: 350 or consent of instructor. F

480 Advanced Landscape Design (4) Comprehensive application of landscape design skills. Design applications involving site layout, landscape grading, applied landscape construction, planting design. Analysis, programming, design, detailing, estimating, and specifying applicable to various landscape projects. Prereq: 280, 350, and 380, or consent of instructor. 1 hr and 2-3 hr labs. Sp

485 Computer Aided Landscape Design (3) Overview of drafting and design (CAD). Site planning and construction of related landscape plan view and 3-D drawings. Introduction to operating systems: techniques on utilization of AutoCAD and LANDSCAPE software. Prereq: Fundamentals of Landscape Design. Microcomputer Applications to Problem Solving or consent of instructor: 2-3 hr labs. F,Sp

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

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. 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 faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

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, F

511 Plant Disease Fungi (4) (Same as Entomology and Plant Pathology 510.)

550 Microtechnique (3) Methods of investigating histoculture, histochemistry, ploidy, and pathological structures in ornamental and crop plants, light microscopy. Prereq: 8 hrs biological science, 8 hrs chemistry, and consent of instructor: 1 hr and 2 labs. Sp

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 methods and techniques of plant and environmental physiology. Prereq: 8 hrs biological science, 8 hrs chemistry, and consent of instructor: 1 hr and 2 labs. Sp

585 Professional Practices in Landscape Construction and Management (2) Professionalism, salesmanship, proposal writing, estimating, specification, and contract management in landscape design and construction. Interaction with industry representatives through special presentations. Prereq: 350 or consent of instructor. F

590 Seminar (1) Current literature and developments. May be repeated. Maximum 3 hrs. E

593 Problems in Ornamental Horticulture and Landscape Design (1-3) Independent study. Current topic related to technology and science. May be repeated. Maximum 6 hrs. E

Pathology

See College of Veterinary Medicine and Comparative Experimental Medicine

Philosophy

(College of Arts and Sciences)

MAJOR DEGREES

Philosophy .................................................. M.A., Ph.D.

George G. Brenkert, Head

Professors:

Aquila, Richard E., Ph.D. .............. Northwestern
Brenkert, George G., Ph.D. .......... Michigan
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 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 and West Virginia; Kentucky, Texas, or Virginia (concentration in medical ethics only); the Ph.D. program to residents of Arkansas (concentration in medical ethics only); Louisiana, or Mississippi; 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 philosophy or consent of instructor. May be repeated when topic varies. Maximum 9 hrs.

425 American Philosophy (3) Colonial to early 20th Century. Prereq: 6 hrs of philosophy or consent of instructor.

435 Intermediate Formal Logic (3) Metaphysics, 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.

445 Theoretical Issues in Medical Ethics (3) Prereq: 240 or 245 or consent of instructor. (Same as Religious Studies 445.)

460 Philosophy of Science (3) Methodological and conceptual issues in natural and social sciences; patterns of theory modification and replacement, nature of explanation and causation, status of theoretical entities. Prereq: 360 and 1 yr of natural or social science, or consent of instructor.

465 Philosophy of History (3) Speculative and critical aspects of philosophy of history. Prereq: 6 hrs of philosophy or consent of instructor.

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.

475 Analytic Metaphysics and Epistemology (3) Topics in metaphysics and epistemology in recent Anglo-American tradition. Prereq: 6 hrs of philosophy or consent of instructor.

478 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 6 hrs.

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

502 Registration for Use of Facilities (3-15) Required of students concentrating in medical ethics. Prereq: Consent of Medical Ethics Committee. May be repeated. Maximum 9 hrs.

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.

528 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 "mental illness," informed consent in psychiatric research, patients' rights, involuntary hospitalization and treatment, and behavior control therapies.

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.

560 Topics in the Philosophy of Science (3) Nature of subject matter and method of science. May be repeated. Maximum 9 hrs.

570 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 (3) Series of clinical rotations at one or more local health care institutions. Open only to Ph.D. students concentrating in medical ethics. Prereq: 587 and consent of Medical Ethics Committee and the UTMC Graduate Education Committee.

590 Topics in Social and Political Philosophy (3) Philosophical problems concerning social and political life: family, state, freedom, justice; major theoretical responses: anarchism, social contract, Marxism. May be repeated. Maximum 9 hrs.

591 Foreign Study (1-15) See College of Arts and Sciences.
Physics and Astronomy

(College of Arts and Sciences)

MAJOR DEGREES

Physics ........................................ M.S., Ph.D.

William M. Bugg, Head

Professors:

Bingham, C. R., Ph.D. ......................... Tennessee
Blass, W. E., Ph.D. ....................... Michigan State
Brezeale, M. A., Ph.D. ....................... Michigan State
Breining, M. Ph., Ph.D. ...................... Oregon
Bugg, W. M., Ph.D. .......................... Tennessee
Burgdoerfer, J., Ph.D. ................. Frie Universitat Berlin
Callow, T. A., Ph.D. ....................... Purdue
Childers, R. W., Ph.D. ..................... Vanderbilt
Christophorou, L. G., Ph.D. ............. Manchester
Condo, G. T., Ph.D. .......................... Illinois
Cramer, H. W. (UTSI), Ph.D. .............. Yale
Deeds, W. E. (Emeritus), Ph.D. .......... Ohio State
Duckett, K. E., Ph.D. ....................... Tennessee
Eguluz, Adolf G., Ph.D. ..................... Brown
Elston, S. B., Ph.D. .......................... Massachusetts
Fox, K. D., Ph.D. ............................. Michigan
Gallier, N. M. (Emeritus), Ph.D. .......... Ohio State
Georgiou, S., Ph.D. ......................... Manchester
Gulidy, M. W., Ph.D. ....................... Tennessee
Hansler, T. H., Ph.D. ....................... Rutgers
Harris, E. G. (Emeritus), Ph.D. .......... Tennessee
Hart, E. L. (Laison), Ph.D. .................. Cornell
Jacobson, H. C., Ph.D. ...................... Yale
King, D. T. (Emeritus), Ph.D. ............. Bristol
Lewis, J. W. L. (UTSI), Ph.D. ............. Mississippi
Maciej, J. (Distinguished Scientist), Ph.D. .......................... Rensselaer
Mahan, G. D. (Distinguished Scientist), Ph.D. .......................... California
Mason, A. A. (UTSI), Ph.D. ............. Tennessee
McGregor, W. K. (UTSI), Ph.D. .......... Tennessee
Nazarewicz, 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. (Lincoln Chair), Ph.D. ..... Maryland
Riedinger, L. L., Ph.D. ....................... Vanderbilt
Sellin, I. A. (Chancellor’s Research Scholar), Ph.D. ....................... Chicago
Shih, C. C. (Emeritus), Ph.D. ..................... Cornell
Sorensen, P. S., Ph.D. ..................... Copenhagen
Strayer, M. R., Ph.D. ....................... MIT
Thompson, J. R., Ph.D. ..................... Duke
Thomson, J. O. (Emeritus), Ph.D. ............. Illinois
Ward, B. L., Ph.D. ........................... Princeton
Wheeler, G. W. (Emeritus), Ph.D. ............. Yale
White, J. W. (Emeritus), Ph.D. ............. North Carolina

Associate Professors:

Muehlehauser, J. W. (UTSI), Ph.D. ............. Tennessee
Shieh, S. Y., Ph.D. ............................ Maryland

Assistant Professors:

Carrign, G., Ph.D. .............................. Tennessee
Daunt, S. J., Ph.D. .............................. Queens
Harmatz, R., Ph.D. ............................. Ohio State
Levin, J. C., Ph.D. ............................. Oregon
Menzel, R. (UTSI), Ph.D. ..................... Tennessee
Perigard, C., (UTSI), Ph.D. ..................... New Zealand
Phillips, W. (UTSI), Ph.D. ..................... Tennessee
Read, K. F., Ph.D. .............................. Cornell
Sanders, A. J., Ph.D. ........................... Tufts
Siopsis, G., Ph.D. ............................. Cal Tech
Weitling, H. H., Ph.D. ....................... Groningen (Netherlands)

Research Professors:

Kamyshkov, I., Ph.D. ......................... ITEP (Russia)
Zhang, J., Ph.D. ............................... Lanzhou

Research Associate Professors:

Du, Yuan-Cai, Ph.D. ............................ Beijing
McCorcle, D. L., Ph.D. ....................... Tennessee
Saini, Suresh, Ph.D. ......................... Bombay

Research Assistant Professors:

Chen, X., Ph.D. ................................. Purdue
Datskos, P. E., Ph.D. ......................... Texas
Davis, L. (UTSI), Ph.D. ....................... Auckland
Erfemeno, Y. Y., Ph.D. ....................... ITP (Russia)
Mezzacappa, A., Ph.D. ....................... Texas
Ormand, W. E., Ph.D. ......................... Michigan State
Pinnaudague, L.A., Ph.D. ...................... Pittsburgh
Riehl-Ridler, C. O., Ph.D. ..................... Buenos Aires
Yosh, S. A., Ph.D. ............................. Princeton

Instructors:

Fairman, R. C., B.A. .......................... Earlham
Riedinger, T. M., Ph.D. ..................... Vanderbilt

Graduate programs leading to the Master of Science and the Doctor of Philosophy are offered in a number of concentration areas: atomic and low temperature physics, biophysics, chemical physics, elementary particle physics, health physics, heavy ion atomic physics, molecular spectroscopy, nuclear physics, plasma physics, condensed matter physics, theoretical physics, and ultrastructure. 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 obtaining an advanced degree in Physics will have completed an undergraduate major in Physics or its equivalent. Physics 511-12, 521-22, 531-32, 541-42, and 541-41 constitute the minimum courses prerequisite to graduate study.

A student who intends to present Physics as a graduate minor will have completed an undergraduate minor in Physics or its equivalent. Physics 311 and 431-2 constitute the minimum coursework prerequisite to a minor in Physics.

All first-year graduate students are required, for advising purposes only, to take a qualifying examination in undergraduate physics during the fall semester registration period.

The Master’s Program

Thesis Option

This program is designed primarily for students intending to go into industry or governmental laboratories as physicists. The course requirements include 24 semester hours of physics courses, of which at least 12 semester hours are taken from Physics 511-12, 521-22, 531-32, 541-42, and 571-72. Each candidate must present an acceptable thesis, 6 hours of 500, and pass an oral examination on course material and thesis.

Non-Thesis Option

This program is designed 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, 561, 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; Physics 683-84 of students in plasma physics; Physics 601-02 of students in health physics; Physics 671-72 of students in solid-state 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 chosen from Chemistry 580, 670.

The courses Physics 531-32, 571-72, 521-22, 541-42, 561 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.

A reading knowledge of one foreign language in which there exists a significant body of literature is required. German 332 or French
Astronomy

GRADUATE COURSES

411 Astrophysics (3) Development of analytical physical models of galactic structure of universe, stellar and interstellar matter, and planetary systems. Theoretical and interdisciplinary, consideration of quasars, pulsars, black holes and current developments in field. Acceptable for major credit in physics. Preq: Physics 232 and consent of instructor.

410 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.

490 Senior Seminar (1-3) Topic of current interest. May be repeated with consent of department. Maximum 6 hrs.

500 Thesis (1-3) P/NP only. E

501 Graduate Research Participation (3) Advanced research techniques under supervision of staff research director whose research area coincides with interests of student. Open to all graduate students in good standing. Preq: Consent of department and research director. May be repeated with consent of department. Maximum 18 hrs. S/NC only. E

502 Registration for Use of Facilities (3-15) Required May be repeated with consent of department. Maximum 6 hrs.

547-48 Health Physics (3,3) Radioactivity, interaction of electromagnetic radiation with matter, radiation quantities and units, point kernel and extended sources, x-rays and gamma rays, neutron activation, interaction of charged particles with matter, stopping power, range-energy relations, counting statistics, shielding, dosimetry, waste disposal, criticality prevention, radiation biology and ecology. Preq: Consent of instructor.


574 Group Theory for Physicists (3) Introduction to abstract group theory, discrete and continuous groups, representation theory, Noether’s theorem, symmetries and quantum mechanics, application of group-theoretical methods to atomic physics, solid-state physics, and particle physics. Preq: 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


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

601-02 Advanced Atomic Physics (3,3) Atomic structure, Dirac equation for one-electron atoms, quantum atomic and molecular physics, optical atomic and molecular physics, density functional theory of solids, magnetism. Prereq: 561 or 611 or consent of instructor.

606 Nonlinear Optics (3) Nonlinear optical susceptibilities, wave propagation in nonlinear media, femtosecond phenomena, optical nonlinear effects and free induction decay, optical breakdown and nonlinear effects in plasmas. Preq: 522.

610 Quantum Optics (3) Quantum theory of emission and absorption of radiation; frequency-dependent susceptibility; coherence theory; field quantization and coherent photon states; interaction of radiation with atoms; parametric oscillators, cavity and higher-order coherence, atomic scattering phenomena. Preq: 521.

611 Advanced Quantum Mechanics & Field Theory (3) Second quantization, quantization of electromagnetic field, emission, absorption, and scattering of light, bremsstrahlung, pair creation and annihilation, quantum field theory methods in condensed matter physics, and quantum optics. Topics vary according to interest of instructor. Prereq: 522 and 542 or equivalent. Preq or coreq: 561 or consent of instructor.

612 Advanced Topics in Quantum Field Theory (3) Renormalization, Lamb shift, anomalous magnetic moments, gauge theories, electroweak theory, quantum chromodynamics, grand unified theories, and advanced topics in nuclear physics and quantum optics. Topics vary according to interest of instructor, instructor and present state of physics. Prereq: 561 or 611 or consent of instructor.

621-22 Nuclear Structure (3,3) General properties of nucleus; two-body scattering problems; saturation and mean-field approximations; nuclear reactions; nuclear structure; nuclear spectroscopy; special nuclear models; theory of nuclear reactions; theory of beta-decay. Preq: 571-72.


641 Advanced Topics in Classical Theory (3) To meet special needs of students. Advanced dynamics and
hydrodynamics, electromagnetic theory, statistical mechanics, or theory of nonequilibrium processes. Prereq: 530, 542, 551. May be repeated with consent of department. Maximum 9 hrs.

642 Advanced Topics in Quantum Theory (3) To meet special needs of students. Angular-momentum theory, beta-ray theory, theory of atomic spectra, molecular structure and vibration theory, theory of radiation, electric and magnetic susceptibilities, high energy processes, scattering and collision processes, or theory of fields. Prereq: 522. May be repeated with consent of department. Maximum 9 hrs.

643 Computational Physics (3) Developing computer algorithms for solving representative problems in various fields of physics, celestial dynamics in astrophysics, boundary value problems in electromagnetism, atomic and nuclear structures, band structure on solid state physics, transport problems in statistical mechanics, Monte Carlo simulation of liquids, fitting and interpolation of data, correlation analysis, or optimization strategy. Prereq: 522, 531, 542, and 572.

561-62 Collision Interactions (3,3) Interaction of electromagnetic radiation and charged particles with atoms and molecules or free particles, scattering, ionization, transport and capture, collective excitations, Compton, electron, and stopping power. Prereq: 522.

563 Advanced Plasma Physics I (3) (Same as Electrical and Computer Engineering 663.)


511 Graphic and Oral Communications in Planning (3) Emphasis on communication of planning information: design of planning decision-support systems in college, university, and city planning; use of public data bases; impact of information technology and of planning; U.S. experience in urban and other levels of planning. State of the art, process, comprehensive plan, implementation devices. Planning issues in society. Not for credit for M.S.P. degree.

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/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. SNC 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)

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) Research techniques in subject areas associated with city and regional planning. Research tools, data collection and analysis as basis for planning and development. Prereq: 515, 520, 521, 523, 530, 531, 532, 540, and 545.

521 Computers in Planning (3) Basic computer concepts, hardware and software, use of mainframe and microcomputers in planning and government.

523 Statistics for Planners (3) Applications of basic descriptive and inferential classical and non-parametric techniques in planning research. Data organization and display, measures of location, dispersion and association; data transformations; some basic probability theory; selected one and two sample tests; correlation and regression analysis. Prereq: 520 or consent of instructor.


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 or 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 and the Association of Collegiate Schools of Planning.

THE MASTER'S PROGRAM

Admission Requirements

Applicants are to submit an application for admission to The Graduate School, two letters of reference from faculty familiar with their prior academic work, and a statement describing personal career objectives. If the applicant has prior work experience in planning, a reference letter should also be provided by the work supervisor. Graduate Record Examination scores are requested of all applicants whose undergraduate GPA is below 3.0. Other applicants are encouraged to submit them.

Degree Requirements

The M.S.P. requires completion of at least 48 hours of graduate credit, at least 30 of which must be in planning. The following courses are the core curriculum required of all students: 510, 511, 515, 520, 521, 523, 530, 531, 532, 540, and 545.

Students should plan to enter the program in the fall term to take the core courses in the proper sequence.

Each student is required to develop an area of concentrated competence beyond the core curriculum. After selecting the area of concentration, usually by the end of the second semester, the student takes a minimum number of courses or hours from a prescribed set of courses in the subject area. Further enhancement of the concentration is gained by taking additional elective courses in the subject and by focusing the thesis or major paper on the subject. Concentration courses are drawn from the planning curriculum and from other departments in the University. Concentrations are available in land use planning, information systems in planning, economic development planning, real estate development planning, transportation planning, environmental planning, historic preservation planning, and international planning.

Students have the latitude to propose an alternate specialization consisting of at least 9 hours of coursework, subject to approval of a faculty committee. Each student is required to demonstrate competence in individual research. This may be done in one of two ways:

- Thesis Option—Complete a thesis for 6 hours credit.
- Non-Thesis Option—Complete a major study with acceptable documentation. To be eligible for the major study option, the student must have completed at least 12 hours of graduate coursework in planning with at least a 3.5 cumulative grade-point average. The student meeting these criteria may present a proposal to his/her committee for a major study that will include at least 6 hours of subsequent coursework. The proposal shall justify the selection of the topic, describe the approach to the study, and describe the nature of the final product. The topic will normally be expected to reinforce or complement the student's concentration.

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.

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, Mississippi, or 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.)

402 Survey of Planning (3) History of city development and of planning; U.S. experience in urban and other levels of planning. State of the art, process, comprehensive plan, implementation devices. Planning issues in society. Not for credit for M.S.P. degree.

446 Housing (3) Nature and demand for housing in U.S. and abroad. U.S. experience, private market processes and public influences. Problems of change in housing supply, impact of new technology, and governmental programs to improve supply and quality of housing.

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/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. SNC 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)

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) Research techniques in subject areas associated with city and regional planning. Research tools, data collection and analysis as basis for planning and development. Prereq: 515, 520, 521, 523, 530, 531, 532, 540, and 545.

521 Computers in Planning (3) Basic computer concepts, hardware and software, use of mainframe and microcomputers in planning and government.

523 Statistics for Planners (3) Applications of basic descriptive and inferential classical and non-parametric techniques in planning research. Data organization and display, measures of location, dispersion and association; data transformations; some basic probability theory; selected one and two sample tests; correlation and regression analysis. Prereq: 520 or consent of instructor.

526 Library Research for Planning (1) Survey of publications of interest to planners, resources and research techniques. Use of facilities and collections of library.

530 Planning Analysis and Forecasting (3) Methods of quantitative analysis and modeling in urban and regional studies. Population, employment, and economic base studies; 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 (5) 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, 520, 530 and 531 or consent of instructor.

537 Planning and Transportation (3) (Same as Civil Engineering 558.)

538 Urban and Site Design (3-4) 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 roles 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.

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. Prereq: 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 development 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 improvements programming in plan implementation. Tax and expenditure limitations, infrastructure financing, municipal bond market, alternative revenue sources: development fees, exactions, 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, and framework of integrated resource management. (Same as Ecology 552.)

555 Environmental Planning (3) Role of planners and planning in maintenance of balance between natural and built environment. (Same as Ecology 555.)

560 Policy Analysis and Strategic Planning (3) Models of policy making process and role of strategic planning and applied decision making. Quantitative and qualitative approaches, evaluative research and program evaluation, and impact assessment.

590 Practicum (3) Prereq: Consent of instructor. S/NC 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.

635 Environmental Assessment and Sustainable Development in Third World Countries (3) (Same as Ecology and Botany 635.)

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For 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 chairperson 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 declare this intention 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 24 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 dissertation for approval and acceptance by The Graduate School.

