The University of
TENNESSEE
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2001–2002
Graduate Catalog
Table of Contents
Inside Front Cover--Catalog/Responsibility/Contacts

University Calendar for 2001-02 4
The University Administration 5
The Graduate Council 6
The Graduate School Administration 6

The Graduate School
Introduction 9
Graduate Majors and Degree Programs 10

Admission Requirements
Application Procedures 14
Admission Classifications 14
Degree Admission 14
Non-Degree Admission 14
Graduate Certificate of Credit Admission 15
Transient Admission 15
Post-Doctoral Admission 15
Admission of International Students 15
English Certification 15
Admission of Faculty and Staff Members 15
Readmission 15
Revision of Admission Classification 15

Registration and Enrollment Requirements
Graduate Credit 16
Undergraduate and Professional Students 16
UT Seniors 16
UT Veterinary Medicine Students 16
UT Law Students 16
Law Courses 16
Graduate Certificate of Credit Programs 16
Senior or Disabled Citizens 16
Auditors and Audited Courses 17
Courses in Non-Standard Format 17
Correspondence Study 17
Proficiency Examinations 17
English Proficiency 17
Prerequisites 17
Advisor/Major Professor 17
Departmental Liaison 17
Registration 17
Conditional Registration 18
Registration for Use of Facilities 18
Course Description 18
Change of Registration 18
Course Loads 18
Grade-Point Average and Grades 18
Academic Standards 19
Academic Probation 19
Dismissal 19
Academic Honesty 19
Plagiarism 19
Appeals Procedure 19

Degree Program Requirements
Definition of Graduate Terms 20
Minors 20
Transfer Credits 20
Master’s Degree 20
Ed.S. Degree 20
Doctoral Degree 20
Theses and Dissertations 20
Master’s Degrees 20
Course Requirements 21
Second Master’s Degrees 21
Master’s Committee 21
Admission to Candidacy 21
Thesis Registration 21
Thesis 21
Final Examination For Thesis And Problems in Lieu Of Thesis 21
Final Examination For Non-thesis Students 21
Time Limit 21
Specialist in Education Degree 21
Course Requirements 21
Ed.S. Committee 22
Residence Requirements 22
Admission To Candidacy 22
Research Requirements 22
Final Examination 22
Time Limit 22
Doctoral Degrees 22
Program Of Study 22
Doctoral Committee 22
Doctoral Examinations 22
Language Requirements 23
Residence Requirements 23
Admission To Candidacy 23
Continuous Registration 23
Dissertation 23
Time Limit 23
Summary of Procedures for Master’s Degrees and Specialist in Education Degree 24
Summary of Procedures for Doctoral Degrees 25

Fees and Financial Assistance
Residency Classification for Tuition Purposes 26
Rules of Residency Classification 26
University Fees 27
Application Fee 27
VolXpress 27
University Programs and Services Fee 27
Technology Fee 27
Facilities Fee 28
Music Fee 28
Special Course Fees 28
Graduation Fee 28
Proficiency Fees 28
Fees for Courses Not Taken for Credit 28
Deferred Payment Plan Service Fee 28
Priority Registration 28
Final Registration Late Fee 28
Reinstatement Fee 28
Returned Check Service Fee Policy 28
Returned Check Policy 28
Tuition Payment Plans 28
Refunds 28
Summer Term Fees and Expenses 29
Waiver of Fees 29
Student Health Insurance 29
Identification Card 30
Fees For Sponsored International Students 30
Financial Assistance 30
Assistantships 30
Fellowships 30
Academic Common Market 30
Employment 30
Graduate Student Travel Fund 30
Loans 30
Veterans Benefits 30

Special Federal and State Laws and University Policies
Family Educational Rights and Privacy Act 31
Use of Social Security Number 31
EEO/Title IX/Section 504 Statement 31
Security Information 31
Drug-Free Campus and Workplace 31
Alcohol Abuse Health Risks 31
Drug Use Health Risks 31
Policy for the Administration of Graduate Assistantships 31
Preamble 31
Definition 32
Types of Assistantships 32
Work Assignments and Related Factors 32
Qualifications of Graduate Assistants 32
Competency in English 33
Rights/Responsibilities of Graduate Assistants 33
Evaluation/Supervision of Graduate Assistants 33
Orientation/Training of Graduate Teaching Assistants and Graduate Teaching Associates 34
Orientation/Training of Graduate Assistants and Graduate Research Assistants 34
Accepting/Declining An Assistantship 34