Graduate Courses

411 Soil Microbiology (3) Soil microbial populations and role in soil ecosystem, microbial transformation of inorganic and organic compounds, decomposition of residues, dynamics of soil organic matter. Prereq: Introduction to Soil Science and Introduction to Organic and Biochemistry or Organic Chemistry or consent of instructor. 2 hrs and 1 lab. F

414 Soil, Land Use, and the Environment (3) Soil as related to exchange, chemical equilibria, soil and chemical properties of soil materials; colloidal fraction. Prereq: Introduction to Soil Science and Soil and chemical properties. Two Saturday field trips. Prereq: 210 or consent of instructor. 2 hrs and 1 lab. F

413 Soil Chemistry (3) Principles concerning structure and chemical properties of soil materials; colloidal fraction as related to exchange, chemical equilibria, soil acidity, oxidation-reduction, weathering, nutrient availability and waste disposal. Prereq: 311 or consent of instructor. F

415 Soil Hydrology (3) Physical relationships among solid, liquid, and gaseous phases of soil system. Relationships of soil properties to processes governing transport of water, and chemicals in soil. Prereq: Introduction to Soil Science, 2 hrs and 1 lab. F, A

421 Crop Physiology and Ecology (3) Principles of plant physiology and ecology as applied to crop production. Effects of environmental factors on physiological processes. Prereq: 220, Botany 321, 2 hrs and 1 lab. F, A

422 Bioclimatology (3) Solar energy budget; interactions between global, regional and local climates and biological systems; quantification of macro- and microclimates; microclimate and their modification; automated weather station data collection and analysis; biological responses to climatic stresses; climate variation and change and their effects on biological systems. Prereq: 1 yr physical or biological science, junior standing. 2 hrs and 1 lab. F

433 Agricultural Pesticides (3) Regulation of pesticide development, manufacture, transportation, marketing and use. Structure, mode of action, degradation and environmental impact of pesticides used in agriculture, forestry and related areas. Prereq: 1 yr biological sciences and 1 semester chemistry. 2 hrs and 1 lab. F

434 Postharvest Biology and Technology (3) Principles, methods, and techniques related to maintenance of quality of horticultural commodities. Preservation, handling, storage facilities and techniques, quality evaluation and biological and physiological mechanisms related to maturation, ripening, and senescence. Prerequisite: Soil and Environmental Science. 2 hrs and 1 lab. F

453 Principles of Plant Breeding (3) Genetic principles and techniques used in crop improvement. Prereq: Biology 200 or equivalent. 2 hrs and 1 lab. F

511 Advanced Soil Fertility (3) Concepts of soil chemistry as related to nutrient movement and adsorption by plant roots. Fertilizer use efficiency as measured by plant response factors. Prereq: 413 or consent of instructor. 2 hrs and 1 lab. F

514 Advanced Soil Physics (3) Theory and mathematical modeling of flow and solute transport in unsaturated soils. Geostatistical models for soil properties. Prereq: Calculus III, 415, or consent of instructor. F

510 Pedology (3) Physical and chemical weathering processes, factors of soil formation, soil forming processes. Prereq: 412 or consent of instructor. 2 hrs and 1 lab. F, A

512 Soil Genesis, Classification, and Mapping (3) Soil genesis and formation; observing and describing soil systems. Prereq: Introductory geology, 1 yr introductory chemistry. 2 hrs and 1 lab. FA

515 Soil Hydrology (3) Physical relationships among solid, liquid, and gaseous phases of soil system. Relationships of soil properties to processes governing transport of water, and chemicals in soil. Prereq: Introduction to Soil Science, 2 hrs and 1 lab. F, A

516 Advanced Soil Physics (3) Theory and mathematical modeling of flow and solute transport in unsaturated soils. Geostatistical models for soil properties. Prereq: Calculus III, 415, or consent of instructor. F

517 Design and Analysis of Biological Research (3) Same as Animal Science 571.

519 Special Problems in Plant and Soil Science (1-3) May be repeated. Maximum 6 hrs. E


521 and 522 Advanced Plant Breeding (4) Development and commercial uses of plant growth regulators. Prereq: Botany 612 and 522 or equivalent. F, A

523 Advanced Crop Ecology (3) General and specific relationships among environmental factors, organisms, and agricultural systems; quantification of macro- and microclimatic influences on crop growth; world climates, crop distribution and productivity, human cultures, and their interaction. Prereq: 471 or equivalent. 43 or equivalent, or Agricultural Climatology or equivalent. 2 hrs and 1 lab. F

524 Advanced Soil Chemistry (3) Surface and colloid soil colloidal stability. Prereq: 413 or consent of instructor. F

530 Integrated Pest Management (3) (Same as Entomology and Plant Pathology 530.)

551 Advanced Plant Genetics (3) Discovery of genetic elements, induced mutations, genome organization, polyploidy, tetrasomic inheritance, plant breeding, heterosis, methods of selection, in vitro breeding, molecular genetics and randomized breeding. Prereq: Biology 220. F


571 Soil Fertility (3) Concepts of soil chemistry as related to nutrient movement and adsorption by plant roots. Fertilizer use efficiency as measured by plant response factors. Prereq: Calculus III, 415, or consent of instructor. F

572 Soil Physics (3) Theory and mathematical modeling of flow and solute transport in unsaturated soils. Geostatistical models for soil properties. Prereq: Calculus III, 415, or consent of instructor. F

573 Advanced Crop Physiology (3) Principles of plant physiology and ecology as applied to crop production. Effects of environmental factors on physiological processes. Prereq: 220, Botany 321, 2 hrs and 1 lab. F, A

593 Special Problems in Plant and Soil Science (1-3) May be repeated. Maximum 6 hrs. E

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

601 Special Topics in Soil Science (1-3) Thermodynamics of soil-water-plant system, soil mineralogy, water movement and use by plants, soil structure and soil thermal properties, interaction in the soil environment. May be repeated. Maximum 6 hrs. E

602 Special Topics in Crop Physiology and Ecology (1-3) Microclimatology of agroecosystems, crop dormancy and responses to stress, physiology of crop growth and reproduction. Prereq: 473 or equivalent. Maximum 6 hrs. E

603 Special Topics in Crop Physiology and Ecology (1-3) Microclimatology of agroecosystems, crop dormancy and responses to stress, physiology of crop growth and reproduction. Prereq: 473 or equivalent. Maximum 6 hrs. E

605 Special Topics in Plant Breeding and Genetics (1-3) Gene flow by environmental interactions, gene populations of quantitative parameters, mutations, chromosome dynamics, polygamy, genetic engineering, interspecific hybridization, linkage, screening methods, genome organization. May be repeated. Maximum 6 hrs. E

613 Advanced Soil Chemistry (3) Surface and colloid chemistry of soil minerals; recent developments in ion speciation, ion movement, surface charge, surface complexity and soil colloidal stability. Prereq: 413 or consent of instructor. Sp

615 Advanced Crop Physiology (3) Principles of plant physiology and ecology as applied to crop production. Effects of environmental factors on physiological processes. Prereq: 220, Botany 321, 2 hrs and 1 lab. F, A

631 Plant Growth Control and Herbicide Action (3) Principles of uptake, translocation, mode of action and uses of herbicides and plant growth regulators and their effects on plant morphology, metabolic systems and enzymatic activities. Practical aspects and current commercial uses of plant growth regulators. Prereq: Botany 612 and 522 or equivalent. F, A

633 Advanced Plant Breeding (4) Development and utilization of concepts of quantitative parameters, inbreeding, heterosis, methods of selection, in vitro breeding, interspecific hybridization, stability parameters, genetic resistance and vulnerability to pests and environmental stresses. Prereq: 453 and 571 or equivalent or consent of instructor. 3 hrs and 1 lab. Sp, A

671 Advanced Research Planning (3) Development of agricultural research proposals utilizing prescribed resources and emphasizing experimental design and statistical techniques. Prereq: 571, Animal Science 572, Statistics 401, or equivalent. F, A

Political Science

(College of Arts and Sciences)

MAJORS

DEGREES

Political Science ..................................... M.A., Ph.D.

Public Administration .................................... M.P.A., J.D.-M.P.A.

Michael Gant, Head

Professors:

Carlisle, D. H. (Emeritus), Ph.D........ North Carolina

Cunningham, Robert B., Ph.D........... Indiana

Fitzgerald, Michael R., Ph.D........ Oklahoma

Gant, Michael M., Ph.D........ Michigan State

Gerratt, Robert A., Ph.D........ New York

Iredell, Vernon R., Ph.D.............. Chicago

Lyons, William, Ph.D........ Oklahoma

Peters, John, Ph.D........ Utah

Plaa, Hyram, Ph.D.............. Reno

Robinson, Nelson M. (Emeritus), Ph.D........ Syracuse

Scheb, John M., II, Ph.D............ Florida

Smith, T. Alexander, Ph.D........ Ohio State

Stephen, O. H. (Distinguished Prof.), Ph.D........ College of Science

Hopkins, Uns, Thomas D., Ph.D........ Iowa

Welborn, David M., Ph.D........ Texas

Associate Professors:

Evans, Gill C., Ph.D............ Columbus

Malz, David H. (Liaison), Ph.D........ Tennessee

Freeland, Patricia K. (Liaison), Ph.D........ Wisconsin (Milwaukee)

Peterson, Robert L., Ph.D........ Yale

Assistant Professors:

Houston, David J., Ph.D........ SUNY (Binghamton)

Nowens, Anthony J., Ph.D........ Kansas

Richardson, Lillard, Ph.D........ Texas
The Department of Political Science offers the M.A., M.P.A., and Ph.D. The department also offers a dual program with the College of Law. Inquiries concerning all programs should be directed to the departmental office.

**ADMISSION REQUIREMENTS**

Three departmental recommendation forms must be submitted to The Graduate School. In addition, scores on the general portion of the Graduate Record Examination must be submitted.

**THE MASTERS OF ARTS PROGRAM**

A Bachelor’s degree or its equivalent is required for admission. Normally an overall average of 3.0 is also required together with an average of 3.2 in the last two years of political science or social science. In addition, a composite score of at least 1100 on the verbal and quantitative parts of the GRE is normally required.

Students pursuing the Master of Arts degree may follow one of two options:

**Thesis Option:** (30 hours) Coursework, preparation of a thesis, and an oral examination on coursework and the thesis, is required. At least 12 of these hours must be in political science, with 6 in the field of methodology (Political Science 510 and either 511 or 512). Six hours may be directed through thesis credit.

**Non-Thesis Option:** (36 hours) Coursework, plus a written comprehensive examination on all coursework is required. At least 12 of these hours must be in political science, with 6 in the field of methodology (Political Science 510 and either 511 or 512), and 3 hours in the 600-level research seminar in the student’s first field of interest.

**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, an elective specialization and a recommended internship.

Applicants for admission to the program must have a Bachelor’s degree or its equivalent. Normally, an overall average of 3.0 and an average of 3.2 in the last two years of political science or social science courses is required. In addition, a composite score of at least 1100 on the verbal and quantitative parts of the GRE is normally required.

Students must demonstrate proficiency in the use of personal computers prior to the completion of 9 credit hours in the M.P.A. program. Students may fulfill this requirement by successful completion of a short course(s) offered by the UT Computing Center. The Coordinator of the M.P.A. program will provide a list of acceptable courses. Exceptions to this requirement will be considered on an individual basis.

The M.P.A. is a non-thesis program. Specific requirements include the following:

1. Core - 21 hours
   b. Analytical skills (6 hours): 512 Quantitative Political Analysis; 514 Research and Methodology in Public Administration.
   c. Management skills (6 hours): 560 Public Budgeting; and either 562 Public Management or 564 Human Resources Management in Public Administration.
2. Specialization - 9 hours
   A specialization is designed by the student in consultation with the Coordinator of the M.P.A. program. Possible specializations include general government, public health, budgeting and finance, planning, natural resources, program evaluation, criminal justice, public relations, personnel, and others.
3. Recommended internship with a public agency - 6 hours
   Internships are arranged in consultation with the coordinator of the M.P.A. program.
4. 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 in the College of Arts and Sciences offer a coordinated dual 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 enroll 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 have a 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 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 15 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 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 degree 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.

**AWARDING OF GRADES**

For grade recording purposes in the College of Law and the Department of Political Science, grades awarded in courses in the other unit will be converted to either Satisfactory or No Credit and will not be computed in determining a student’s GPA or class standing. The College of Law will award a grade of Satisfactory for an approved 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 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 one year 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.
GRADUATE COURSES

430 United States Constitutional Law: Sources of Power and Restraint (3) Analysis of judicial review, constitutional powers of President and Congress, federalism, sources of regulatory authority, and constitutional protection of political and economic rights.

431 U.S. Constitutional Law: Civil Rights and Liberties (3) Analysis of current issues in civil rights and liberties including the civil rights movement, 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 I (3) Selected topics on Latin American political dynamics, consideration of leading theoretical explanations. (Same as Latin American Studies 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 western political thinkers from Socrates to Marsilio of Padua.

476 Modern Political Thought (3) Survey of major western political thinker from Machiavelli to Marx.

500 Thesis (1-15) P/NP only. 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 for degree completion. May not be used toward degree requirements. May be repeated. S/N 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 Qualitative Political Analysis (3) Methods and techniques in qualitative 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 analyses of public opinion, political socialization, political attitudes and behavior, especially voting behavior.

537 Political Parties and Interest Groups (3) Theoretical and empirical examination of the structure, functions and operations of political parties and interest groups.

539 State and Local Government and Politics (3) Theoretical and empirical analysis of government, politics, policymaking and public administration at the state and local levels.

540 Public Law (3) Selective examination of published research and current approaches in subfields of constitutional law, judicial process, and judicial behavior. May be repeated with consent of department. Maximum 9 hrs.

546 Law and the Administrative Process (3) Constitutional position, decisional processes, regulation and management; limitations on governmental action; questions of structure, role, and administrative choice. May be repeated with consent of department. Maximum 9 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) Appraisal of major theories of organization and their applicability to public sector.

553 Management of Information Systems (3) Theory, design, development, implementation and evaluation of information systems in public organizations. Database systems, computer applications, and training in management information technology.

555 Policy Analysis (3) Strategies and techniques for identification and analysis of public problems and policy solutions. May be repeated with consent of department. Maximum 9 hrs.

558 The Politics of Administration (3) Examination of public administration theory and function.

602 Governmental Budgeting and Finance (3) Technical and political aspects of governmental budgeting and adoption of government budgets. Management implications of revenue collection, debt management, treasury function, accounting, internal auditing, purchasing risk management, post-auditing.

562 Public Management (3) Interpersonal and leadership skills, techniques and methods for planning, decision making, and implementation of management strategies in public sector. May be repeated with consent of department. Maximum 9 hrs.


566 Ethics, Values, and Morality in Public Administration (3) Moral-ethical-value dilemmas confronting administrators in American political system.

569 Internship in Public Administration (3-9) Open to students participating in approved internship programs. May be repeated with consent of department. Maximum 9 hrs. S/N only.

570 Comparative Government and Politics (3) Selected topics in modern governments. 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.

573 Ares Seminar in Comparative Government and Politics (3) Selected topics in areas: Africa, 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.

596 Readings and Special Problems in Political Science (1-3) Prereq: Consent of instructor. May be repeated. Maximum 15 hrs.

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

610 Special Topics in Empirical Theory and Methodology (3) Advanced methods and procedures of analysis in political science. May be repeated with consent of department. Maximum 9 hrs.

615 Formal Political Analysis (3) Assumptions, methods and applications of formal models, including game theory, rational choice theory, and mathematical modeling. May be repeated with consent of instructor. Maximum 9 hrs.

628 Topics in Political Theory (3) Selected issues and problems in normative political theory. Specific content determined by instructor. May be repeated with consent of instructor. Maximum 9 hrs.

639 Special Topics in American Government and Politics (3) Advanced study of selected topics. May be repeated with consent of instructor. Maximum 9 hrs.

640 Special Topics in U.S. Constitutional Law (3) Systematic analysis of research and judicial decisions of constitutional law as major component of public policy. May be repeated with consent of department. Maximum 9 hrs.

642 The Politics of Criminal Justice (3) Selective examination of controversial policy topics of research and public policy formulation: criminal process, law enforcement administration; criminal court administration; and prison administration. May be repeated with consent of department. Maximum 9 hrs.

654 Contemporary Public Policies (3) Problems in one or more public policy areas: methodology and administrative perspectives. Topics selected by instructor. May be repeated with consent of department. Maximum 9 hrs.

660 Contemporary Perspectives on Public Administration (3) Development of theory in public administration; contemporary critiques and alternatives. May be repeated with consent of instructor. Maximum 9 hrs.

667 Comparative Public Administration (3) Comparison of policy-making structures and public policies in
selected countries. May be repeated with consent of department. Maximum 9 hrs.

566 Special Topics in Public Administration (3) Analysis of selected issues and problems in public administration. May be repeated. Maximum 9 hrs.

570 Special Topics in Comparative Government and Politics (3) Research into selected topics. May be repeated with consent of department. Maximum 9 hrs.

882 Theory and Analysis of U.S. Foreign Policy Processes (3) Theoretical approaches to decision making in foreign policy area and analysis of policy-making process. May be repeated with consent of department. Maximum 9 hrs.

568 Special Topics in International Politics (3) Selected topics and problems in international politics. Specific content determined by instructor. May be repeated with consent of instructor. Maximum 9 hrs.

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Polymer Engineering
See Materials Science and Engineering

Psychoeducational Studies
(Studies of Education)

MAJORS DEGREES

Education Ph.D.
Pedagogical Psychology M.S., Ed.D.
Educational Psychology and Guidance Ed.S.

K. Greenberg, Leader

Professors:
Bellon, Jerry J., Ed.D. UC Berkeley
Cameron, Walter A., Ph.D. Ohio State
Dickinson, Donald J., Ed.D. Oklahoma State
George, Thomas W., Ed.D. Tennessee
McCallum, R. S. (Liaison), Ph.D. Georgia
Peters, John M., Ed.D. NC State
Williams, R. L., Ph.D. George Peabody

Associate Professors:
Greenberg, Katherine H., Ph.D.
George Peebody
Kindall, Luther M., Ed.D.

The Psychoeducational Studies unit offers graduate programs leading to the following: Master of Science with a major in Educational Psychology, Educational Specialist with a major in Educational Psychology and Guidance, concentrations in educational psychology and school psychology; and Doctor of Education with a major in Educational Psychology. The unit also participates in the college-wide Ph.D. program with a major in Education. The concentration area is theories and practices of educational and personal adjustment with specializations in educational psychology and school psychology. See Education under Fields of Instruction for full description of all degree requirements.

The mission of the Psychoeducational Studies unit is to provide national leadership in creating learning environments that foster psychological health, address authentic educational needs, and promote life-long learning. The unit will seek opportunities in a diversity of contexts for learners to apply data-based problem solving, engage in reflective and evaluative thinking, and implement the structures and processes necessary for effective collaboration.

The school psychology program is accredited by the American Psychological Association and the National Association for School Psychology. This program also has the approval of the National Council for Accreditation of Teacher Education. The program in Educational Psychology has been recognized as a "Designated Program" by the American Association of State Psychology Boards and the Council for the National Register of Health Service Providers in Psychology.

ADMISSION REQUIREMENTS

Admission requirements include up-to-date scores from the GRE, the unit admissions application form and letters of recommendation. For the doctoral program, a writing sample is also required. The application deadline for admission to the doctoral programs is February 1, and to the Ed.S. and M.S. programs, February 1 and November 1. For information about the various programs of study and admissions, write to the Graduate Center in the College of Education.

GRADUATE COURSES

432 The Disadvantaged Student: Psychoeducational Perspectives (3) Theory and research regarding etiology, psychosocial behavior and appropriate interventions. S

450 Self-Management in the Helping Professions (3) Applications of self-management strategies to career, social, emotional, and health domains for both helping professionals and their clientele. Prereq: 510 or consent of instructor. S/NC or letter grade. Sp, Su

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

502 Registration for Use of Facilities (3-15) Required for classroom learning.

510 Special Topics (1-3) Instructor-initiated courses offered at convenience of unit on topics of current interest. May be repeated. Maximum 15 hrs. S/NC or letter grade. E

510 Psychological Theories of Human Development Applied to Education (3) Theory and research on emotional, social, and intellectual development over the life span with applications to educational and therapeutic settings. F, Su

511 Cognitive Development: Implications for Education (3) Applications of theory and research related to higher mental problem-solving. Prereq: 510 or consent of instructor. F

513 Reflective Practice in Education and Psychology (3) Concepts, theories and processes of reflective practice applied to educational settings.

515 Educational Applications of Behavioral Theories of Learning (3) Behavioral theories and research, conditioning, observational learning, and ethological learning as systems applied to student motivation, discipline and learning. F, Su

516 Educational Applications of Cognitive Learning Theories (3) Cognitive theory and research, social learning, attribution and information processing as systems to apply to education. Prereq: 515 or consent of instructor. F

518 Educational Specialist Research and Thesis (3) May be repeated. P/NP only. E

526 Informal Methods of Assessment (3) Development and use of rating scales, check-lists, observation, test scores and case reports in assessment and counseling of children and adults. Prereq: 525. 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. F, Sp

542 Practicum in Psychoeducational Assessment (3) Application of assessment skills to clients in learning environments. Coreq: 541 or consent of instructor. May be repeated. Maximum 6 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

546 Practicum in Consultation (3) Application of consultation skills to educational settings. Coreq: 545. Sp

549 Internship in School Psychology (1-6) Supervised employment in approved school psychology internship sites. Prereq: Enrollment in school psychology program and consent of instructor. May be repeated. Maximum 12 hrs. S/NC only. E

551 Issues and Theories in Cognitive Education for Disabled Learners (3) Current cognitive education theories; implications for disabled learners; effects of philosophy, politics, and ideology on assessment and instructional practices. May not be used toward degree requirements. May be repeated. Maximum 15 hrs. S/NC only. E

552 Instructional Systems in Cognitive Education for Disabled Learners (3) Informal and formal assessment approaches, data collection, instructional programming and decision-making related to nature and needs of disabled learners. Prereq or coreq: 551 or consent of instructor.

560 Discipline and Conflict Resolution (3) Applications of major models of discipline and conflict resolution strategies in development of constructive atmosphere for classroom learning.


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

603 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

604 Advanced Seminar in Curriculum and Learning (4) Teacher as decision maker. Themes and issues in curriculum and learning. Reading and discussions based on significant research and scholarly publications.

635 Ethical, Legal, and Professional Issues in Psychological Practice (3) (Same as Psychology 635 and Counseling Psychology 635, and Education 638.) Sp

649 Advanced Internship in School Psychology (1-9) Supervised experience as school psychologist in unit-approved internship site for doctoral level students. Prereq: Admission to doctoral level school psychology program and 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 and interpersonal development of children and adults. Social and mental health settings for intervention, consultation, prevention, and assessment services. May be repeated. Maximum 9 hrs. S/NC only.

663 Scale Construction (3) Development, pilot testing, and revision of attitude inventories, rating scales, and other paper-and-pencil techniques for assessing beliefs, personality characteristics, and opinion. Prereq: 525, and two-course sequence in statistical analysis. A

665 Analysis of Research in Instructional Technology (3) Research on human learning, design of learning environments. Analysis of teacher behavior, text development, computer software design and video presentations. 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/N C only. E

685 Educational Leadership: Theory and Practice (3) Theories of leadership applied to variety of educational settings. Prereq: Consent of instructor. F, S

693 Independent Study (1-3) May be repeated. S/N C or letter grade. E

Psychology
(College of Arts and Sciences)

MAJOR DEGREES
Psychology.................................M.A., Ph.D.

Warren H. Jones, Head

Professors:
Burghardt, Gordon M., Ph.D. .......... Chicago
Burtstein, Alvin G., Ph.D. .......... Chicago
Cahoun, William H., Ph.D. ............ California
Cohen, Charles P., Ph.D. .......... Kansas
Fine, Harold J. (Emeritus), Ph.D. ....... Syracuse
Handel, Stephen J., Ph.D. .......... Johns Hopkins
Hendler, Leonard, Ph.D. .......... Michigan State
Jones, Warren H., Ph.D. .......... Oklahoma State
Lawler, James E., Ph.D. ........ North Carolina
Lawler, Kathleen A. (Liaison), Ph.D. .... Duke
Newton, Kenneth R. (Emeritus), Ph.D. ....

Pollio, Howard R. (Distinguished Prof.), Ph.D. .......... Michigan
Samiehnia, Fumiko, Ph.D. .......... Keio
Saudargas, Richard S., Ph.D. .......... Florida State
Shrader, Raymond R. (Emeritus), Ph.D. .......

Ph.D. .......... Tennessee
Sundstrom, Eric D., Ph.D. .......... Utah
Travis, Cheryl B., Ph.D. .......... California (Davis)
Verplanck, William S. (Emeritus), Ph.D. .... Brown
Weiner, Robert G. (Liaison), Ph.D. .......... Washington
Wiberley, J. Albert (Emeritus), Ph.D. .......... Syracuse

Associate Professors:
Johnson, Michael G., Ph.D. .......... Johns Hopkins
McIntyre, Anne, Ph.D. .......... Yale
Morgan, Wesley G., Ph.D. .......... Tennessee
Nash, Michael R., Ph.D. .......... Ohio

Assistant Professors:
Baldwin, Debra R., Ph.D. .......... Kent State
Hopson, Ronald E., Ph.D. .......... Michigan State
Welsh, Deborah, Ph.D. .......... Massachusetts

THE MASTER'S PROGRAM
Graduate study leading to the M.A. degree in psychology is available with a concentration in experimental psychology. This program is appropriate for students who desire a master's degree as part of their progress toward a doctorate or for those who wish to complement a degree in a different field.

Admission
Any student with a B.A. or B.S. may apply to the Department of Psychology for admission to the master's program. All students must also submit scores from the Graduate Record Examination (general and subject).

Major Advisor and Committee
Initially, the Director of Experimental Psychology will advise the student. As soon as possible, the student must select an advisor and obtain his or her approval for registration. Subsequently, the advisor and student will select two additional faculty members to comprise the student's master's committee. Final committee approval comes from the Graduate Dean, upon recommendation by the Department Head.

Program Requirements
All students must complete 30 semester hours of graduate level courses in psychology. These hours must include 504-05, or Statistics 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 experimental or clinical psychology 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 specialties 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 in 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, 560, and 570 or 571).
3. Six semester hours of research practicum (509).
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 obtain a score of at least 630 on the GRE in psychology by the end of the first year and complete a predissertation research project by the end of the second year.

After forming the doctoral committee, students must submit two satisfactory papers, one addressing a topic of the student's choice and the second addressing an understanding of one individual's personality and cognitive functioning. All doctoral students must complete a minimum of 78 hours of graduate level courses; at least six hours in courses outside of psychology and at least 24 hours of dissertation research (600). Finally, students must complete an acceptable doctoral dissertation and conduct a satisfactory oral defense of this dissertation. Requirements are as follows:
1. Apprenticeship with one faculty member during the first year, 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. Satisfactory completion of listed courses (or equivalents) in the following seventeen categories:
   a. Foundations of Psychology; Biological Factors, Perception, Learning, Thinking, Motivation (513);
   b. Interviewing and Observation (556) and Laboratory (559);
   c. Research Practicum (509) (4 hrs.);
   d. Life-Span Development (512) or Developmental Psychology (511);
   e. Personality: Theory and Research I and II (570/571);
   f. History and Systems of Psychology (565);
   g. Research Questions and Designs (580);

407 Group Facilitation (3) Study of theory and technique through supervised experience in small groups. Prereq: 359 and consent of instructor. May be repeated. Maximum 6 hrs.


424 Psychology and the Law (3) Psychological aspects of legal systems. Prereq: 110 or equivalent, upper-division standing and consent of instructor.

430 Health Psychology (3) Survey of psychological factors related to health and illness; stress, personality, and environment. Applications of psychological treatments to physical illness. Prereq: 110 or equivalent, 420.

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 Zoology 450.)

459 Comparative Animal Behavior Laboratory (3) Coreq: 450. (Same as Zoology 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 human personality and their development. Prereq: 220 and 300 or 330.

480 Theories of Learning (3) Classical and current approaches to learning and cognition. Prereq: 310.


489 Supervised Research (1-9) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs in 489, 490, 491, 492, and 493 combined may apply toward undergraduate major.

500 Thesis (1-15) F/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 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

508 Readings and Special Issues in Psychology (1-3) Prereq: Consent of instructor. May be repeated. Maximum 9 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 socialization; 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 normal human development throughout life, adulthood, and old age. Prereq: Consent of instructor.

513 Foundations of Psychology: Biological Factors, Perception, Learning, Control and Natural settings (4) Intensive survey. Prereq: Consent of instructor.

516 Colloquium in Ethology (1) Current research and theory. May be repeated. Maximum 9 hrs. (Same as Zoology 516.) S/NC only. E

517-18 Proseminar in Industrial and Organizational Psychology (3,3) (Same as Management 517-18) Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. F

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 economies and strategies for self-control. Prereq: Consent of instructor.

525 Laboratory Techniques and Instrumentation (3) Procedures for laboratory research involving humans and nonhuman animals; techniques for collecting, transforming, storing, and analyzing data; use of microcomputers. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

526 General Vertebrate Neuroanatomy (3) Lecture and laboratory. Structure and function of central and peripheral nervous system. Prereq: 461, 463, or equivalent and consent of instructor. (Same as Zoology 526.)

527 Behavioral Neurology (3) Disorders of nervous system, organic brain dysfunctions. Diagnosis and treatment. Prereq: Consent of instructor.

528 College Teaching in Psychology (3) Concepts, techniques, and materials for teaching psychology at college or university level. Supervised practice. Prereq: Consent of instructor. S/N only.


545 Advanced Animal Behavior (3) (Same as Zoology 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 on theory and methods in comparative analysis of behavior. (Same as Zoology 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 537-538 or equivalent. May be repeated. Maximum 6 hrs.

556 Applied Psychological Measurement (3) Issues and techniques in applying psychological measurement in organizational, clinical, and community research. Prereq: Statistics 537-538 or equivalent or consent of instructor. May be repeated. Maximum 6 hrs.

558 Interviewing and Observation (3) Sensitizing students to own feelings and beliefs and to feelings of interviewee, and analysis of language content, style, and function. 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 from research involving human and/or nonhuman animals. Prereq: 400 and consent of instructor. May be repeated. Maximum 6 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.

570 Personality: Theory and Research (3) Advanced survey of psychodynamic and neo-Fraunian approaches to personality-related research. Prereq: Admission to clinical program or consent of instructor. F

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. Sp

575 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

577 Atypical Development in Childhood (3) Research on etiologies of atypical patterns of development in infancy and childhood. Prereq: 511 and consent of instructor. May be repeated. Maximum 6 hrs.

578 Clinical Aspects of Human Sexuality (3) Variation in human sexual behavior. Theories of etiology, treatment. Prereq: 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.
Rehabilitation and Deafness

(College of Education)

MAJORS

DEGREES

Education

Ph.D.

Rehabilitation Counseling

M.S.

Special Education

M.S.

S. Wayne Mulkey, Leader

Professors:

Doll, E. E. (Emeritus), Ph.D. .............. Pennsylvania
Muller, James H. (Liaison), Ed.D. ........... Auburn
Woodrick, William E., Ed.S. ................. Mississippi

Associate Professors:

Cassell, Jack L., Ph.D. ....................... Kansas
Colvin, Craig R., Ed.D. ....................... Virginia
Mulkey, S. Wayne, Ph.D. ..................... Florida State
Welch, Olga, Ed.D. ............................. Tennessee

Warden, K., Ph.D. ............................ Tennessee

The Rehabilitation and Deafness unit offers graduate programs leading to the Master of Science with a major in Rehabilitation Counseling or in Special Education, concentration in hearing impaired. The unit also participates in the Doctor of Philosophy program in Education as described under Education. See Education under Fields of Instruction for full description of all degree requirements.

The vision of the Rehabilitation and Deafness unit is to meet the unique educational, social, and vocational needs of persons with disabilities in a multicultural nation. Faculty and staff pursue, as a common mission, improvement in the quality of life for persons with disabilities and focus research interests on the development of new knowledge and technology to meet the unique educational, social, and employment needs of this population. A major goal of the unit is the preparation of graduates for future leadership and professional roles in business and industry, education, and community and government service.

The Rehabilitation and Deafness unit includes several educational programs sponsored by the United States Department of Education, Office of Special Education and Rehabilitative Services, Rehabilitation Services Administration, including: Regional Rehabilitation Continuing Education Program, Orientation to Deafness, Southeastern Regional Interpreter Training Consortium, National Interpreter Training Center, and the Educational Interpretation program.

GRADUATE COURSES

415 Language Development of Hearing Impaired I (3) Language problems of hearing impaired contrasted with scope and sequence of normal language development. Formal linguistic systems used to describe language development problems.


419 Speech Development of Hearing Impaired (4) Theories of speech development, approaches in training perception and production of speech, and aural habilitation. Practice experiences.

423 Communication Processes for the Hearing Impaired (3) Expressive and receptive vocabulary development in sign communication. Fingerspelling and educational applications of sign language.

424 Nature of Hearing Impairments (3) Basic principles of audiology: anatomy and physiology of hearing; nature and causes of hearing loss; methods and instrumentation for assessment of hearing level; interpretation of audiologic services to medical and other rehabilitative disciplines.

425 Introduction to the Psychology and Education of the 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.

482 Speech and Language Services in the Schools (3) Organization and implementation of speech and language programs in schools. IPP process as it affects assessment, case-selection, and programming for students age 4-21. Procedures and materials, group intervention, and classroom consultation.

483 Clinical Practice in Communication Disorders in Schools (3) Supervised practice with children with communication disorders. Prereq: 433, 434 (80-100 clinical contact hrs), 482.

500 Thesis (1-15) (3-15) Required for master practitioners. May be repeated. S/NC only. E

502 Registration for Use of Facilities (3-15) (Same as Management 625.) Required for master practitioners. May be repeated. S/NC only. E

504 Clinical Experience in Teaching and Supervision of Exceptional Children (3-9) (Same as Management 625.) Required for master practitioners. May be repeated. S/NC only. E

506 Internships in Teaching in Special Education and Rehabilitation (3-15) Placement in professional settings in public schools or agencies under supervision of master practitioners. Enrolment limited to those in fifth-year program. S/NC only.

509 Vocational Guidance and Career Planning With Hearing Impaired (3) Utilization of psychological, educational, vocational, and counseling 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. S/NC only. E

523 Practicum in Hearing Impaired (3) Receptive and expressive language capabilities of hearing impaired student. Designing, teaching, and post-testing of instruction for remediation of specific language deficits.

525 Manual Communication (3) American Sign Language (ASL) and culture of American deaf community. Acquisition of basic linguistic properties of ASL, cultural differences between hearing and deaf community, and...
vocabulary development. Prereq: Prior sign language experience or consent of instructor.

525 Advanced Sign Language (3) Intermediate ASL, stressing fluency of expressive and receptive communication with deaf people and structure and history of language. Prereq: 522 or equivalent.


529 Teaching Reading to the Hearing Impaired (3) Specific methods necessary to teach the prelingually hearing impaired student. Practice in preparation of developmentally appropriate teaching materials. Methods which assist in integrating hearing impaired students in regular reading curricula and materials. Prereq: 415.

530 Orientation to Rehabilitation (3) History, philosophy, legal, and ethical bases; current issues, and practices in public and private rehabilitation agencies. Qualifications of service providers. Assessment, plan development, and provision of services to people who have disabilities and vocational handicap: identification, mobilization, and utilization of rehabilitation resources.

532 Case Load Management in Rehabilitation (3) Techniques and procedures involved in management of case loads in Federal-State vocational rehabilitation agencies, private rehabilitation companies, and public or private rehabilitation facilities. Analysis of appropriate industrial management models related to rehabilitation programs.

533 Job Analysis, Development, and Placement (3) Determining employment-readiness of people with disabilities; identifying appropriate jobs for selected clients, and assisting clients in seeking, obtaining, and retaining employment. Job analysis, job modification and re-engineering, marketing, and employer-service techniques; legislation impacting job placement; supported work; and use of occupational adjustment training.

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 administration of relevant 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 models, and simulated work experiences in vocational evaluation. Clinical interpretation of data through formal staff conference, vocational counseling, and report writing.

539 Transition from School to Work (3) Development of programs and procedures to facilitate adjustment of exceptional persons to independent living: evolving perspectives and directions in effective programs, and interface between school-based programs and rehabilitation agencies.

541 Psychosocial Aspects of Exceptionalities (3) Psychosocial impact of exceptionality on person and family; reaction to loss, coping with disability, and societal rehabilitation.

543 Medical Aspects of Disability (3) Biology and clinical symptoms related to disabling conditions served by special education and rehabilitation personnel. Rehabilitation measures to eliminate or minimize resulting handicaps. Skills necessary to communicate with lay and professional persons.

545 The Rehabilitation Interview (3) Interview as used in assessment and planning with people who have disabilities and vocational handicaps.

547 Practicum in Rehabilitation (3) Supervised experience in area of rehabilitation; application of concepts, principles, and skills. Prereq: Consent of instructor.

549 Internship in Rehabilitation Counseling (12) Supervised practice in rehabilitation counseling. Full time clinical experience for second-year students (600 clock hrs required).

570 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 age students/clients. Delivery of assistive technology services; software programs and assistive devices; delivery systems, interdisciplinary evaluation/planning, and funding issues.

593 Independent Study (1-3) May be repeated. S/NC or letter grade. E

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

601 Seminar in Educational Theories in Special Education and Rehabilitation (3) Education theories: education and 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) 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) 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) Social phenomene which influence impact of disability on person and on significant others. Implications for habilitation. Prereq: Admission to doctoral program or consent of instructor.

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.

670 Special Topics (1-3) Prereq: Admission to doctoral program. May be repeated. Maximum 9 hrs. S/NC or letter grade.

690 Independent Study (1-3) May be repeated. S/NC or letter grade. E

Religious Studies

(Office of Arts and Sciences)

Charles H. Reynolds, Head

Professors:
- Humphreys, W. Lee, Ph.D. (Union)
- Linge, David E. (Lillian), Ph.D. (Vanderbilt)
- Lusby, F. Stanley (Emetris), M.Div.
- Norman, Ralph V., Jr., Ph.D. (Colgate Rochester)
- Reynolds, Charles H., Ph.D. (Harvard)

Associate Professors:
- Fitzgerald, James L., Ph.D. (Chicago)
- Gwynne, Rossalind W., Ph.D. (Washington)
- Hackett, Rachel O., Ph.D. (Aberdeen)
- Hodges, John O., Ph.D. (Chicago)
- Levering, Miriam L., Ph.D. (Harvard)

Assistant Professors:
- Hulsether, Mark, Ph.D. (Minnesota)
- Schmidt, G. Gerde, Ph.D. (Pittsburgh)

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.

GRADUATE COURSES

411 Modern Religious Philosophies (3) Religious implications of major Western thinkers and movements from Aristotle to twentieth-century German idealists. (Same as Philosophy 411.)

412 Classical Indian Systems of Philosophy: The Moksha Tradition (3) Investigation of selected writings and philosophical problems of traditions of Samkhya, Yoga, Vedanta, Buddhism, or Jainism. Prereq: 374 or consent of instructor. (Same as Philosophy 412.)

416 Jesus and Paul Compared (3) Central ideas and concepts of each compared with equivalent concepts in the other. Advanced study of Gospels and Acts of Paul. Involving extensive independent research.

425 Seminar in Western Religions (3) Selected figures, themes, movements, and problems. Content varies. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

430 Seminar in American Religion (3) Selected figures, themes, movements, and problems. Content varies. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

435 Seminar in Asian Religion (3) Selected figures, themes, movements, and problems. Content varies. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

440 Seminar in Comparative Religion (3) Selected figures, themes, movements, and problems. Content varies. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

446 Theoretical Issues in Medical Ethics (3) (Same as Philosophy 446.)

490 Readings and Research in Religious Studies (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.


532 Topics in the History of Religions (3) Prereq: Consent of instructor.

533 Topics in Religious Thought (3) Prereq: Consent of instructor.

591 Foreign Study (1-15) See College of Arts and Sciences.

592 Off-Campus Study (1-15) See College of Arts and Sciences.

593 Independent Study (1-15) See College of Arts and Sciences.
THE MASTER'S PROGRAM

Thesis Option
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, 5 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.

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 Languages and requires advanced training in at least two foreign 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.

Requirements for the Ph.D.
Candidates 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: (1) at least 39 hours in the first concentration; (2) at least 18 hours in the second concentration; and (3) at least 6 hours in a cognate field.

First Concentration: French, German, or Spanish. It consists of a minimum of 39 semester hours beyond the Bachelor's degree, distributed as follows:
- A maximum of 6 hours of 400-level classes taken for the Master's degree may be applied.
- A minimum of 21 hours at the 500 level (exclusive of thesis hours) including French 594(3), German 560 (3), or Spanish 550 (3); German 512 (3), French 512 (3), or Spanish 512 (3); French 515-16 (2.2) or German 520 (3).
- At least 12 hours at the 600 level (exclusive of dissertation hours).

Second Concentration: French, German, Italian, Russian, or Spanish (different from the first concentration). It consists of at least 18 hours of courses beyond the Bachelor's degree, at least 12 of which must be at the 500 or 600 level.

1. First Concentration: French or Spanish. It consists of 45 semester hours beyond the bachelor's degree, distributed as follows:
   - A minimum of 27 hours at the 500 level (exclusive of thesis hours) including French 584 (3) or Spanish 550 (3); French 512 (3) or Spanish 512 (3); and French 516 (2) or the appropriate Spanish course.
   - At least 12 hours at the 600 level (exclusive of dissertation hours).

2. Second Concentration: French, German, Italian, Portuguese, Russian, or Spanish (different from the first concentration). It consists of at least 12 hours, with a minimum of 3 hours at the 500 level. Students are encouraged to take classes that complement the primary area of expertise in the first concentration, so that this second concentration will be a useful research tool for the dissertation and future professional activities. (Because Track II students will have taken 12 graduate hours instead of 18 hours in the second concentration, they will normally not be eligible to teach that language at institutions which follow SAC guidelines for college foreign language teaching.)

3. Cognate Field: Six hours must be in courses numbered 400 and above and in a field outside the candidate's first concentration but related to the student's principal area of research. If the cognate field is yet a third foreign language, a reading proficiency exam will be administered after completion of the 6 cognate hours by the language section concerned.

4. Additional requirements for both tracks: A student must demonstrate competence in the languages of both the first and second concentrations by taking a test in each language. 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 the National Teacher's Examination, the MLA Examination for Teachers and Advanced Students, or the proficiency standards of the United States Foreign Service Institute (FSI).

If the 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.
A comprehensive examination on the language and literature of the first and second concentrations must be passed before the student may be admitted to candidacy. The candidate is required to defend his/her dissertation in an oral examination. Central emphasis is put on the doctoral dissertation as a final test of the candidate's scholarly qualifications.

Graduate Teaching Assistants in the program should have the opportunity and will be strongly encouraged to instruct at least two foreign languages, subject to staffing needs. Doctoral students are strongly encouraged to reside and study abroad and will be assisted in identifying potential sources of financial support (e.g., Fulbright, McC lure, 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.

451 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 Pleiade. Prereq: 212, 218 or equivalent.


413 French Literature of the 18th Century (3) Major works of Enlightenment. Prereq: 212, 218 or equivalent.


416 Survey of Francophone Literature (3) Examination of French literature outside metropolitan France, particularly Africa and Caribbean. Prereq: 212, 218 or equivalent.