Student Services
Black Cultural Center 34
Career Services 34
Center for International Education 34
Dining Services 35
Unlimited Access Plus Plan 35
The Any Ten Plus Plan 35
Unlimited Access Plan 35
The Any Ten Plan 35
The Varsity Inn Fifteen Plan 35
Disability Services 35
Early Education Programs 35
Graduate Student Association 35
Hearing and Speech Services 35
Housing 35
University Apartments 35
Residence Halls 35
Colleges

College of Agricultural Sciences and Natural Resources 41
College of Architecture and Design 41
College of Arts and Sciences 42
College of Business Administration 42
College of Communications 43
College of Education 43
College of Engineering 44
College of Human Ecology 44
College of Law 44
College of Nursing 45
College of Social Work 45
College of Veterinary Medicine 45

Fields of Instruction

Accounting and Business Law 49
Advertising 50
Agricultural and Biosystems Engineering 51
Agricultural and Extension Education 53
Agricultural Economics 54
Agriculture and Natural Resources 55
Animal Science 55
Anthropology 56
Architecture 59
Art 60
Audiology and Speech Pathology 63
Aviation Systems 65
Biochemistry and Cellular and Molecular Biology 66
Botany 68
Broadcasting 69
Business Administration 70
Chemical Engineering 75
Chemistry 76
Child and Family Studies 77
Civil and Environmental Engineering 79
Classics 82
Communications 82
Comparative and Experimental Medicine 84
Computer Science 86
Consumer and Industry Services Management 87
Counseling, Deafness and Human Services 90
Ecology and Evolutionary Biology 92
Economics 94
Education 95
Educational Administration and Cultural Studies 98
Educational Psychology 100
Electrical and Computer Engineering 102
English 105

Entomology and Plant Pathology 108
Exercise Science and Sport Management 109
Finance 111
Food Science and Technology 111
Forestry, Wildlife and Fisheries 112
Geography 115
Geological Sciences 117
Health and Safety Sciences 118
History 121
Human Ecology 123
Human Resource Development 124
Industrial and Organizational Psychology 126
Industrial Engineering 126
Information Sciences 129
Instructional Technology, Curriculum and Evaluation 132
Interdisciplinary Programs 133
Journalism and Public Relations 134
Law 135
Life Sciences 139
Management 140
Marketing, Logistics and Transportation 142
Materials Science and Engineering 143
Mathematics 145
Mechanical and Aerospace Engineering and Engineering Science 148
Microbiology 154
Modern Foreign Languages and Literatures 155
Music 160
Nuclear Engineering 162
Nursing 164
Nutrition 167
Ornamental Horticulture and Landscape Design 168
Philosophy 170
Physics and Astronomy 171
Plant and Soil Sciences 173
Political Science 175
Psychology 178
Religious Studies 180
Social Work 181
Sociology 184
Speech Communication 185
Statistics 186
Theatre 188
Theory and Practice in Teacher Education 189
Urban and Regional Planning 193
Veterinary Medicine 194

Facilities for Research and Service

Bureau of Evaluation, Research, and Service 199
Center for Business and Economic Research 199
Center for Executive Education 199
Center for Information Studies 199
Center for Literacy Studies 200
Center for Physical Activity and Health 200
Center for Transportation Research 200
Center of Excellence for Materials Processing 200
Centers and Chairs of Excellence 200
Child Development Laboratories 201
Communications Research Center 201
Division of Information Infrastructure 201
DII Help Desk 201
DII Customer Service Center 202
Walk-in Consulting 202
Enhanced Remote Access (ERA) and Support 202
Communications Software Distribution 202
Dorm Ethernet Card Installation 202
Technology Training 202
Computer-Based Training 202
Statistical and Computational Consulting Center 202
DII Website and Documentation 202
Campus Phone and Cable TV 202
Energy, Environment, and Resources Center 202
Institute of Agriculture 202
Agricultural Experiment Station 203
Agricultural Extension Service 203
Libraries, The University of Tennessee 203
Maintenance and Reliability Center 204
Measurement and Control Engineering Center 204
Nutrition Institute 204
Off-Campus Graduate Centers 204
Kingsport Graduate Program 204
Chattanooga Education Program 204
College of Social Work 204
Psychological Clinic 204
Research Consortiums 204
Textiles and Nonwovens Development Center 205
Tourism Institute 205
University of Tennessee Space Institute 205
University Outreach and Continuing Education 206
Department of Conferences 206
English Language Institute 206
UT Professional and Personal Development 206
Department of Distance Education and Independent Study 206
UT New College 207
University Evening School 207
Summer School and Special Programs 207
Water Resources Research Center 208