516 Bibliography and Methods of Research (2) Critical research tools and scholarly contributions in French literature and language. Practical exercises on compiling of scholarly data using computer-based and non-computer sources.


531 French Literature of the 16th Century (1) Literature of first half of 16th century. Rabelais and other prose writers, humanists, and poetry of Marot, Lyonnaise group, and young Peliade poets.

532 French Literature of the 16th Century II (3) Literature of second half of 16th century, mature works of Pliade writers and such poets as d'Aubigné and Spontin; Montanges; writers of scientific works and memoirists; drama.

541 French Literature of the 17th Century (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: the Philosophes (3,3) Textual analysis of works of Voltaire, Diderot, Rousseau, and other major French 18th-century writers.

556 Lyric Poetry of the 19th Century (3) Reading and interpreting great French romantic poets, "l'art pour l'art" movement, Parnassians, Charles Baudelaire and Symbolists.

571-72 Trends in Modern French Literature (3,3) In-depth study of some of the major literary movements, such as flowers, 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 Literary Criticism: the Foundations of Romance Criticism (3) Survey of critical ideas utilized over centuries in the development of one's theories of criticism.

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/NC.

594-95 French Directed Readings (3,3)

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

621-22-23 Seminar in French Literature (3,3,3) 621--Middle Ages; 622--16th Century; 623--17th Century. May be repeated with consent of department. Maximum 6 hrs each.

632-33 Seminar in French Literature (3,3) 632--19th Century; 633-20th Century. May be repeated with consent of department. Maximum 6 hrs each.

Italian

GRADUATE COURSES

401 Dante and Medieval Culture (3) Introduction to significance of this great Italian writer. Prereq: 212 or consent of instructor.

402 Petrarch and Boccaccio (3) Prereq: 212 or consent of instructor.

403-04 Literature of the Rinascimento (3,3) From Pico to Tasso, Quadrontino and Cinquecento. Prereq: 212 or consent of instructor.

405 Modern Italian Poetry (3) From Pascoli to Montale. Prereq: Italian 212 or consent of instructor.

406 The Modern Italian Novel (3) From Manzoni to Calvino. Prereq: 212 or consent of instructor.

409 Directed Readings (3)
410 Italian Theatre (3) Survey of Italian theatre from Renaissance to present. Prereq: Intermediate Italian or consent of instructor.

421 Topics in Italian Literature and Cinema (3) Italian literature and cinema from 1530 to present focusing on literary works translated into English and adapted into film. Investigation of relationship between literature and cinema and achievement of greater understanding of Italian culture since 1935. Film in Italian with English subtitles. May be repeated. Maximum 6 hrs. (Same as Cinema Studies 421.)

510 Readings in Italian Literature (3) Topics vary. May be repeated with consent of department.

591 Foreign Study (1-15) See College of Arts and Sciences.

592 Off-Campus Study (1-15) See College of Arts and Sciences.

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

Portuguese

GRADUATE COURSES

431-32 Topics in the Literature & Language of Portuguese-speaking World (3,3) Outstanding works of literature and culture from Portuguese countries. Topics may vary. Prereq: At least one course at the 300 level or the equivalent. May be repeated. Maximum 12 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.

Spanish

GRADUATE COURSES

421 Phonetics (3) Prereq: Intermediate Conversation and Composition or consent of instructor.

422 Advanced Grammar (3) Piner points of grammatical structures. Required of all majors. Native speakers must receive consent of instructor. Prereq: Intermediate Conversation and Composition or consent of instructor.

423-24 Advanced Conversation and Composition (3,3) Advanced conversational and written skills in Spanish for pre-professionals. Native speakers must receive consent from instructor to take course. Prereq for 423: Intermediate Conversation and Composition or consent of instructor. Prereq for 424: 423 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.)

428 Romance Linguistics (3) (Same as French 429 and Linguistics 429.)

431 Spanish Civilization (3) Major social, political, and cultural achievements of Spanish people from origins of their civilization until today. Prereq: Aspects of Spanish and Spanish American Literature 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 Literature or equivalent.

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 Literature 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 Literature 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 Literature 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 may vary. May be repeated with consent of department. Maximum 6 hrs.

471 Latin American Civilization (3) Latin America's diverse heritage and major societal 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 ills 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 facility 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 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.

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 and written 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) Old Spanish language and medieval Spanish literature through 13th century.

532 Medieval Spanish Literature (3) Spanish literature of 14th and 15th centuries.

533 Golden Age Prose (3) Wide range of prose fiction in Spain during 16th and 17th centuries. Moonsh, picaresque, sentimental, pastoral and exemplary novels, and dialogues.

534 Don Quixote (3)

535 Golden Age Poetry (3) Garcilaso, Fray Luis de León, San Juan de la Cruz, Lope de Vega, Quevedo, and Gongora.

537 Golden Age Drama (3) Major dramatists of period: Lope de Vega, Tirso de Molina, Ruiz de Alarcón, Guillermin de Castor, Calderón de la Barca, Moreto, and Rojas Zorrilla.

542 The Generation of '98 and Ortega (3) Unamuno, A. Machado, Azorín, Valé-Infante, Benavente, Ortega y Gasset.

543 The 20th-Century Spanish Novel (3) Baroja, Azorín, Valé-Infante, Pérez de Ayala, Cela, Delibes, Goyesco, Matute, and at least one present-day novelist.

545 Modern Spanish Poetry (3) From Bécquer, Unamuno, A. Machado, Jiménez, Lorca, Guillén, Aleixandre, and a contemporary, Celayga.

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)

561 Spanish American Colonial Literature (3) From pre-Columbian era through 18th century. Reading and analysis of selected works from Colonial Spanish American period and their Continental sources. Indigenous texts and authors.

562 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.


573 The Spanish American Novel: Chile and the River Plate Nations (3) Novels from Chile, Argentina, Uruguay and Paraguay. Modern world.


576 Contemporary Spanish American Poetry (3) Major poets in Spanish American from post-modernismo to present day.

577 Spanish American Drama (3) Major playwrights of 20th-century Spanish America.


579 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.

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

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.

Russian

See Germanic and Slavic Languages

Small Animal Clinical Sciences

See College of Veterinary Medicine and Comparative and Experimental Medicine
Social Work

(College of Social Work)

MAJOR DEGREES

Social Work ........................................... M.S.S.W., Ph.D.

Eunice Shatz, Dean

Professors:

Bloch, M. H. (Emeritus), M.S. ............. Ohio State
Cetingok, M., Ph.D. .......... Washington (St. Louis)
Faver, C., Ph.D. .............................. Michigan
Fryer, Gideon W. (Emeritus), Ed.D. .......... Columbia
Glasier, C. A., Ph.D. ............. Washington (St. Louis)
Granger, Ben P. (Emeritus), Ph.D. ....... Brandeis
Hirayama, H., D.S.W. ............. Pennsylvania
Mclaran, G. (Emeritus), M.S.S.W. ......... Tennessee
Mullins, Kate (Emeritus), Ph.D. ........... Chicago
Noee, Roger M., D.S.W. ............. Tulane
Orten, J. D. (Emeritus), D.S.W. .......... Alabama
Pomerantz, Edward (Memphis), M.S.W. ....... Barry
Spaulding, E., Ph.D. ............................. Smith
Vaughn, H. H., Ed.D. ............... Memphis State

Associate Professors:

Bett, W. J., D.S.W. ............................... Tulane
Combs-Orme, Terri, Ph.D. ...................... Washington (St. Louis)
Cruthirds, C., D.S.W. ...................... Tulane
Flene, Judith, Ph.D. ................................ Tennessee
Jennings, J., Ph.D. .............................. Michigan
Moses, A. E., D.S.W. ...................... California
Nugent, W., Ph.D. .............................. Florida State
Orme, J., Ph.D. .............................. Washington (St. Louis)
Spicuzza, Frank, M.S.S.W. .................. Tennessee
Thompson, J., Ph.D. ............................... Rutgers
Vaughn, H., Ed.D. ............................... Memphis State

Assistant Professors:

Campbell, P. M., D.S.W. ...................... Alabama
Collier, G. J., M.S.W. .............................. Tulane
Crawford, S., M.S.W. ...................... Tulane
Jones, J., Ph.D. .............................. Bryn Mawr
Knox, Karen, Ph.D. ............................. Texas
Marley, Marsha, D.S.W. ...................... Tulane
Patterson, D., Ph.D. ............................. Utah
Rocha, Cynthia, Ph.D. ........................... Washington (St. Louis)
Spaulding, E., Ph.D. ............................. Smith
Vickerstaff, Susan, Ph.D. ...................... Alabama

Field Practice Coordinators:

Betz, Phyllis (Knoxville), M.S.S.W., Tennessee
Harris, Joyce (Nashville), M.S.S.W., Tennessee
Pomerantz, Edward (Memphis), M.S.W., Barry

THE MASTER'S PROGRAM

The Master of Science in Social Work 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.

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.

3. Personal qualifications acceptable for entrance into the professional practice of social work. Preference is given to applicants with a GPA of 3.0 or above in their undergraduate work with substantial preparation in the social sciences.

4. Successful completion of a comprehensive exam or thesis defense.

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 development 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 management and community practice.

Clinical Social Work Practice: The clinical social work practice concentration includes students developing expertise in providing services to individuals, couples, families, and 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 toward 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 of organizations and communities, knowledge and skills in the development of service intervention strategies to address such and related needs; and the organizational and management skills that enable practitioners to work in a variety of challenging and turbulent environments. The concentration emphasizes theory and skills related to leadership and administration, and permits flexibility in tailoring a program to fit the student's individual interests, capabilities, and career goals.

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 field agencies to ensure that students are successfully prepared for the professional practice of social work.
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 variaton 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 pass/fail system) on the field practicum is also accepted. In addition, transfer courses must be part of an otherwise satisfactory graduate program (A average) and be approved by the dean. This coursework must be completed within the six-year period prior to the receipt of the master’s 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 focus of social work education at the doctoral level is to foster the development of an attitude of scientific inquiry, knowledge of the scientific method, ability to extend the knowledge base of social work practice, and effective participation in leadership roles in social work education, research, and practice.

The emphasis of the doctoral program is upon:

- The analysis of direct intervention and social administration and of the interrelationships among each of them and their social policy, organizational, and community contexts. Research-based knowledge to inform and guide social work; research to inform social policy, and social welfare program development.

The program consists of foundation courses, elective courses, and dissertation research. The courses are available only in Knoxville. Students and their committees can develop a plan for completing the 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/senior welfare experience. Applicants who do not meet these requirements, but believe they have equivalent credentials, should contact the Chair of Ph.D. program for further information regarding admissions criteria.

General Requirements
1. A minimum of 60 semester hours beyond the master’s degree including a) completion of 21 credits of required coursework, b) completion of 15 credits of advanced electives, at least 12 of which are taken outside the department, and c) completion of at least 24 credits of dissertation research.
2. Successful completion of qualifying and comprehensive examinations.
3. Completion of dissertation.

Curriculum
The curriculum of the Ph.D. program consists of required coursework, electives, and dissertation research. The foundation curriculum consists of 21 hours of coursework in the history and philosophy of social work, issues in direct service and administration and planning, areas of practice, and research methodology and statistics. Upon this foundation, students and their academic committees develop plans of study consisting of coursework in Social Work and other departments of the University.

Typically, the foundation curriculum is completed and elective coursework begun 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, 631, 631, 640, 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 research assistantships. Graduate assistantships and other forms of financial aid 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, communication, intervention, and evaluation skills. Prerequisite: Admission to College or 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. E

503 Foundations of Social Work Practice II (3) Generalist practice with individual, family, and small group systems. Ecological theory to frame understanding of such systems and their adaptation to environments. Various social work roles and intervention strategies pertaining to each client system. Prerequisites: 501 or consent of instructor.

504 Foundations of Social Work Practice III (3) Basic theory, methods, problems, and strategies in implementing planned change within and among larger social systems: task groups, human service organizations, and community systems. Various practice roles: planner, program developer, supervisor, administrator, advocate and task group leader. Prerequisite: Completion of first semester of foundation or consent of instructor.

506 Social Work Research (3) Research methodologies with respect to evolution and application to social work theory and practice. History and theories of science; problem formulation; research design; ethics; instrument use and construction; data collection; analysis and reporting; and evaluation and utilization of research.
508 Practicum in Social Work Research (3-6) Supervised practice in application of research methods to social work. Prereq: 510 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.)

510 Social Work Research (3) Research methodology applied to problems in social welfare. Problem formulation, research design, data collection, analysis, and reporting; statistical procedures; research reporting; and evaluation and utilization of research. Prereq: Admission to college or consent of instructor. F

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 of consent of instructor. Spring

515 Human Behavior in the Social Environment II (3) Theories, developmental concepts, and empirical research findings relevant to clinical perspective on adaptive and psychopathological development of individuals. Relationships among biology, social/cultural context, environment, theory, organization, and intergenerational model of ego development. DSM-IV use to provide information regarding descriptive categorical diagnostic. Prereq: 514 or consent of instructor. Spring

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 social welfare programs are generated, authorized, financed, and programmed. Theories of complex organization of social welfare 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 both social systems and personal experience. Connections among various forms of oppression: racism, sexism, classism, and heterosexism. Forces which perpetuate such conditions. Prereq: Admission to College of consent of instructor. Spring

521 Clinical Social Work Practice with Individuals (3) Theories, knowledge, and skills for clinical practice with individuals from ecological perspective. Therapeutic process and treatment strategies, incorporating content from psychodynamic and cognitive practice models. Specific client problems. Prereq: Completion of foundation or consent of instructor. Spring

523 Clinical Social Work Practice with Families (3) Concepts related to understanding and analyzing family dynamics and informational systems and processes. Specific family problems. Prereq: Completion of foundation or consent of instructor. Spring

525 Clinical Social Work Practice with Groups (3) Theoretical and historical approaches to social work with groups and clinical group supervision. Types of group work used in clinical practice and associated leader interventions. Prereq: Completion of foundation or consent of instructor. Spring

526 Research for Assessment of Social Work Treatment (3) History and philosophy, conceptual approaches, techniques and methods, and issues in evaluation of research evaluation. Prereq: Consent of instructor. Summer

530 Seminar in Clinical Social Work (3) Topics in theory and practice of clinical social work with individuals, couples, families and groups. Prereq: Completion of foundation or consent of instructor. Spring

532 Short-Term Treatment (3) Theory and practice of planned short-term emergency treatment, and crisis intervention. Prereq: Foundation and 520, or consent of instructor. Spring

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 and 520, or consent of instructor. Spring

534 Social Work Treatment with Children and Adolescents (3) Examination of various treatment modalities for assessing and treating children and adolescents. Prereq: 520 and 522, or consent of instructor. Spring

541 Leadership and Management in Human Services (3) Management practices and leadership skills required in development and management of human services delivery systems. Issues regarding human resources management, resource allocation, strategic planning, and organizational dynamics. Prereq: Completion of foundation or consent of instructor. Spring

543 Computer Technology, Information Systems, and Resource Development in Human Services (3) Analysis of role of computer technology in automation of human services' information and financial planning and budgeting systems. Technical aids to budgetary choice and other aspects of financial and information management for decision-making. Prereq: Completion of foundation or consent of instructor. Spring

547 Evaluation Research (3) History and philosophies, conceptual approaches, techniques and methods, and issues in evaluation of research evaluation process as applied to development and evaluation of social work programs and policies. Issues pertaining to strengths and limitations of various methods and strategies for application of data, and measurement of program goals and objectives. Prereq: Completion of foundation or consent of instructor. Spring

559 Seminar in Social Welfare Policy and Administration and Planning (2-3) Areas and issues relating to methods and techniques of social welfare administration and planning. Prereq: Foundation or consent of instructor. May be repeated. Maximum 6 hrs. Spring

551 Seminar in Social Welfare (2-3) Social welfare policy areas or field of practice. Prereq: Foundation or consent of instructor. May be repeated. Maximum 6 hrs. Spring

552 Community Organization (3) Locality development, social planning and social action as practice models for development of resources to meet human needs. Prereq: Foundation or consent of instructor. Spring

554 Social Policy Analysis (3) Techniques for assessing social, political, and economic implications of social policy proposals. Prereq: Foundation or consent of instructor. Spring

561 Supervision and Consultation in Social Work (3) Roles, techniques, and methods of supervision and consultation. Prereq: Foundation or consent of instructor. Spring

562 Social Work and Black Families (3) Historical and contemporary theories about black family systems. Development of frameworks to assess and plan for black families within service delivery systems. Prereq: Foundation or consent of instructor. Spring

563 Social Aspects of Illness (3) Social, economic, and emotional problems arising from or related to illness and disability and their implications for social work. Prereq: Foundation or consent of instructor. Spring

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. Summer

566 Social Gerontology (3) Physical, psychological and social aspects of aging. Major social policies and programs. Prereq: Foundation or consent of instructor. Summer

580 Field Practice (3) Instruction and supervision in social work practice. Prereq: Foundation or consent of instructor. Spring

581 Field Practice (3) Instruction and supervision in social work practice. Prereq: Foundation or consent of instructor. Fall

582 Field Practice (6) Instruction and supervision in clinical social work practice and management and community practice. Prereq: Completion of foundation. S/NC only. Fall

583 Field Practice (6) Instruction and supervision in clinical social work practice and management and community practice. Prereq: Foundation or consent of instructor. Fall

584 Field Practice (2-6) Instruction and supervision in social work practice. Prereq: Foundation or consent of instructor. Fall

585 Seminar in Gerontology (1) (Same as Human Ecology 585, Counsellor Education 556, Counseling Psychology 585, Exercise Science 585, Nursing 585, Public Health 585, Psychosocial Education 585, and Sociology 585.) Spring

593 Independent Study (1-6) Individualized study, student seminars, 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 (3-15) F,Sp

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 (3) Epistemological and methodological considerations for both quantitative and qualitative research for social work practice. Sp

604 Research in Social Service Settings (3) Advanced research, under faculty supervision, of practice issues in community agency. 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 and for evaluating processes and outcomes of social work practice. F


640 History of American Social Work (3) Social, cultural, economic and political contexts for development of social work profession, development of education for profession, and modern welfare system. F

660 Issues in Social Work Knowledge Building (3) Advanced seminar in theory and model building in direct intervention, administration and planning. Prereq: First year required Ph.D. courses or consent of instructor. May be repeated. Maximum 9 hrs. F,Sp

693 Directed Study in Social Work Research (3) Advanced individual study, under faculty guidance, of social work practice issues. Prereq: First year required Ph.D. courses or consent of instructor. May be repeated. Maximum 9 hrs. F,Sp

Sociology

(College of Arts and Sciences)

MAJOR

DEGREES

Sociology ............................................. M.A., Ph.D.

Michael L. Benson, Head

Professors:

Betz, D. Michael, Ph.D. ....................... Michigan State
Black, James A., Ph.D. ........................... Iowa
Hastings, Donald W., Ph.D. ................... Massachusetts
Hood, Thomas C., Ph.D. ....................... Duke
Ploch, Donald R., Ph.D. ....................... North Carolina
Shriver, N., Ph.D. ................................. Illinois
Wallace, Samuel E., Ph.D. ................. Minnesota

Associate Professors:

Benson, Michael L., Ph.D. .................... Illinois
Cable, Sherry, Ph.D. ............................. Penn State
Gaventa, John P., Ph.D. ....................... Oxford
Kurth, Suzanne B., Ph.D. ..................... Illinois (Chicago)
Perrin, Robert G. (Liaison), Ph.D. ......... British Columbia
Assistant Professor:
Jalata, Asafa, Ph.D. .......... SUNY (Binghamton)
Jones, Robert E., Ph.D. ....... Washington State

The Sociology Department offers graduate study leading to the Master of Arts and the Doctor of Philosophy. The M.A. program includes a thesis and non-thesis option. The graduate program has concentrations in criminology, energy, environment, and resource policy; and political economy. The criminology concentration includes 505, 551, 653, and 655. The energy, environment, and resource policy concentration includes 560, 563, 661, 662, and 665. The political economy concentration includes 504, 540, 541, 643, 644, and 645. Both the master's and the doctoral program allow for the construction of individualized programs of study. Detailed information may be obtained from the Director of Graduate Studies in Sociology. All incoming students will be advised by the Director of Graduate Studies. New students are admitted in fall semester only and applications must be received by the Graduate Admissions and Records Office by February 1.

ADMISSION REQUIREMENTS
1. Acceptable scores on the general Graduate Record Examination. GRE scores in the subject area (sociology) are requested but not required.
2. Three letters of recommendation (forms may be obtained from the department).
3. Completion of the appropriate previous degree (baccalaureate, preferably with a major in one of the social sciences, for the M.A. program; master's degree in one of the social sciences for the doctoral program).

THE MASTER'S PROGRAM
Thesis Option
A minimum of 30 hours beyond the baccalaureate degree, including 24 hours of coursework and 6 hours of Thesis 500, is required. Students must complete Sociology 521, 531, Statistics 531, and one foundation course (504, 505, or 560). At or near the end of all coursework, the student must take an oral examination on course material and thesis. The examination will be administered by the student's committee.

Non-Thesis Option
A minimum of 30 hours of coursework is required, including Sociology 521, 531, Statistics 531, and one of the following: 504, 505, or 560. Sociology 534, 822, and Statistics 532 are recommended. Sociology courses at the 400 level may be taken with the approval of 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 supervisory work in their programs are encouraged to prepare a report based on these experiences that demonstrates their understanding of research, theory, and report writing. All students must take final written and oral examinations that include questions on their general coursework in theory and methods and on their special areas of study.

Subject to approval by the student's committee, up to 12 hours may be taken in courses outside the department for either program.

THE DOCTORAL PROGRAM
Coursework
Twenty-four hours of coursework beyond the master's degree are required (exclusive of S/N/C 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 residence. Students must complete Sociology 622*, 634, 653, 663, or 666; and Sociology 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 master's-level graduate students an opportunity to develop 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 in American society with his/her major concentration. Please refer to Human Ecology for specific requirements.

GRADUATE COURSES
405 Sociology of Sport (3) Social meaning, organization, and process of sport. Prereq: 281 or consent of instructor.
414 Sociology of Health Care (3) Organization of health care facilities, staff-patient 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 patterns of conflict. Analysis of who gets what, why, and how in global political economy.
455 Society and Law (3) How laws and legal processes are affected by social change, social impact of legal sanctions, relations between law and social justice.
459 Organizational and Corporate Crime (3) Analysis of crime and deviance committed by organizations. Case studies of corporate and organizational crime, organizational dynamics of crime, sources 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 484.)
471 Sociolinguistics (3) (Same as English 471 and Linguistics 471.)
480 Diffusion of Agricultural Technology (3) (Same as Rural Sociology 480.)
500 Thesis (1-18) 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 student's degree is completed. Not may be used toward degree requirements. May be repeated. S/N/C 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.
506 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, and research methods. May be repeated. S/N/C only.
533 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 collectivities and efforts of collec-
tives to change existing society.

542 Sociological Aspects of Sport (3) (Same as Sport Studies 542)

543 Sociology of Development (3) Sociological theo-
ries and studies of development: modernization, coloni-
alism, dependency, comparative impact of various de-
velopment paths upon selected aspects of social struc-
ture 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 on responsibility and punishment.

560 Environmental Sociology (3) Systematic treat-
ment 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.)

585 Seminar in Gerontology (1) (Same as Human
Ecology 585, Counselor Education and Counseling Psych-
ology 585, Exercise Science 585, Nursing 585, Public
Health 585, Psychoeducational Studies 585, and Social
Work 585.)

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
Sciences.)

595 Special Topics in Rural Sociology (1-3) (Same as
Rural Sociology 593.)

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 socio-
logical theory and contributions of their principal expan-
sicators. Prereq: 521 or consent of instructor.

629 Supplementary Readings in Sociological Theory
(3) Individual guidance. Preparation for comprehsive
examination. Prereq: Consent of instructor. S/N only.

633 Survey Design and Analysis (3) Systematic explo-
ration of survey problems through student participation in
design and analysis of survey. Prereq: 531 or consent of
instructor. (Same as Child and Family Studies 633.)

636 Field Research (3) Research experience in se-
lected field sites using techniques of interviewing, partici-
patant observation, and other methods of field research.
Prereq: 531 or consent of instructor.

639 Supplementary Readings in Methodology (3)
Individual guidance. Preparation for comprehensive
examination. Prereq: Consent of department. S/N only.

643 Class Analysis (3) Critical analysis of theories and
research on class structure and conflict.

644 Political Sociology (3) Critical examination of theo-
ries of state and political processes.

645 Advanced Studies in Political Economy (3) Topi-
cal seminar. Prereq: 504 or consent of instructor. May be
repeated. Maximum 6 hrs.

648 Supplementary Readings (3) Prereq: Consent of
department. May be repeated. Maximum 6 hrs. S/N only.

585 Sociology of Law (3) Intensive examination of se-
lected topics in sociology of law. Prereq: 505 or con-
sent of instructor.

585 Advanced Studies in Criminology (3) Intensive
examination of selected topics in criminology. Recom-
mented prereq: 505. May be repeated. Maximum 6 hrs.

661 Theory and Methods of Human Ecology (3) His-
torical and contemporary studies of interaction be-
tween humans and their environment. Prereq: Consent of
instructor.

662 Urban and Regional Sociology (3) Historical and
contemporary studies of South and Appalachian region
with comparisons to other regions.

665 Advanced Studies in Energy, Environment and
Natural Resources Policy (3) Seminar covering the
particulars of research and theory within the area. Prereq:
Consent of instructor. May be repeated. Maximum 6 hrs.

673 Advanced Studies in Social Psychology (3) Se-
lected contemporary research issues related to social
psychological theories. Prereq: 541 or consent of in-
structor. May be repeated. Maximum 6 hrs.

695 Advanced Special Topics (3) Topic of special
interest or student-initiated courses that will not be regu-
larly offered. Prereq: Consent of department. May be
repeated. Maximum 6 hrs.

699 Tutorials in Advanced Topics (3) Individual in-
struction. Prereq: Consent of department. May be re-
peated. Maximum 6 hrs.

Spanish
See Romance and Asian Languages

Special Programs

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 expe-
rience 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,dif-
critical figures in shaping of scientific thought,and
methodology for observation and experimentation in natu-
ral 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 environ-
ments and their behavior.

Speech Communication

(College of Arts and Sciences)

Faye D. Julian, Head

Professors:
Julien, 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, Jerry J., Ph.D. Northwestern
Cook, N. C., M.A. Alabama
Glenn, Robert W., Ph.D. Northwestern

Assistant Professors:
Ambler, R. S., Ph.D. Ohio State

Arnold, Christa L., Ph.D. Florida
Haas, John W., Ph.D. Kentucky

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 under-
standing, 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, organi-
zational or societal levels.

425 Interpersonal Health Communication (3) Inter-
personal communication in health care settings: pro-
vider-client interactions, social support groups, stigma
disease, and contemporary models explaining use of
health-related information.

440 Organizational Communication (3) Organiza-
tional 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 ADfperal public address
in campaign for women's rights in United States from
1830's through 1920's. (Same as Women's Studies 466.)

476 Rhetoric of the Contemporary Feminist Move-
ment (3) Historical and critical study of rhetoric in cam-
paign for women's rights in United States from 1940's to
present. (Same as Women's Studies 476.)

480 Ensemble Interpretation (3) Study and present-
ration of literary texts through group performance.

570 Legal and Ethical Issues of Communication (3)
Communication and legal responsibilities. Prereq: Con-
sent of instructor.

590 Directed Reading and Research (3) May be re-
peated. 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.

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

Sport and Physical Activity

(College of Education)

MAJORS

DEGREES

Human Performance and Sport
Studies ............................................. M.S.
D. Kelley, Leader

Professors:
Lay, Nancy E., Ph.D. Florida State
Watson, Helen B. (Emeritus), Ph.D. . . . . . . Michigan

Associate Professor:
Jones, Ralph E., Ph.D. Toledo

Assistant Professors:
Borovicka, Patricia C., M.S. Tennessee
Kelley, Dennis R., Ph.D. Georgia State
McCutchin, M. G., Ed.D. North Carolina (Greensboro)
Sport Management

GRADUATE COURSES

415 Managing Leisure/Sport and Related Facilities (3) (Same as Recreation and Leisure Studies 415.)

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

501 Special Project (3) Culminating experience for non-thesis major. Research study suitable for publication, or praxisicum: requiring special written work. Prereq: 532.

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any quarter in which they may prepare themselves for entrance to the program. May be repeated.


511 Administrative and Supervisory Processes in Sport (3) Organizational concepts, administrative strategies, and supervisory techniques related to sport administration at all levels of participation in profit and nonprofit settings. F

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

533 Sport Administration (3) Development of knowledge and analytic skills desirable for middle management positions in sport business/organization. Sp

541 Management and Operation of Recreation and Sport Related Facilities (3) (Same as Recreation and Leisure Studies 541.)

544 Theories of Leadership and Leadership 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. Sp, Su

554 Readings in Sport Administration (3) Survey of pertinent literature in refereed and applied journals and texts. E

555 Assessment of Sport Programming Needs (3) Development and assessment of approaches and/or instruction for purpose of evaluation, research, feasibility studies, and needs assessment in sport administration: qualitative and quantitative techniques. Prereq: 532.

570 Event Management (3) Review of current research related to theory and practices in event management. Prereq: 532. Sp

580 Practicum (1-3) Intern experience in areas of major interest. May be repeated.

593 Independent Study (1-3) May be repeated. S/NP or letter grade. E

595 Internship (3) Full-time application of previous theoretical and applied knowledge and skills in appropriate sport setting. 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.

430 Dance through the 19th Century (3) Dance of various societies and culture from pre-historic through 19th century.

490 Dance in the 20th Century (3) History and philosophy of dance.

495 Dance Pedagogy (3) Principles and methods of teaching dance with practical application in mini-teaching experience. Prereq: Upperclass or graduate standing and consent of instructor.

Statistics

(College of Business Administration and Intercollegiate Program)

MAJORS DEGREES

Statistics M.S.

Business Administration MBA

William C. Parr, Head

Professors:

McLean, Robert A. (Emeritus), Ph.D. ........... Southern Methodist Philpot, John W., Ph.D. .......... VPI

Sanders, Richard D., Ph.D. ................. Texas

Sylwester, David L., Ph.D. .............. Stanford

Thigpen, Charles C. (Emeritus), Ph.D. .......... VPI

Associate Professors:

Bozdogan, Hamparsum, Ph.D. ............... Illinois

Guess, Frank M., Ph.D. ................ Florida State

Leitmaker, Mary G. (Liaison), Ph.D. ...... Kentucky

León, Ramón V., Ph.D. ................ Florida State

Lin, Dennis K. J., Ph.D. ................... Wisconsin

Mee, Robert W., Ph.D. ..................... Iowa State

Walker, Esteban, Ph.D. ...................... VPI

Younger, M. S., Ph.D. ......................... VPI

Lecturer:

Schmidhammer, James L., Ph.D. ............ Pittsburgh

Additional Intercollegiate Program Faculty:

Bunting, Dewey, Arts and Sciences; Chatterjee, Arun, Engineering; Dessart, Don, Education; Fitzpatrick, Beth, Arts and Sciences; Fribourg, Henry, Agricultural Sciences and Natural Resources; Gillson, Charles, Social Work; Gross, Louis, Arts and Sciences; Huc, Schuyler, Education; Ladd, R. T., Business Administration; Lounsberry, John, Arts and Sciences; Lyons, William, Arts and Sciences; McLemore, Don, Agricultural Sciences and Natural Resources; Miller, Mark, Communications; Orme, John, Social Work; Ploch, Donnald, Arts and Sciences; Rajput, Baliram, Arts and Sciences; Richardson, Jr., Lillard, Arts and Sciences; Rosinski, Jan, Arts and Sciences; Saxton, Arnold, Agricultural Sciences and Natural Resources; Singletary, Michael, Communications; Smith, Julius, Arts and Sciences; Wagner, Carl, Arts and Sciences.

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 two years of calculus and some exposure to linear algebra. Students 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.

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 30 credit hours must be completed for the master's degree. Required of all students are 6 hours in statistical methods, 6 hours 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.

Comprensive 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 or an M.S. in Statistics simultaneously with a master's or doctoral degree in another department. Approved coursework taken to meet doctoral requirements in the student's home department may also be credited toward the 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 minor and/or M.S. joint major curriculum offered through the program. The program is administered by an Executive Committee, consisting of college representatives from all colleges with approved programs, with advisory input from the program faculty.

Degree Program Hours in Approved IGSP Courses
Master's in home department, minor in Statistics 9
Master's in home department, M.S. in Statistics 24
Doctorate in home department, minor in Statistics 15
Doctorate in home department, M.S. in Statistics 24
*The M.S. in Statistics requires 33 hours.

Course options consist of courses in statistics, offered either by the Department of Statistics or by other departments, which have been reviewed and approved by the IGSP Executive Committee. Students taking an M.S. in Statistics must pass the two-part comprehensive examination covering statistical theory and methods. Students taking a minor in Statistics in conjunction with a doctorate in another field must pass a written comprehensive examination in Statistics, constructed and evaluated by the student's Exam Committee. No formal comprehensive examination is required of students earning a minor in Statistics along with a master's in another field beyond questions which the home department includes as part of the comprehensive examination for the master's degree.

General Admissions and Degree Requirements
1. The student's home department must have an approved program of courses with the Executive Committee. That program will specify the sequences of statistics courses, chosen from the IGSP approved list, that are considered appropriate by the home department. Students who wish to participate in this program should contact their college representative or the Chair of IGSP in the Department of Statistics.

2. The student's graduate committee must include a faculty member of the Department of Statistics at the rank of Assistant Professor or above.

3. The student's Admission to Candidacy form must contain all courses required for the chosen degree program set off in a group and labeled as Statistics Courses Required for the Minor or M.S. in Statistics. Should the student decide not to apply for admission to the program until after completion of some of the courses, the student's major professor should file a program change with the cooperating department and assist the student in obtaining a Department of Statistics faculty member to serve on the student's graduate committee.

Successful completion of the Statistics M.S. or minor is recognized by appropriate documentation on the student's transcript. Students who do not complete the chosen degree program or minor or M.S. will still receive academic credit for the statistics courses they have successfully completed.

BUSINESS ADMINISTRATION CONCENTRATION
For complete listing of MBA program requirements, see Business Administration, MBA Concentration: Statistics.

Minimum coursework requirements are 571, 566, 572 with preq or coreq of 561.

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 semesters' coursework as established by the degree program for part-time students.

GRADUATE COURSES
411 Introduction to Statistical Computing (3) Use of computer operating system commands and packages for statistical analysis and file management. Not applicable for credit for statistics majors. Prereq: 201 or 251.

461 Applied Regression Analysis (3) Linear regression and correlation, multiple regression, polynomial regression, selection of variables, use of dummy variables, analysis of residuals. Logit regression and its applications. Use of standard computer packages. Major writing requirement. Prereq: Probability and Statistics for Scientists and Engineers I and Introduction to Statistical Software or graduate standing and consent of instructor. F.

462 Analysis of Variance and Experimental Design (3) Analysis of variance techniques for single and multifactor studies, past history, randomized complete block and Latin square designs, response surface methodology. Major writing requirement. Prereq: Probability and Statistics for Scientists and Engineers II and Intro to Statistical Software or graduate standing and consent of instructor. SP.

471 Random Processes and Probability Models (3) Functions of random variables, multivariate distributions, conditional expectations, waiting time distributions, random processes, Markov chains, queuing theory. Prereq: 251. 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. SNC only. E.


531 Survey of Statistical Methods I (3) Univariate and bivariate data collection and organization, statistical estimation and hypothesis testing; analysis of categorical and numerical data, including Chi-square tests and simple linear and quadratic regression. Use of computing facilities required. Credit not given for both 551 and 557. Prereq: 1 yr. college mathematics. E.

532 Survey of Statistical Methods II (3) Multiple regression, including use of dummy variables; analysis of variance and covariance; issues in experimental design and analysis. Use of computing facilities required. Prereq: 531. E.

537 Statistics for Research I (3) Principles and applications of statistical methodology, integrated with considerable use of major statistical computing system. Probability and distribution models, forming, testing hypotheses using parametric and nonparametric procedures, correlation and regression methods, matrix-based simple linear regression and correlation. Credit not given for both 531 and 537. Prereq: 1 yr. undergraduate mathematics and 1 undergraduate statistics course. Sp.

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 repeated designs, preplanned versus post hoc contrasts. Random factors and repeated measures. Prereq: 537 or 533. F.
Textiles, Retailing, and Interior Design

College of Human Ecology

MAJORS

Interior Design ............................................ M.S.
Textiles, Retailing and Consumer Sciences M.S.
Human Ecology ............................................ Ph.D.

Nancy B. Fair, Head

Professors:

Blickemeier, R. C. (Emeritus), Ph.D., Florida State
De Jonge, Jacquelyn O., Ph.D. .............. Iowa State
DeLong, A. J. (Liaison), Ph.D. .............. Penn State
Drake, Mary Fran, Ph.D. ................. Penn State
Duckett, Kermit E., Ph.D. ................. Tennessee
Wadsworth, Larry C., Ph.D. ............. NC State

Associate Professors:

Breeze, Randall R. (Liaison), Ph.D., Florida State
Dyer, C. L. (Liaison), Ph.D. ............. North Carolina
Fair, Nancy B., Ph.D. ................. NC State
Rabun, Josette, Ph.D. ................. Pennsylvania

Assistant Professors:

Bhat, Gajanan, Ph.D. ................. Georgia Tech
Gupta, Millend, Ph.D. ................. Missouri
Kupritz, Virginia, Ph.D. ................. VPI

Research Assistant Professors:

Dover, Molly, Ph.D. ................. Kansas State
Hassenboehler, Charles, Ph.D. ....... Tennessee
Khan, Ahamad, Ph.D. ................. Tennessee
Ko, Wen-Chien, Ph.D. ................. Tennessee
Malkan, Sanjiv, Ph.D. ................. Tennessee
Tsai, Peter, Ph.D. ................. Tennessee

The Department of Textiles, Retailing, and Interior Design offers master's degrees in Interior Design and in Textiles, Retailing and Consumer Sciences. The program in Textiles, Retailing and Consumer Sciences offers concentrations in textile science and in retail and consumer sciences. An interdisciplinary minor in interior design is available.

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.

Admission to the master's degree program requires: 1) an appropriate background in interior design, 2) a cumulative GPA of 3.0 or above (on a 4.0 scale), and 3) a portfolio of undergraduate studio work (and professional work, if applicable) submitted to the department. The portfolio may include slides or original work. It is recommended that deficiencies in preparation, as identified in the admission process, be removed prior to full admission to the graduate program.

Textiles, Retailing and Consumer Sciences

Admission to the master's degree program requires: 1) a background in interior design, 2) a cumulative GPA of 3.0 or above (on a 4.0 scale), and 3) a portfolio of undergraduate studio work (and professional work, if applicable). Courses in environments, business, and technical studies are recommended.

Admission to the master's degree program 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 business, economics, and general physics. 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, general physics, and general chemistry.

Textiles, Retailing and Interior Design
Textiles, Retailing and Interior Design

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 PROGRAMS

Interior Design

The M.S. in Interior Design requires the completion of 36 hours of graduate credit. The requirements for the degree include the following: in the major, 18 hours (including 510, 564, 573, and 590 - students must enroll in 590 the first two semesters in the program); a cognate area, 6 hours; research methods, 3 hours; statistics, 3 hours; a comprehensive design/research project with acceptable documentation, a publishable paper or outside examination by the student's committee on the project/research conducted.

Based on interest and prior background, each student has a choice of the areas of emphasis within the interior design program beyond the core curriculum. Emphases may include historic preservation and/or adaptive use or environmental-behavior, or any acceptable combination (e.g., an adaptive use project with an emphasis on behavioral aspects). Areas within the environment-behavior emphasis considered appropriate are proxemics, environments for the elderly or children, or professional design.

Each student is required to demonstrate competence in individual research either through the thesis or non-thesis option (a comprehensive design/research project).

**Thesis Option:** Complete a thesis for 6 hours credit. An oral examination will occur upon completion of the program.

**Non-Thesis Option:** Complete a comprehensive design project with acceptable documentation or a publishable paper. To be eligible, the student must have completed 12 hours of graduate credit in interior design with at least a 3.0 GPA. Having met this criteria, the student must present a proposal to the supervisory committee that will include 6 hours of subsequent coursework. This proposal must outline the nature of the project and/or paper and explain the methodological approach. A comprehensive oral and written examination, administered by the committee, will occur upon completion of the program.

**Textiles, Retailing and Consumer Sciences**

The major in Textiles, Retailing and Consumer Sciences has concentrations in Textiles, Retailing and Consumer Sciences. Requirements are listed below. A comprehensive oral examination, administered by the thesis committee, will be given upon completion of the thesis research. A non-thesis option is not available.

**Retail and Consumer Sciences**

Major (Required courses: 510, 511, 552, 562, 569) 19 hours

- Cognate Area 6 hours
- Statistics 3 hours
- Thesis 6 hours
- TOTAL 34 hours

**Textile Science**

- RCS 552 3 hours
- Research Methods 3 hours
- TS 560 1 hour
- Textile Science courses 12 hours
- Cognate Area 6 hours

**Statistics** 3 hours

**Thesis** 6 hours

**TOTAL 34 hours**

1. Must include RCS 562 or equivalent; or 3 hours of laboratory techniques in materials analysis and characterization.

**THE PH.D. CONCENTRATIONS**

**Consumer Environments**

Students enrolled in the Ph.D. program with a concentration in consumer environments are provided with a foundation in management and retail and consumer sciences or in understanding the consumer in the designed environment and management of facilities. From this base, students focus on retail and consumer sciences or on areas of specialization including historic preservation and adaptive use, human environment interaction and facilities management to further theory and application in advanced study and research. See the consumer environments concentration under Human Ecology.

**Textile Science**

Students enrolled in the Ph.D. program in Human Ecology with a concentration in textile science take one common course which provides 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. College Professional Seminar, HE 610 (3 hours);
2. RCS 552 (3 hours);
3. Research Methods which must include 6 hours of laboratory techniques in materials analysis and characterization;
4. TS 590 (2 hours). Attendance at seminar is required for all full-time students;
5. Six hours in statistics at the 500-600 level;
6. Eighteen hours in textile science courses;
7. Nine hours in a cognate area;
8. 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 UTK.

**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 demonstrated 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 Interior Design is available to residents of the states of Louisiana, Mississippi, or Virginia. 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.

**Interior Design**

**GRADUATE COURSES**

**400 Proxemics (3)** Space and behavior within cultural contexts. Application to design and design process. Theoretical foundations and concepts from environment and behavior. Simulation techniques and methods for identifying behavioral design requirements. Prereq: Human Environment Systems and Micro Computer for Interior Design or consent of instructor. F

**450 Advanced Interior Design II (5)** Comprehensive studio problems of advanced complexity; integration and extension of experiences utilizing systematic design methodologies. Prereq: Advanced Interior Design or consent of instructor. 2 hrs and 3 labs. Sp

**470 History of Contemporary Interior Architecture (2)** Interior architecture, furniture, design philosophies, twentieth century roots for twentieth century developments. Design as influenced by movements in fine arts, technological advances, cultural context. Prereq: History of Interior Architecture or consent of instructor. Sp

**475 History of American Interior Architecture (3)** Major styles of interior architecture, decoration, and decorative arts within cultural contexts. Colonial era through nineteen century. European influences. Prereq: 370 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

**510 Needs Assessment and Design Programming (3)** Systematic methodology and multidisciplinary research methods as part of design problem solving experience. Appropriate for evaluating various environments: commercial, corporate, hospitality and retail. Seminar. May be repeated. Maximum 6 hrs. Prereq: Admission to graduate program. F

**520 Integrative Interior Design Studio (3)** Identification, integration, and synthesis of multidisciplinary data input. Advanced programming techniques and design evaluation. Lecture and studio. Prereq: 510, 564, or consent of instructor. Sp

**531 Research Methods in Historic Preservation (3)** Methodology for historic preservation problems in interior design. Prereq: Architecture 403 or consent of instructor. Sp

**555 Micro-computer Application in Interior Design (3)** Advanced micro-computer concepts and applications for research and interior design. Project design and management, optimization of design criteria, programming, schematic design, computer-aided design, advanced spreadsheets and database analysis, and computer presentations. Prereq: Consent of instructor. Sp

**564 Environmental Factors in Interior Design (3)** Human factors and associated research techniques and design methodologies related to interior architectural environments. Human factors and design requirements from psychology, anthropology, and behavioral sciences. Prereq: 6 hrs behavioral science and 6 hrs natural science, or consent of instructor. Sp

**573 Applied Research Strategies in Interior Design (3)** Synthesis of research methods, statistics, and design research issues within framework of creating viable research proposal.

**575 Environment and Aging (3)** Seminar on design of physical environment and relationship to aging process. Concepts and theories from design, and social and
consideration of U.S. textile complex. Quantitative analysis and demand models for individual and household behavior. Research methods for industry structure, production, marketing, and special populations, special research methods. Prereq: 9 hrs graduate coursework. May be repeated. Maximum 9 hrs.

595 Special Topics in Retail and Consumer Sciences (1-3) Lecture, group discussion on specialized topics. Prereq: 9 hrs textiles graduate coursework or consent of instructor. May be repeated. Maximum 9 hrs.

596 Advanced Topics in Retail and Consumer Sciences (3) Lecture, group discussion, individual research on advanced topics and research areas of current significance: future direction and policy implications. Prereq: Doctoral student and 9 hrs textiles graduate coursework. May be repeated. Maximum 9 hrs.

596 Special Topics in Retail and Consumer Sciences (1-3) Lecture, group discussion, individual research on advanced topics and research areas of current significance: future direction and policy implications. Prereq: Doctoral student and 9 hrs textiles 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 textiles graduate coursework or consent of instructor. May be repeated. Maximum 9 hrs.

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

500 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 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 sales systems. Prereq: Retail Management or equivalent. Sp

511 International Trade and Retail Analysis (3) International trade and marketing concepts with implications for retail, services, and consumer. Theoretical and applied analysis. International retailing. Current issues. Fall, Sp

540 Socio-Psychological Aspects of Apparel (3) Apparel and human behavior in social situations. Prereq: 6 hrs or equivalent from sociology and psychology.


526 Research Methods (3) Fundamentals of science method, advancement of science, methodology and method of research. Issues and concepts of basic and applied research. Prereq: Statistics 531 or equivalent. Sp

520 Research Seminar (3) Research topics in retail and consumer sciences. May be repeated. S/NC 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.

592 Research Seminar (1) Research topics in textile science. May be repeated. S/NC only. F, Sp

591 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.


586 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 531. Sp

541 Retail Consumer Behavior (3) Theories and concepts from social science in relation to ultimate consumer's behavior. Prereq: 6 hrs of sociology and/or psychology or consent of instructor.

540 Socio-Psychological Aspects of Apparel (3) Apparel and human behavior in social situations. Prereq: 6 hrs or equivalent from sociology and psychology.


526 Research Methods (3) Fundamentals of science method, advancement of science, methodology and method of research. Issues and concepts of basic and applied research. Prereq: Statistics 531 or equivalent. Sp

520 Research Seminar (3) Research topics in retail and consumer sciences. May be repeated. S/NC 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.

592 Research Seminar (1) Research topics in textile science. May be repeated. S/NC only. F, Sp

591 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.


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526 Research Methods (3) Fundamentals of science method, advancement of science, methodology and method of research. Issues and concepts of basic and applied research. Prereq: Statistics 531 or equivalent. Sp

520 Research Seminar (3) Research topics in retail and consumer sciences. May be repeated. S/NC 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.

592 Research Seminar (1) Research topics in textile science. May be repeated. S/NC only. F, Sp

591 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.


586 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 531. Sp

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540 Socio-Psychological Aspects of Apparel (3) Apparel and human behavior in social situations. Prereq: 6 hrs or equivalent from sociology and psychology.


526 Research Methods (3) Fundamentals of science method, advancement of science, methodology and method of research. Issues and concepts of basic and applied research. Prereq: Statistics 531 or equivalent. Sp

520 Research Seminar (3) Research topics in retail and consumer sciences. May be repeated. S/NC 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.

592 Research Seminar (1) Research topics in textile science. May be repeated. S/NC only. F, Sp

591 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.

lighting design and theatre technology. Not all areas of concentration accept applicants every year.

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

The Graduate Record Examination, three letters of recommendation and interviews with appropriate faculty are required of all applicants. Applicants for admission to M.F.A. degree acting, technical theatre and playwriting/dramaturgy programs must submit samples of their work. Auditions are required of M.F.A. degree acting and directing applicants.

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

THE MASTER OF FINE ARTS PROGRAM

At least 60 semester hours, 40 of which must be at the 500 level or above, are required for the degree of Master of Fine Arts with a major in Theatrical and Technical Theatre normally to be completed in three consecutive years of full time residence. Theatre 501 is required the first year of residence. A diagnostic examination in theatre history and literature/criticism and 3 hours of advanced theater history is required. An additional 6 hours of each may be required as determined by the diagnostic examination.

Students in the M.F.A degree program are evaluated annually by juried performance or portfolio submission. Continuation in the program is with the approval of the faculty committee for the M.F.A degree program. Theatre 559 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 and Technical Production Seminar, and at least 6 hours in the projects courses, Theatre 401, Principles of Design is required 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.

Directing

Required courses are 430 Directing, 520-21 Master Class for first year acting candidates and 6 hours of 536 Projects in Play Directing.

Playwriting

Required are 470-71 Playwriting, at least 12 hours of 573 Playwriting Seminar, and at least 3 hours of 585 Production Workshops.

Dramaturgy

An additional two courses in dramatic theory and criticism are required as are Theatre 570 Drama: Theory and Practice, at least 6 hours of 585 Production Workshops, 430 Play Directing, 3 hours of 536 Projects in Directing, and 12 hours of 573 Seminar and Projects. In addition, students must select an arts and humanities specialization comprising at least one year of language study plus 6 hours in the selected area.

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 (6 years) established for completion of the MFA degree.

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.F.A. program in Theatre is available to residents of the state of Virginia (concentration in costume design only).

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

GRADUATE COURSES

401 Principles of Theatrical Design (3) Fundamental principles of design; visual and structural relationships. Projects assigned to develop understanding and perception. Required courses are at least 12 hours of Theatre 580, Design and Technical Production Seminar, and at least 6 hours in the projects courses. Theatre 401, Principles of Design is required the first year of residence.

409 Stage Make-up (2) Problems in make-up design and application, character analysis, physiology and chiroscuro. Prereq: 190.

420 Special Studies in Acting (3) Content varies. Exercises in selected concentrated areas such as styles, techniques, approaches, e.g., Shakespearean movement, humor. Prereq: Advanced Acting and consent of instructor. May be repeated. Maximum 9 hrs.

423 Period Movement and Dance (2) Movement styles and dances from Renaissance to 20th century. Prereq: Stage Movement or consent of instructor. May be repeated. Maximum 9 hrs.

425 Selected Musical Theatre Techniques (3,3) 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 reproduction 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 studies in 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. Consentry and study of historic patterns 1500-1900. Prereq: 345 or consent of instructor.

450 Advanced Scenery Technology 1 (3) Study and practice of theatre wardrobe, production participation required. Prereq: 250. Graduate credit to theatre M.F.A. students only.

451 Advanced Scenery Technology 2 (3) Study and practice of metalworking and plastics for theatrical productions; production participation required. Prereq: 250.

452 Advanced Scenery Technology 3 (3) Study and practice of stage rigging for theatrical productions; participation required. Prereq: 250. Graduate credit to theatre M.F.A. students only.

454 Scenery Painting (2) Introduction to materials, techniques, 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: 365 or consent of instructor.

464 Computer Assisted Design for Stage Lighting (3) Advanced techniques in computer-assisted design for stage lighting. Work with CAD and other stage-lighting software. Preparation for technical plots and associated paperwork. Prereq: Introduction to Lighting Design or consent of instructor.

465 Aesthetics of Lighting Design (3) Theory and practice of stage lighting design, relationship between designers and non-practitioners; directors, actors, choreographers, architects, etc.

470-71 Playwriting (3,3) Additional 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.

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 for faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC 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 strategy and major playwrights, using a variety of analytical approaches from Aristotelian to Structuralist.

520-21-22-23-24-25 Master Classes in Acting (4,4,4,4,4,4) 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 mores, architecture and furniture.


545 Millinery for the Stage (2) Pattern making and construction techniques for hats from antiquity to present. Prereq: Consent of instructor.

546 Advanced Costume Pattern Making (3) Advanced studies in pattern making and construction techniques for hats from antiquity to present. Prereq: Consent of instructor.

547 Painting and Dyeing for the Theatre (2) Fibers, dyes and dye processes; color matching and dyeing.
Transportation
See Marketing, Logistics and Transportation.

Veterinary Medicine
(College of Veterinary Medicine)

MAJOR
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 requirements listed below. These may be completed at any accredited college or university that offers courses equivalent to those at The University of Tennessee, Knoxville. Pre-veterinary course requirements must be completed by the end of the 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

<table>
<thead>
<tr>
<th>Semester Hours</th>
<th>English</th>
<th>Humanities and Social Sciences*</th>
<th>Physics</th>
<th>General Chemistry</th>
<th>Organic Chemistry</th>
<th>Biochemistry**</th>
<th>General Biology</th>
<th>Genetics</th>
<th>Cellular Biology***</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TOTAL</strong></td>
<td>66</td>
<td></td>
<td>18</td>
<td>8</td>
<td>8</td>
<td>4</td>
<td>8</td>
<td>3</td>
<td>66</td>
</tr>
</tbody>
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*May include, for example, courses in English literature, speech, music, art, philosophy, religion, language, history, economics, anthropology, political science, psychology, sociology and geography.

**Exclusive of laboratory.

***It is expected that this requirement will be fulfilled by a course in cellular or molecular biology.

Admission Procedures
Admission of new students is for the fall semester, with first priority given to residents of Tennessee.

Beginning with the 1995 application cycle, the College of Veterinary Medicine will utilize the new Veterinary Medical College Application Service (VMCAS) for all applicants. Forms and instructions for making application for admission may be obtained beginning July 1, 1995 from the Office of the Associate Dean, The University of Tennessee, Knoxville, 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.

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 pre-clinical subjects of anatomy, physiology, histology, and microbiology. Also included in this first year are clinical subjects of physical diagnosis and anesthesiology. 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 as one 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 15 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 CVM 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 the 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 (bacteriology, virology and immunology), Ecology (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.

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. and Ph.D. programs in Comparative and Experimental Medicine are 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.

PROFESSIONAL COURSES

811 Bacteriology and Mycology (4) Fundamental aspects of microbiology and cell biology relative to pathogenesis of bacterial and fungal diseases of animals; antimicrobial actions and mechanisms of bacterial resistance. General approaches to detection, treatment and prevention.
parative and Experimental Medicine - Veterinary Medicine 454.) Sp

Zoology

(College of Arts and Sciences)

MAJOR DEGREES

Zoology ........................................... M.S., Ph.D.

Arthur C. Eichertnacht, Head

Professors:

Bagby, R. M., Ph.D. .......... Illinois
Carlson, J. G. (Emeritus) (Distinguished Prof.), Ph.D. ........ Pennsylvania
Chen, T. T., Ph.D. .......... Florida
Eichertnacht, Arthur C., Ph.D. .......... Kansas
Ettrier, D. A., Ph.D. .......... Minnesota
Handel, Mary Ann (Distinguished Prof.), Ph.D. .......... Kansas State
Hochman, J. C., Ph.D. .......... California
Jeon, K. W., Ph.D. .......... London
Joy, D. C. (Distinguished Scientist), Ph.D. .......... Oxford (UK)
Kennedy, J. R., Ph.D. .......... Iowa
Liles, J. N. (Emeritus), Ph.D. .......... Ohio State
MacCabe, J. A. (Liaison), Ph.D. .......... Davis (California)
McCracken, G. F., Ph.D. .......... Cornell
Pimm, S. L., Ph.D. .......... Wisconsin
Riechert, Susan E. (Distinguished Prof.), Ph.D. .......... Florida
Shivers, C. A., Ph.D. .......... Michigan State
Vaughan, J. A., Ph.D. .......... Michigan State
Welch, H. G. (Emeritus), Ph.D. .......... Florida
Whitson, G. L., Ph.D. .......... Iowa

Associate Professors:

Boake, C. R. B., Ph.D. .......... Cornell
Burnham, K. D. (Emeritus), Ph.D. .......... Iowa
Carlson, J. G., Ph.D. .......... Purdue
Chen, T. T., Ph.D. .......... Johns Hopkins
Ganguly, R., Ph.D. .......... Nebraska
Gittelman, J. L., Ph.D. .......... Sussex
Greenberg, Neil, Ph.D. .......... Rutgers
McKee, B. D., Ph.D. .......... Michigan State
Pan, M. L., Ph.D. .......... Pennsylvania

Assistant Professors:

Hall, J. C., Ph.D. .......... Illinois
Prosser, R. A., Ph.D. .......... Illinois

The Department of Zoology offers the Master of Science and Doctor of Philosophy with concentrations in aquatic biology, ecology, cell and molecular biology, physiology, genetics, and reproductive and developmental biology.

REQUIREMENTS FOR ADMISSION

Applicants for graduate study are expected to have a background no less extensive than that required of undergraduate majors in this department. This includes a knowledge of the basic principles of cell biology, genetics, and ecology. Other requirements for admission are:

1. one year of general zoology or biology;
2. 18 semester hours of upper division zoology or biology;
3. two years of chemistry including one year of general inorganic chemistry;
4. one year of mathematics including calculus;
5. one year of physics;
6. Graduate Record Examination scores (general and biology); and
7. a 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 Affairs Committee.

THE MASTER’S PROGRAM

Special requirements in Zoology are as follows: (1) completion of course requirements as determined by the candidate’s faculty committee, including a course in biostatistics; (2) achievement of a 3.0 or better GPA in all courses taken for graduate credit; (3) completion of a thesis.

THE DOCTORAL PROGRAM

Special requirements in Zoology are as follows:

1. courses as determined by the candidate’s faculty committee, including a course in biostatistics;
2. an oral and comprehensive written examination in zoology and allied fields in which the candidate has had training;
3. a reading knowledge of at least one foreign language in which there exists a sizeable amount of literature relevant to the major field of study. The student has the option of demonstrating a reading knowledge of this foreign language by (a) passing the official reading examination given by the language department or (b) earning a grade of at least a B in the second semester of a special language reading course for graduate students. This foreign language requirement must be fulfilled before a student can take the comprehensive examination.

GRADUATE COURSES

403 General Genetics Laboratory (3) Experiments designed to illustrate basic principles of inheritance; primary organism—Drosophila. Prereq: Biology 220. 2 labs.
406-05-11-12 Minicourse in Zoology (2,2,2,2) Select advanced topics in zoology, concentrated in time and subject matter. Consult departmental listing for topics offered. Prereq: As announced. May be repeated. Maximum 4 hrs may apply toward zoology major.
420 Cell and Tissue Structure and Function (4) Study of animal cells and tissues at electron and light microscope levels. Prereq: Biology 210. 2 hrs and 1 lab.
430 Immunology (3) (Same as Microbiology 430.)
439 Immunology Laboratory (2) (Same as Microbiology 439.)
449 Laboratory in Physiology (2) Prereq or coreq: 440 or 445.
450 Comparative Animal Behavior (3) Principles and methods of ethology; ecological, developmental, physiological, and evolutionary aspects. (Same as Psychology 450.)
459 Comparative Animal Behavior Laboratory (3) Introduction to observational and experimental research in ethology. Coreq: 450. (Same as Psychology 459.)
460 Evolution (3) Modern concepts of animal evolution. Prereq: Biology 220.
465 Human Genetics (3) Genetic and molecular principles and problems of human inheritance. Prereq: Biology 220.
470 Aquatic Ecology (3) Introduction to physicochemical nature of inland waters with description of biotic communities and their interrelationships. Prereq: Chemistry 120-30 and Biology 230. 2 hrs and 1 lab.
472 Arachnology (3) Biology of spiders, mites, scorpions and relatives. Prereq: 360 or 380. 2 hrs and 1 lab.
473 Herpetology (3) Biology of amphibians and reptiles, ecology and adaptive radiation. Prereq: Biology 230. 2 hrs and 1 lab.
475 Ornithology (3) Behavior, ecology, populations, evolution and field identification of birds. Prereq: Biology 230. 2 hrs and 1 lab.
476 Mammalogy (3) Evolution, classification, biogeography, ecology, behavior and functional anatomy of mammals. Prereq: Biology 230 or equivalent: 2 hrs and 1 lab.
480 Physiology of Exercise (3) (Same as Physical Education 480.)
484 Conservation Biology (3) Application of principles and techniques of ecological research to conservation of biological diversity at genetic, population, community, and ecosystem levels. Prereq: General Genetics and General Ecology. (Same as Ecology 484.)
490 Comparative Endocrinology (3) Comparative analysis of physiology and morphology of endocrine glands in vertebrates and invertebrates, their role and interaction in maintenance of organism and species. Prereq: 440 or equivalent.
500 Thesis (1-15) N/P only. E
501 Graduate Research Participation (3) Advanced research techniques studied under supervision of staff research director. Open to all graduate students in good standing. Prereq: Consent of department and research director: S/NC only.
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. Maximum 15 hrs. S/NC only.
503 Zoology Seminar (1) Advanced topics in zoology. Senior Zoology majors encouraged. Required of all first- and second-year graduate students. May be repeated. Maximum 4 hrs. S/NC only.
504 Special Topics (1-2) Selected directed readings or special course in topics of current interest. Consult departmental listing for offerings. May be repeated with consent of instructor. Maximum 4 hrs. S/NC only.
506 Research Methods (3-12) Instruction in methods and techniques of research. Consult departmental listing for offerings. May be repeated with consent of instructor. Maximum 9 hrs.
507 Animal Cell Culture (2) Techniques for culture of animal cells, tissues and organs. 1 hr and 1 lab.
510 Introduction to Electron Microscopy - Transmis sion Electron Microscope (4) Practical application of techniques for preparation of biological samples for viewing in transmission electron microscopy. Use of microscope and ancillary equipment, darkroom techniques, preparation of materials for publication and special project. Admission limited to departamentally approved graduate students. (Same as Botany 510.) 2-3 hrs lab.
511 Introduction to Electron Microscopy - Scanning Electron Microscope (3) Practical introduction to techniques of electron microscopy and to scanning electron microscope. Use of microscope, introduction to darkroom techniques and digital image processing, prepara-
tion of samples for observation, and special project. Prereq: Consent of instructor. 2 hrs and 1 lab. Sp.

513 Advanced Developmental Biology (3) Molecular and genetic aspects of differentiation and morphogenesis; current literature. Recommended prereq: Life Sciences 511-12.

516 Colloquium in Ethology (1) (Same as Psychology 516.)

521 Advanced Mammalian Physiology I (4) (Same as Comparative and Experimental Medicine - Veterinary Medicine 521.)

522 Advanced Mammalian Physiology II (4) Respiratory, renal, gastrointestinal, and reproductive physiology, acid-base mechanisms, and metabolism. Prereq: 521. (Same as Comparative and Experimental Medicine - Veterinary Medicine 522.)

523 Physiology of Hormones (3) Cellular and organismal action of hormones in invertebrate and vertebrate animals. Prereq: 490 or consent of instructor. Recommended prereq: Biochemistry 410. 2 hrs and 1 lab.

524 Physiological Ecology of Animals (3) Adaptive physiological response of animals to natural changes in or extremes of physical and biotic environment. Terrestrial vertebrates. Prereq: Undergraduate courses in animal physiology and ecology, 440 and Biology 230 or equivalent.

526 General Vertebrate Neuroanatomy (3) (Same as Psychology 526.)

540 Insect Taxonomy I: Major Orders (3) Survey of classification of major orders of insects, with practical experience in identification of insects at family level. Prereq: Consent of instructor. 4 hrs combined lecture and lab.

541 Insect Taxonomy II: Minor Orders (3) Survey of classification of minor orders of insects, with practical experience in identification of insects at family level. Prereq: 540 or consent of instructor. 4 hrs combined lecture and lab.

542 Insect Structure and Function (3) Integrated study of morphology and physiology at tissue and cellular level of insects. Prereq: Consent of instructor.

543 Aquatic Insects (3) Taxonomy and biology of aquatic insects; immature forms. Prereq: Consent of instructor. 2 hrs and 1 lab.

544 Fresh Water Invertebrate Zoology (3) Ecology and taxonomy of fresh water invertebrates exclusive of insects. Prereq: 360. 3 hrs lab and field study.

545 Advanced Animal Behavior (3) Second-level course in ethology, stressing evolution, genetics, physiology, ecology and human behavior. Prereq: 450 or equivalent. (Same as Psychology 545.)

547 Conceptual Foundations of Evolution and Behavior (3) (Same as Psychology 547.)

550 Biometry (3) Statistical methods in analysis of quantitative biological data. Prereq: Statistics course or consent of instructor.

573 Population Biology (3) Genetics and ecology of natural populations of plants and animals and aspects of behavior in determining population structure. Prereq: Introductory courses in ecology and genetics. (Same as Botany 573 and Ecology 573.)

575 Ecological Genetics (3) Genetics of natural populations, using both single-locus and quantitative genetic approaches. Prereq: 573 and statistics course.

583 Zoogeography (3) Processes determining geographic distribution of animals and distribution and composition of animal communities. Prereq: Ecology course or consent of instructor.

591 Foreign Study (1-15) See College of Arts and Sciences.

592 Off-Campus Study (1-15) See College of Arts and Sciences.

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

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

601 Advanced Topics (1-3) Readings and discussion of recent advances. Consult the departmental listing for offerings. May be repeated with consent of department. Maximum 9 hrs.

602 Seminar in Cell and Molecular Biology (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs.

603 Seminar in Genetics (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs.

604 Seminar in Developmental Biology (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs.

605 Seminar in Physiology (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs.

606 Seminar in Aquatic Biology (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs.

607 Seminar in Ecology (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs.

608 Seminar in Ethology (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs.

609 Seminar in Organic Evolution (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs.

610 Current Topics in Cell and Developmental Biology (1) Critical analyses of current literature in journal club format. May be repeated. Maximum 10 hrs. S/NC only.

611 Advanced Topics in Medical Science (1-3) (Same as Comparative and Experimental Medicine - Graduate School of Medicine 611.)
FACILITIES FOR RESEARCH AND SERVICE
Facilities for Research and Service

Bureau of Educational Research and Service
(College of Education)

Carol E. Kasworm, Director

Four major types of activities--research, development, educational services, and publications--are channeled through the Bureau of Educational Research and Service (BERS), located in 212 CEB. The research activities relate to the development of research proposals, conducting and/or assisting in research, and assisting others in development of research proposals in the College of Education. Educational services include a wide list of activities such as in-service educational programs, consultant services, and technical assistance and administrative training programs. Official publications of the College of Education are channeled through the Bureau. A limited number of graduate student assistantships are available.

Center for Business and Economic Research
(College of Business Administration)

David A. Hake, 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.

While its core mission remains little changed, the scope of the CBER unit has expanded from a largely individualistic fiscal assistance program to a regional economic research, policy analysis, and communications technology arm of the College of Business Administration, with a staff of three senior research faculty and a support staff in research, information technology and information dissemination, located at 100 CEB.

Increased emphasis on international participation, particularly in the light of the new democratization in Europe and the formation of the European Economic Community, has expanded the scope of activity of the Center through the formation of the East European Center and has opened up new possibilities for research in emerging European regional economies.

Center for Information Studies
(School of Information Sciences)

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, companies, etc. 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.

Centers and Chairs of Excellence

The Centers of Excellence grew out of Tennessee's Better Schools Program, an initiative to upgrade state-aided education at all levels. State officials and legislators wanted to give a few outstanding academic programs in state-aided universities a special push toward prominence, well beyond regular annual increases for all programs.

In 1984, the General Assembly appropriated and the governor approved $10 million for the first Centers of Excellence throughout the state. The public colleges and universities submitted their proposals for Centers of Excellence to the Tennessee Higher Education Commission, which made the final determinations. Funding has been extended each successive year, and now five 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.

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 Laser Applications
Dr. Dennis Keeler, Director
UT Space Institute
Tullahoma, TN 37388-8997
(615) 458-0631 Ext. 475
Communications Research Center
(College of Communications)

The Communications Research Center, 426 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.

Computing Center

Bruce Delaney, Interim Director

Faculty Associates:

Instructional Technology: Dr. Patricia L. Fisher; Art: Susan E. Metro; Computer Science: Dr. David W. Straight; Engineering: Dr. Osama Soliman; Physics: Dr. William E. Bliss; Statistics: Dr. James L. Schmidhammer; Agriculture: Dr. Boyd Dearden; Human Ecology: Kurt Weiss; Social Work: Dr. David Patterson; Communications: Dr. Mark Miller.

The University of Tennessee Computing Center (UTCC), which is part of the Division of Computing and Telecommunications, provides computing facilities and services for the University’s teaching, research, public service, and administrative activities. UTCC offices and principal computing facilities are located on the first two floors of Stokely Management Center (SMC) and on the third floor of Dunford Hall. Assistance with any computer related questions, including information about UTCC services and facilities, is available by calling the Division of Computing and Telecommunications Help Desk at (615) 974-3500.

The Computer Access for Education (CAFE) program provides every UT Knoxville student, faculty, and staff member the opportunity for computing experience through an individual UTCC account. Student accounts for use in coursework are requested by the department through which the course is offered. Faculty and staff members can request a UTCC account for research or administration by completing a request for computing services. Forms are available from the receptionist at 200 SMC. Each UTCC account is assigned a consultant who is available to answer questions about UTCC resources and to assist in accessing the UTCC library of computer programs.

Noncredit short courses covering levels of computing from personal computing to supercomputing are taught throughout the year. Topics include programming languages, job control language, vector processing, the use of graphics, word processing, and the statistical and mathematical programs available at UTCC. Videotapes covering mainframe and microcomputer topics are available for private viewing in the Audiovisual services section of Hodges Library and the UTCC Hodges Library Micro Lab. Instructional tapes on microcomputer software are in the Micro Lab. Short courses are announced in the UTCC Newsletter, the “Campus Capsule” section of the UT Daily Beacon, and Tennessee This Week. During the break following each academic term, UTCC consultants conduct a four-day seminar for faculty, staff, and graduate students on the use of either the IBM or DEC VMScluster computers.

UTCC maintains online and printed documents describing the availability and use of system hardware and software. The IBM User’s Guide, the UNIX User’s Guide, and the VMScluster User’s Guide are available at the UT Book & Supply Store. The monthly UTCC Newsletter announces changes to systems, equipment, and procedures and contains other items of interest to users.

The UTCC computer network connects mainframe computers, workstations, microcomputers and video terminals in a multimedia, heterogeneous environment. Ethernet and fiber optics connect many buildings on the Knoxville campus to provide rapid access to data in remote locations and supports several protocols including TCP/IP, DECnet, LAT, Novell, NetWare and Apple Appletalk. A terminal port selection and multiplexing system, which is connected to a similar system at the Oak Ridge National Laboratory, provides access to the network through 200 dialup lines.

UTCC networks connect to the Internet which provides access to other Internet sites via the Southeastern University Research Association Network (SURAnet). SURAnet connects to the National Science Foundation Network (NSFNET) which joins other state and regional University of Tennessee Computing regional networks as well as directly connecting to the five NSF supercomputing centers: The Cornell National Supercomputer Facility, The National Center for Supercomputing Applications at the University of Illinois, the Pittsburgh Supercomputing Center, the National Center for Atmospheric Research, and the San Diego Supercomputer Center.

UTCC is an affiliate of the Pittsburgh Supercomputing Center, the National Center for Supercomputing Applications at the University of Illinois, and the National Supercomputer Facility. Consulting services are provided by UTCC on those systems.

UTCC is also a member of BITNET, a network of several thousand computers located at educational and research institutions throughout North and South America, Europe, and Asia. BITNET provides a gateway to the Internet which allows all BITNET members to exchange messages with Internet nodes.

Several major operating systems provide both batch and timesharing computing services. The Time Sharing Option (T SO) runs under MVSOFF on an IBM 3081-D, with three vector processors. The Conversational Monitor System (CMS) runs under VM/SP on an IBM 3081-D. The OpenVMS operating system runs in a Digital Equipment Corporation VMS cluster that consists of a 4 processor VAX 7000-640, a 1 processor VAX 6000-420 with 2 vector units, a 6 processor VAX 6000-460, and a 2 processor DEC 7000-620 AXP. The UNIX operating system is available on two 690/50 file servers and several workstations from Sun Microsystems.

UTCC provides technical support for other University Computing Center sites at the UT Knoxville campus and includes equipment from DEC, HP, Silicon Graphics, IBM and Sun Microsystems.

UTCC maintains more than 150 microcomputers, including several models of both Apple and IBM, in remote user work areas and microcomputer laboratories. A number of
software packages are made available for use on the machines at these locations. UTCC 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 UTCC includes most of the commonly used compilers and interpreters, and a large number of programs for statistical, mathematical, engineering, operations research, and graphics applications. UTCC is the administrator for a number of site licenses for workstation and microcomputer software. UTCC participates in educational programs sponsored by DEC, IBM, SGI and Sun that provide software packages at reduced or no cost to the University of Tennessee.

UTCC maintains 15 user work areas on the Knoxville campus in addition to locations in all residence halls. Several of the areas provide high speed line printing; some also provide laser printing. Computing services are made available to the other UT campuses through remote links. Many of the terminals and microcomputers in the user work areas are capable of being used for graphics.

A Digital LPS-32 Postscript laser printer is used to produce high quality printed output. The Imagen printer can also produce graphics at 300 dots per inch. A Xerox DocuTech Production Publishing System, located at UT Graphic Arts Services includes a 600 dpi laser printer connected to a scanner and network media server. It permits electronic transmission of documents for processing from computers on the UTCC network.

Continuing Education and Public Service

Laverne B. Lindsey, Associate Vice Chancellor for Academic Affairs and Dean

The Division of Continuing Education, Knoxville, is the administrative unit of UT Knoxville that includes academic courses, educational services, and other programs to the non-traditional student. While most people who participate in the programs are adults, persons of all ages and academic levels enroll in the credit and non-credit offerings of the Division.

Programs and courses are based upon student needs and desires, whether for self-motivated learning; for leisure and recreational programs; or for professional promotion, certification, licensure, relicensure, or mid-career changes. The Division provides these educational opportunities through program coordination and development of the five departments: the University Evening School, Non-Credit Community Programs, Department of Conferences, Department of Independent Study, and English Language Institute.

UNIVERSITY EVENING SCHOOL

Ray Hamilton, Associate Dean of Continuing Education and Director

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 Evenig Program

Classes are offered during late afternoon and evening hours for those students who work or have other commitments during the day. Some departments within the Colleges of Communications, Education, and Engineering offer all courses required for an advanced degree during the evening. For other majors, consult the appropriate academic 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 and 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 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: Doctor of Education and Specialist in Education with a major in Leadership Studies in Education (Chattanooga); Master of Science with a major in Human Resource Development (Statewide); and a Master of Science with a major in Information Sciences (Memphis).

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).

Distance Education

The Evening School in concert with several academic departments at UT Knoxville offers interactive telecourses which allow students to locate themselves in one location and participate actively with the instructor teaching in Knoxville. Graduate courses in various disciplines are transmitted to several sites through use of this advanced technology.

Videotaped courses in engineering and other fields are sent to a variety of sites to accommodate UT Knoxville students pursuing advanced degrees at distant locations.

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 mail, FAX, or phone is offered as a convenience to former Evening School students. Final registration at both on- and off-campus locations is required.

For information, contact the UT Evening School, 451 Communications Bldg, University of Tennessee, Knoxville, TN 37996-0341, or telephone (615) 974-5361 or 1-800-676-VOLS, FAX (615) 974-2027.

NON-CREDIT COMMUNITY PROGRAMS

Cheryl LaBerge, Director

Non-Credit Community Programs provides a comprehensive array of courses and seminars designed to serve the needs of individuals and businesses in Knoxville and surrounding communities. Courses are offered on the UT Knoxville campus and at selected off-campus locations. Courses are taught by University faculty, staff and community experts. Courses also are delivered "on-site" for business or industrial clients, with instructional services tailored to the needs of each individual group.

Courses range from computer literacy and management, to gardening, exercise, and music. There are also courses which meet requirements of the state or other agencies for certification in fields such as real estate, aviation, CEBS (Certified Employee Benefit Specialist) and CCA (Certified Credit Administrator). The department co-sponsors the Smoky Mountain Field School with the Great Smoky Mountains National Park.

Continuous Education Units (CEU's) are awarded to students satisfactorily completing selected courses and seminars offered by the department.

For further information or to register, contact Non-Credit Community Programs, 600 Henley Street, Suite 105, Knoxville, TN 37996-4102 or telephone (615) 974-0150.

DEPARTMENT OF CONFERENCES

Norvel L. Burkett, Associate Dean of Continuing Education and Director

UT Conferences, housed in the Conference Center in downtown Knoxville, provides management services to individuals or groups who desire to hold a high quality convention, conference or meeting anywhere in the state of Tennessee or across the United States. Utilizing the Conference Center, state-wide University system facilities, major hotels and convention centers across Tennessee and the U.S., the department assists University organizations and outside groups in designing programs to meet the needs of clients. The staff provides professional guidance and management for small group meetings as well as for major conventions of several thousand delegates. Concurrent services range from planning and budgeting to lodging, food services, speakers, promotional material, meeting rooms, and all details to assure a successful event. Programs which meet appropriate criteria qualify for Continuing Education Units (CEUs), which become a permanent record maintained by the Division. Transcripts are available upon written request.

The Department cooperates with UT CTV to provide teleconferencing services for the University and community. Professional groups and interested individuals may arrange...
interactive videoconferencing to locations worldwide. Arrangements may also be made to receive (downlink) programming or to transmit (uplink) programming via satellite capabilities. The Conference Center also has the capability of two-way audio-visual conferencing.

Additional information may be obtained from UT Conferences, P.O. Box 2648, Knoxville, TN 37901, or by calling (615) 974-0250. FAX (615) 974-0264.

DEPARTMENT OF INDEPENDENT STUDY
David F. Holden, Director

The UT Knoxville Department of Independent Study administers the program of correspondence courses for all campuses of the University. This includes undergraduate credit courses, high school courses (for credit or for college entrance requirements); and non-credit courses. The courses utilize videotapes and audiocassettes as well as traditional print materials.

For information and enrollment forms for correspondence courses contact: Department of Independent Study, 420 Communications Bldg., The University of Tennessee, Knoxville, TN 37996. Telephone (615) 974-5134.

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. Faculty members 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., (615) 974-3404; FAX (615) 974-0250. Telephone (615) 974-0264.

Energy, Environment, and Resources Center

Jack N. Barkenbus, Director

The Energy, Environment, and Resources Center, 329 South Stadium Hall, 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 researchers at the Oak Ridge National Laboratory and the Tennessee Valley Authority. Sponsors include federal and state agencies, industry, and foundations.

Current research includes solids, hazardous and radioactive waste management, information systems, energy, environment, assessment, applications of biotechnology, global environmental problems, pollution prevention, and ethical and value issues in technology policy. The Center operates the Waste Management Research and Education Institute, a state-funded Center of Excellence. Current grants and contracts of both centers are approximately eight million dollars per year.

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 Agriculture Sciences and Natural Resources, and College of Veterinary Medicine.

AGRICULTURAL EXPERIMENT STATION
Don O. Richardson, Dean
John I. Sewell, Associate Dean
Thomas H. Klindt, 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 University was 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 conversion into usable products 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 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, 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 more effective methods of controlling pests and diseases, 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 a 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, Martin, Milan, Oak Ridge (forestry), Springfield and Spring Hill. Professional and technical staff are in residence at these locations.

AGRICULTURAL EXTENSION SERVICE
Billy G. Hicks, Dean
Mildred F. Clarke, Associate Dean
D. Ray Humbert, 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 supervisors located in their respective 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.

Learning Research Center

W. Lee Humphreys, Director

The Learning Research Center engages in research and facilitates the research of others into all aspects of learning and teaching in...
higher education. The Center also builds upon this research to support faculty and graduate students in course design and instructional activities.

A significant part of the Center’s research activity is coordinated through a weekly research seminar open to all faculty and graduate students. The results of the Center’s research are disseminated through a number of dissertations, publications and presentations, including the series “Teaching-Learning Issues” which is sent to all faculty at the University and to others in this country. The Center offers a range of support programs for instructors, including individual consultations about teaching, occasional workshops, the GTA Seminar, the GTA Consultation service, the SPEAK testing program for foreign GTAs, a lending library of publications on college teaching and learning, an orientation for new faculty, and a course/teacher evaluation program. Several of the Center’s publications are designed to enhance instruction, including the GTA Newsletter and the New GTA Handbook. All of the Center’s development activities are designed to improve instruction at UT, and individual consultations and evaluation services are confidential.

The Center is located in Suite 5, Hodges Library.

Libraries, The University of Tennessee, Knoxville

Paula T. Kaufman, Dean
Aubrey H. Mitchell, Associate Dean for Access Services
Diane E. Perushek, Associate Dean for Collection Services

Professors:
Bayne, Paul S., M.S.L.S. ...... North Carolina
Crawford, Mary Frances, M.S.L.S. ...... Kentucky
Fielder-Hoehne, Felicia H., M.S.L.S. ...... Atlanta
Grady, Agnes M., M.L.S. ...... Washington
Kaufman, Paula T., M.D. ...... Columbia
LeClercq, Anne W., M.L.S. ...... Emory
Phillips, Linda L., M.L.S. ...... Rutgers
Rader, Joe C., M.S.L.S. ...... Tennessee

Associate Professors:
Baker, Gayle D., M.L.S. ...... Alabama
Bridges, Anne E., M.L.S. ...... Rhode Island
Britten, William A., M.S.L.S. ...... Clarion
Clement, Russell T., M.L.S. ...... Brigham Young
Courtols, Martin, M.A.L.S. ...... Wisconsin
Crowther, Karen N.T., M.L.N. ...... Emory
Dixon, Lana, M.S.L.S. ...... Tennessee
Goetsch, Lori, M.S.S. ...... Rosary
Harrwood, Richard, M.L.S. ...... North Texas
Kim, Sook-Hyun, M.A.L.S. ...... Indiana
Lach, Sandra S., M.L.A. ...... Emory
Lloyd, James B., Ph.D. ...... Mississippi
Miller, Tamara J., M.S.L.S. ...... Kentucky
Mitchell, Aubrey H., M.S.L.S. ...... Tennessee
Perushek, Diane E., M.A.L.S. ...... Michigan
Sammaro, Linda, M.L.S. ...... Southern
Connecticut State
Smith, Rita H., M.S.L.S. ...... Illinois
Thompson-Wise, Deborah A., M.L.N. ...... South Carolina
Webster, Judith D., M.S.L.S. ...... Tennessee

Assistant Professors:
Carver, Carolyn S., M.L.S. ...... Vanderbilt
Cobb, Flora, M.L.I.S. ...... Texas
Figg, Milton, M.L.S. ...... Southern Mississippi
Garrett, Marie A., M.L.S. ...... Vanderbilt
Hammons, James W., M.L.S. ...... Indiana
Keally, Jillian M., M.S.L.S. ...... Tennessee
Lahman, JoAnn, M.S.L.S. ...... Tennessee
Mack, Nrv, M.S.L.S. ...... Tennessee
Ponnapra, Biddanda P., M.S.L.S. ...... Tennessee
Prescod, Jane P., M.L.S. ...... Tennessee
Row, Jane S., M.S.L.S. ...... Tennessee
Smith, Earl C., M.S.L.S. ...... Tennessee
Thomas, Deborah L., M.L.S. ...... George Peabody
Thomas, Steve, M.S.L.S. ...... Tennessee
Viera, Ann R., M.I.L.S. ...... California (Berkeley)
Wallace, Alan, M.Ln. ...... Washington
Watkins, Norman B., M.S.L.S. ...... Tennessee
Wise, Flossie, M.S.L.S. ...... Tennessee

The University of Tennessee, Knoxville Libraries own approximately 2 million volumes, more than 3.5 million manuscripts, 2 million microforms, 30,000 audio and video recordings, plus United States and United Nations documents. The UT Knoxville Libraries currently subscribe to more than 14,000 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), five branches on the Knoxville campus (the Agriculture-Veterinary Medicine Library, the Cartographic Information Center, the Music Library, Special Collections Library, and the University Archives), 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 comfortable study space for more than 2,000 people, 308 graduate student carrels, and 192 faculty studies.

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. Users may also search a number of CD-ROM databases. Interlibrary Services borrows monographs and obtains copies of other material 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 persons with disabilities. Adaptive equipment such as a 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. It has a wide-ranging audiovisual collection and an extensive reference collection.

The Cartographic Information Center (Room 15, basement of the Hodges Library, Cumberland Ave. & 15th St.) contains a worldwide collection of over 350,000 maps covering all subject areas. Maps are received from the U.S. Geological Survey, Defense Mapping Agency, and the National Ocean Survey. Maps, atlases, globes, and books relating to cartography may be borrowed for research, reference, and teaching.

The Hodges 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.

The Special Collections Library (2nd floor, west wing, of the Hodges Library) is a repository of regional and local materials, Tennesseeana, and other specialties, including legislative papers and mementoes of many Tennessee political figures. Special Collections materials are of particular interest to scholars in the fields of history, political science, social sciences, and the arts.

The University Archives (Room 2, Hodges Library) contains official records of the University; items published officially and unofficially by its units, departments, and agencies; and other materials that document University of Tennessee life.

The Social Work Library (1720 West End Ave., Nashville) serves College of Social Work students in field practice across the state. The library has a working collection of materials in social work and related disciplines.

The Law Library on the Knoxville campus and the libraries located on the campuses in Chattanooga, Martin, Memphis, and Tullahoma are individually administered. Each library at The University of Tennessee is accessible to all students and faculty in the system.

*Data excludes Law Library faculty and statistics.

Management Development Center

(College of Business Administration)

John E. Riblett, Director

The College of Business Administration's executive/management education efforts are facilitated through the Management Development Center, 709 Stokely Management Center.

The mission of the Center is to promote the learning and dissemination of an integrated framework of managerial excellence. The Center defines excellence in terms of competitive world standards of quality, efficiency, and service to the recognized concerns of all constituencies (customers, employees, suppliers, owners, students, and society in general). This mission includes the accepted responsibility for (1) developing close strategic partnerships with a selected set of companies to better facilitate learning and development of the knowledge which is truly employed and (2) acting as a facilitator in driving this knowledge into the credit curriculum of the College.

The Center has prided itself on the development of long-term relationships with organizations that provide a living laboratory to test and validate the knowledge of the Center that is disseminated in a variety of forms. Executive
and Management Education Programs are one form of dissemination. A staff of 20 designs, develops, and markets fifty yearly offerings for over 1000 participants. The Center emphasizes consistent, high-quality programs, small class sizes, outstanding faculty who bring the added value of experience in the private and public sectors to the classroom, a highly interactive style of instruction, and an applied orientation. The focus is on longer term, more developmentally oriented programs, some four weeks in length such as the four-week University of Tennessee Executive Program and one-week Senior Executive Institute for Productivity Through Quality.

Measurement and Control Engineering Center
(College of Engineering)

Arlene Garrison, Director
The Measurement and Control Engineering Center, 102 Estabrook Hall, is sponsored by the College of Engineering, the Instrumentation and Controls Division of Oak Ridge National Laboratory, and the National Science Foundation. The Center's program combines education, research, and technology transfer. Graduate assistantships are available for qualified students. The research is funded by major U.S. industrial companies and focuses on theoretical and practical developments in measurement and control, concentrating on areas that will significantly improve the productivity, reliability, and safety of industrial systems and processes.

Center sponsored research is carried out in the fields of process control, pattern recognition, signal and image processing, process diagnostics, and sensor development. Research in process control concentrates in the areas of process analysis, process modeling, control system design, and real-time expert systems. Pattern recognition research deals with the development of techniques for the automatic detection of flaws in both continuous and piecepart produced products. Process diagnostics research involves the application of signal validation and sensor fault monitoring techniques to modern process control systems. Finally, fiber optic sensor systems development is underway for monitoring and control of chemical processes.

Nutrition Institute
(College of Human Ecology)

Dileep Sachan, 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 interaction 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.

Oak Ridge Associated Universities

Since 1946, students and faculty of The University of Tennessee have benefited from its membership in Oak Ridge Associated Universities (ORAU), a consortium of colleges and universities and a management and operating contractor for the U.S. Department of Energy (DOE) located in Oak Ridge, Tennessee. ORAU works with its member institutions to help their students and faculty gain access to federal research facilities throughout the country; to keep its members informed about opportunities for fellowship, scholarship, and research appointments; and to organize research alliances among its members.

Through the Oak Ridge Institute for Science and Education (ORISE), the DOE facility that ORAU manages, undergraduates, graduates, postgraduates, as well as faculty enjoy access to a multitude of opportunities for study and research. Students can participate in programs covering a wide variety of disciplines including business, earth sciences, epidemiology, engineering, physics, pharmacology, ocean sciences, biomedical sciences, nuclear chemistry, and mathematics. Appointment and program length range from one month to four years. Many of these programs are especially designed to increase the numbers of underrepresented minority students pursuing degrees in science- and engineering-related disciplines. A comprehensive listing of these programs and other opportunities, their disciplines, and details on locations and benefits can be found in the Resource Guide which is available by calling the contacts below.

ORAU's Office of Members Service seeks opportunities for collaborative research and development alliances among its members, private industry, and major federal facilities. Current alliances include the Southern Association for High Energy Physics, the Electromagnetics Research Consortium, High Performance Computing, Bioprocessing, Pan American Association for Physics, Materials Science Forum, and international initiatives in support of the New Independent States in Central and Eastern Europe. Other UIGA activities include the sponsorship of conferences and workshops, the Visiting Scholars program, and the Junior Faculty enhancement Awards. A copy of Especially for Members, which details UIGA's programs, is available from the contacts below.

For more information about ORAU and its programs, contact Dr. Leo L. Riedinger, ORAU Council member at 615-974-3486; or contact Monnie E. Champion, ORAU Corporate Secretary, at 615-576-3306.

Off-Campus Graduate Centers

KINGSPORT 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).

This program is supported under a subcontract with ORAU with principal support coming from the Martin Marietta Corporation. UT is one of the sixty-two colleges and universities which sponsor ORAU, a nonprofit educational 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 UTK/UT Knoxville Graduate Program, Post Office Box 117, TMSD Building, Oak Ridge, Tennessee 37831-0117.

NASHVILLE ENGINEERING GRADUATE PROGRAM

UT Knoxville offers graduate programs leading to the Master of Science with majors in Civil Engineering, Industrial Engineering, and other disciplines, as the need and resources permit.

Information and application forms may be obtained from the Nashville Engineering Graduate Program, 1720 West End Avenue, Suite 401, Nashville, Tennessee 37203.

CHATTANOOGA EDUCATION PROGRAM

UT Knoxville offers a graduate program in education leading to the Specialist in Education and the Doctor of Education degrees with a major in Leadership Studies in Education.

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 UT-Oak Ridge Graduate Program, Post Office Box 117, TMSD Building, Oak Ridge, Tennessee 37831-0117.

THREE ROADS TO SUCCESS AT 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 with 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.
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. designation. The Institute is open to those interested in continuing education for updating and broadening knowledge, and those who wish to pursue post-doctoral research.

Graduate degree programs are available with majors in Aerospace Engineering, Aviation Systems, Chemical Engineering, Computer Science, Electrical Engineering, Engineering Science, Industrial Engineering (engineering management concentration), Mathematics, Mechanical Engineering, and Physics. In addition to the fundamental studies characteristic of each discipline, research opportunities are available in many areas including aerodynamics, fluid mechanics, advanced space propulsion, neural networks, energy conversion processes, thermal sciences, coal combustion, magnetohydrodynamics, plasma physics, space systems, propulsion, computational fluid dynamics, and other aspects of atmospheric and space flight.

The Institute has an established Center of Excellence in Laser Applications and offers graduate studies and research opportunities in laser diagnostics, laser materials interactions, pico-second processes, and coherent and 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 Forces 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 UT Space Institute 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.

Textiles and Nonwovens Development Center

(College of Human Ecology)

Larry C. Wadsworth, Director

The Textiles and Nonwovens Development Center (TANDEC) was officially dedicated in October 1990. TANDEC was made possible through a grant from Exxon Chemical Company.

Nonwovens products loom large in a number of markets and TANDEC looms large in both basic research and nonwoven product development. Nonwovens research programs at UT Knoxville include structure-property-process relationships in melt-blowing polyolefins, polyesters, nylons, elastomeric polymer engineering thermoplastics and recycled plastics; mechanism of melt blown web formation; modeling of the melt blowing and spunbonding processes; development of on-line optical measurements for control of the critical properties of melt blown webs; electrical measurement of fiber alignment and bonding in nonwoven webs; thermal bonding and characterization of cotton/polyester fiber nonwovens; computational analysis of heat transfer behavior in thermal calendering; study of protective apparel for agricultural, industrial and medical uses; and finishing of nonwovens. In addition to the basic research, technology transfers have been accomplished during the past several years by assisting companies in applied projects, primarily in the melt blowing area.

The primary missions of TANDEC are to conduct nonwoven and textile grant research programs and to develop new product applications. The TANDEC facilities further allow production of nonwovens on a limited basis for participating companies while equipment is not being used for research activities. The TANDEC laboratory hosts numerous guests from industry and academic, and these facilities are planned to meet their needs, while safeguarding research confidentiality.

Transportation Center

(Office of Associate Vice Chancellor)

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, 357 South Stadium Hall, is a University-level organization administratively positioned within the Office of the Associate 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.

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.

Psychological Clinics

(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.

Statistical Consulting Center

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 methodology. SCC is co-sponsored by the University of Tennessee Computing Center and the Department of Statistics.

Services offered are assistance in design of study; management of data, analysis and interpretation of results; aid in choice and creation of the most effective statistical graphics; review of journal article, grant proposal, thesis or dissertation; writing of programs and packages; teaching short courses on how to use statistical software.

There are five full-time Master’s level statisticians, two half-time graduate research assistants, and a quarter-time faculty associate with the Department of Statistics. In addition, access is provided to faculty consultants.

A UT Computing Center account can provide access to many popular computers and statistics packages. Software is also available for use on personal computers through various site-licensing agreements.

Contact the Computing Help Desk, at 974-8200 and ask to speak to a statistical consultant. Charges for our services are billed through a UT Computing Center project code. Consultants are located at 200 Stokely Management Center.

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.
The Water Resources Research Center, 422 South Stadium Hall, 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.
Index

A
Academic Calendar, 4
Academic Honesty, 18
Academic Probation, 16
Academic Standards, 16
Accounting, 43, 65
Accounting and Business Law, 36, 43
Activity Fee, 24
Adding Courses, 15
Administration, Graduate School, 6, 9
Administration of Graduate Assistantships, 27
Administration, University, 5
Administration, UT, Knoxville, 5
Admission Classifications
  Degree Program, 12
  Non-Degree, 12
Transient, 12
Admission Examinations, 10-11, 12
Admission of Faculty and Staff Members, 13
Admission of International Students, 13
Admission Procedures, 12-13
Admission Requirements, 10-11, 12-13
Admission to Candidacy, 18, 19, 20, 21, 22
Adult Education, 124
Advertising, 37, 44
Advisor, 15
Aerospace Engineering, 134
African and African-American Studies, 118
Agricultural and Extension Education, 35, 45
Agricultural Economics, 46
Agricultural Economics and Rural Sociology, 35, 46
Agricultural Education, 45
Agricultural Engineering, 35, 47
Agricultural Engineering Technology, 47
Agricultural Experiment Station, 184
Agricultural Extension Service, 184
Agricultural Sciences and Natural Resources, College of, 35
  Agricultural and Extension Education, 35, 45
  Agricultural Economics and Rural Sociology, 35, 46
  Agricultural Engineering, 35, 47
  Animal Science, 35, 49
  Entomology and Plant Pathology, 35, 95
  Food Science and Technology, 35, 96
  Forestry, Wildlife and Fisheries, 35, 97
  Ornamental Horticulture and Landscape Design, 35, 147
  Plant and Soil Science, 35, 152
Agriculture, 49
Agriculture Campus Map, 200
Agriculture, Institute of, 184
  Agricultural Experiment Station, 184
  Agricultural Extension Service, 184
  College of Agricultural Sciences and Natural Resources, 35
  College of Veterinary Medicine, 39
Animal Science, 35, 49
Animal Science-Veterinary Medicine, 39, 50
Anthropology, 36, 50
Apartment, 31
Appeals Procedure, 17
Application, 11, 12
Application Fee, 12, 13, 24
Application Procedures, 12
Applied and Professional Ethics, Center for, 36
Applied Microbiology, Institute for, 36
Architecture, 35
Architecture and Planning, College of, 35
  Architecture, 35, 52
  Planning, 35, 151
  Architecture, School of, 52
Art, 36, 54
  Art Education, 113
Arts and Sciences, College of, 36
  Anthropology, 36, 50
  Art, 36, 54
  Audiology and Speech Pathology, 36, 56
  Biochemistry, 36, 58
  Botany, 36, 60
  Chemistry, 36, 67
  Classics, 36, 73
  Computer Science, 36, 76
  English, 36, 92
  Geography, 36, 99
  Geological Sciences, 36, 100
  Germanic and Slavic Languages, 36, 103
  History, 36, 106
  Interdisciplinary Programs, 118
  Mathematics, 36, 131
  Microbiology, 36, 136
  Music, 36, 139
  Philosophy, 36, 147
  Physics and Astronomy, 36, 149
  Political Science, 36, 153
  Psychology, 36, 157
  Religious Studies, 36, 160
  Romance and Asian Languages, 36, 161
  Sociology, 36, 167
  Speech Communication, 36, 168
  Theatre, 36, 173
  Zoology, 36, 177
  Asian Languages, 161
  Assistantships, I, 25
  Assistantships, Policy for the Administration of, 27
  Astronomy, 149
  Audiology, 56
  Audiology and Speech Pathology, 36, 56
  Auditors and Audited Courses, 14, 24
  Automobile Registration, 31
  Average, Required, 16
  Aviation Systems, 57
  B
  Biochemistry, 36, 58
  Biomedical Sciences, 59, 186
  Biotechnology, 126
  Black Cultural Center, 29
  Board of Trustees, 5
  Botany, 36, 60
  Broadcasting, 37, 61
  Bureau of Educational Research and Service, 38, 171
  Business Administration, 36, 43, 62, 80, 95, 127, 129, 169
  Business Administration, College of, 36
  Accounting and Business Law, 36, 43
  Economics, 36, 80
  Finance, 36, 96
  Management, 36, 127
  Management Science, 36, 127
  Marketing, Logistics and Transportation, 36, 129
  Statistics, 36, 169
  Business and Economic Research, Center for, 36, 181
  Business Law, 43
C
  Calendar for 1995-96, 4
  Campus Map, 200
  Campus Security, 26
  Candidacy, Admissions to, 18, 19, 20, 21, 22
  Career Services, 29
  Catalog, i
  Cellular, Molecular and Developmental Biology, 127
  Center for Applied and Professional Ethics, 36
  Center for Business and Economic Research, 36, 181
  Center for Environmental Biotechnology, 36
  Center for Environmental/Energy/Science Education, 37
  Center for Information Studies, 181
  Center for International Education, 1, 30
  Center for Laser Applications, 181
  Center for Literacy Studies, 37
  Center for Livestock Diseases and Human Health, 182
  Center for Materials Processing, 38, 182
  Center for Measurement and Control Engineering, 36, 186
  Center for Nursing Practice, 39
  Center for Nursing Research, 39
  Center for Physical Activity and Health, 37
  Center for Psychoanalysis and the Humanities, 36
  Center for Quaternary Studies of the Southeastern U.S., 36
  Center for Research, Service and Inquiry, 35
  Center for the Study of War and Society, 36
  Centers and Chairs of Excellence, 181
  Change (Revision) of Program, 13
  Change of Registration, 15
  Chattanooga Graduate Education Program, 186
  Chemical Engineering, 36, 66
  Chemistry, 36, 67
  Child and Family Studies, 38, 68
  Child Behavior Institute, 36
  Child Care, 30
  Child Development Laboratories, 38, 182
  Cinema Studies, 118
  Civil and Environmental Engineering, 36, 70
  Civil Engineering, 70
  Classics, 36, 73
  Classifications
    Admission, 12
    Residency, 23
    Classified Research, 17
    Cognate, Definition of, 17
    Cognitive Enrichment Network Project, 37
    College Student Personnel, 82, 124
  Colleges, 35
    Agricultural Sciences and Natural Resources, 35
    Architecture and Planning, 35
    Arts and Sciences, 36
    Business Administration, 36
    Communications, 37
    Education, 37
    Engineering, 38
    Human Ecology, 38
    Law, 38
    Nursing, 39
    Social Work, 39
    Veterinary Medicine, 39
  Committees
    Doctoral, 19
    Master's, 18
    Specialist in Education, 19
    Communications, 37, 44, 61, 73, 119
    Communications, College of, 37
    Advertising, 37, 44
    Broadcasting, 37, 61
    Journalism, 37, 119
    Communications Research Center, 37, 182
    Comparative and Experimental Medicine, 75, 175
    Comparative Literature, 118
    Comprehensive Examination, 18, 19
    Computer Engineering, 86
    Computer Science, 36, 76
    Computing Center, 182
    Concentration, Definition of, 17
    Conditional Registration, 15
    Conferences, Department of, 183
Revision of Admission Classification, 13
Revision of Program, 13
Right-to-Know Act, 26
Romance and Asian Languages, 36, 161
Rules of Residency Classification, 23
Rural Sociology, 47
Russian, 103

S
Safety, 106
Safety Education and Service, 104
Scholarships, i, 25
Schools, 35
Architecture, 35, 52
Biomedical Sciences, 186
Information Sciences, 116
Journals, 37, 119
Planning, 35, 151
Science Alliance, 36, 182
Second Master's Degree, 18, 174
Section 504 Statement/EEO/Title IX, 26
Security Information, 26
Senior Citizens, 14
Seniors, 13
Services Fee, 24
Services, Student, 29-32
Short Courses and workshops, 14, 183
Small Animal Clinical Sciences, 39
Small Animal Research Laboratory, 38
Social Science Research Institute, 36
Social Security Number, 26
Social Work, 39, 164, 187
Social Work, College of, 39, 164, 187
Sociology, 36, 167
Soil Science, 152
Space Institute, 38, 187
Spanish, 161
SPEAK Test, 14
Special Education, 82, 108, 112, 159
Special Federal and State Laws and University Policies, 25-30
Special Programs, 168
Specialist in Education Committee, 19, 21
Specialist in Education Degree, 10-11, 18-19, 21, 77, 78, 85, 104, 105, 111, 112, 119, 124, 156
Specialization, Definition of, 17
Speech and Hearing Sciences, 56
Speech Communication, 36, 168
Speech Pathology, 56
Speech Services, 31
Sponsored International Students, 25
Sport and Physical Activity, 37, 82, 168
Sport Management, 29-30
Staff Members, Admission of, 13
State Laws and University Policies, 26-29
State Testing and Evaluation Center, 37
State University, 38
Statistics, 36, 63, 169
Student Apartments, 31
Student Counseling Services Center, 31
Student Employment, i, 26
Student Health Insurance, 25
Student Health Service, 31
Student Housing, 31
Student Responsibility, 25
Student Services, 29-30, 183
Summer Term Fees and Expenses, 25

T
Table of Contents, 2
Teacher Licensure, 38, 82
Teacher Preparation Program, 82
Tennessee Internship Consortium in Professional Psychology, 37
Termination, 16
Terminology, 17
Terms, Definition of, 17
Text of English as a Foreign Language, 12, 13
Textile Science, 172
Textiles and Nonwovens Development Center, 38, 187
Textiles, Retailing and Consumer Sciences, 172
Theses, 10-11, 17, 18, 19, 21
Theses and Dissertations, 17, 21, 22
Thesis Registration, 18
Time Limit, 18, 19, 20
Timetable of Classes, i
Title IX/Section 504 Statement/EOO, 26
Tool, Definition of, 17
Track, Definition of, 17
Traffic Rules, 31
Transcripts, i, 12, 13
Transfer Credits, 17
Transit Admission, 12
Transportation and Logistics, 129
Transportation Center, 187
Trustees, Board of, 5
Tuition, 24
Tuition Payment Plans, 24

U
Undergraduate and Professional Students, 13
University Administration, 5
University Apartments, 31
University Calendar, 5
University Computing Center, 182
University Evening School, 183
University Fees, 23-25
University Libraries, 185
University Policies, 28-29
University Programs and Services Fee, 24
Urban Studies, 119
Use of Facilities Registration, 15
Use of Social Security Number, 26
UT, Knoxville Administration, 5

V
Vehicle Operation and Parking, 32
Venture Analysis, 63
Veterans Benefits, 26
Veterinary Medicine, 39, 49, 148, 175
Veterinary Medicine, College of, 39
Animal Science-Veterinary Medicine, 39, 50
Comparative Medicine, 39
Large Animal Clinical Sciences, 39
Microbiology-Veterinary Medicine, 39, 138
Pathology, 39
Small Animal Clinical Sciences, 39
Veterinary Medicine Students, 14
Vocational-Technical Education, 111
VolCard, 25

W
Waiver of Fees, 25
Waste Management Research and Education Institute, 182
Water Resources Research Center, 188
Wildlife and Fisheries Science, 37
Withdrawal, 15, 24
Women's Center, 32
Women's Studies, 119
Work-Study, i, 26
Workshops, 14, 183
Written Examination, 18, 19

Z
Zoology, 36, 177