Index

Map of Campus
University Calendar for 2001-02

Summer Term 2001
- May 31 (Thursday): Classes Begin
- July 3 (Tuesday): First Session Ends
- July 4 (Wednesday): Independence Day
- July 5 (Thursday): Second Session Begins
- August 8 (Thursday): Second Session Ends
- August 10 (Friday): Commencement

Fall Semester 2001
- August 22 (Wednesday): Classes Begin
- September 3 (Monday): Labor Day
- October 11-12 (Thursday-Friday): Fall Break
- November 22-23 (Thursday-Friday): Thanksgiving Break
- December 6 (Thursday): Classes End
- December 7 (Friday): Study Period
- December 8, 10-13 (Saturday, Monday-Thursday): Final Exams
- December 15 (Saturday): Commencement

Spring Semester 2002
- January 9 (Wednesday): Classes Begin
- January 21 (Monday): Martin Luther King Holiday
- March 18-22 (Monday-Friday): Spring Break
- March 29 (Friday): Spring Recess
- April 29 (Monday): Classes End
- April 30-May 1 (Tuesday-Wednesday): Study Period
- May 2-6 (Saturday-Sunday, Monday-Tuesday): Final Exams
- May 8-29: Mini Term
- May 11 (Saturday): Commencement

Summer Term 2002
- May 30 (Thursday): Classes Begin
- July 3 (Wednesday): First Session Ends
- July 4 (Thursday): Independence Day
- July 5 (Friday): Second Session Begins
- August 7 (Wednesday): Second Session Ends
- August 9: Graduation Date*

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

NOTE: Deadlines for degree requirements are at end of section on Degree Program Requirements.
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President of The University of Tennessee
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First
June 1, 2005
Second
June 1, 2001
Third
June 1, 2006
Fourth
June 1, 2002
Fifth
June 1, 2003
Sixth
June 1, 2005
Seventh
June 1, 2006
Eighth
June 1, 2002
Ninth
June 1, 2001

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TERM EXPIRES
June 1, 2006

From Weakley County
Barbara C. Castlemann
TERM EXPIRES
June 1, 2002

From Davidson County
R. Clayton McWhorter
TERM EXPIRES
June 1, 2005

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TERM EXPIRES
July 1, 2001

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TERM EXPIRES
June 1, 2002

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TERM EXPIRES
July 1, 2001

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TERM EXPIRES
June 1, 2001

James A. Haslam, II
TERM EXPIRES
June 1, 2001

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Catherine S. Mizell, Secretary
Linda Logan, Assistant Secretary

From Shelby County
Arnold E. Perl
TERM EXPIRES
June 1, 2002

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Diana C. Lopez, B.S., M.S., Director

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- Ms. Barbara Dewey, Dean of Libraries

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--- | --- | --- | ---
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 | Mr. Jon Coddington | July 31, 2001 | Mr. Max Robinson
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 | Dr. Ziling Xue | July 31, 2001 | Dr. Charles Feigerle
 | Dr. Mike Lofaro | July 31, 2001 | Mr. James Spencer
 | Dr. Tom Hood | July 31, 2001 | Dr. Joel Lubar
 | Dr. Steffi Ohnesorg | July 31, 2001 | TBD
 | Dr. Carol Harden | July 31, 2001 | TBD
 | Dr. Beauvais Lyons | July 31, 2001 | TBD
Business Administration | Dr. Ray DeGennaro | July 31, 2002 | Dr. Dan Murphy
 | Dr. Melissa Bowers | July 31, 2003 | TBD
 | Dr. Richard Townsend | July 31, 2003 | TBD
Communications | Dr. Barbara Moore | July 31, 2002 | Dr. Ed Caudill
Education | Dr. Jeff Aper | July 31, 2001 | TBD
 | Dr. Kathleen Davis | July 31, 2001 | TBD
 | Dr. Karl Jost | July 31, 2001 | TBD
 | Dr. Sharon Judge | July 31, 2001 | Dr. David Bassett
 | Dr. Dennie Kelley | July 31, 2001 | Dr. Grady Bogue
 | TBD | July 31, 2001 | TBD
Engineering | Dr. Wayne T. Davis | July 31, 2001 | TBD
 | Dr. Arun Chatterjee | July 31, 2001 | Dr. Jack Lawler
 | Dr. Bolle Upadhyaya | July 31, 2001 | Dr. Rajiv Dubey
Graduate Student Association | Mr. Jim Schwab | April 30, 2001 | TBD
 | Mr. Nathan Hammer | April 30, 2001 | TBD
 | Ms. Holly Egan | April 30, 2001 | TBD
Human Ecology | Dr. Jacky De Jonge | July 31, 2001 | Dr. Dileep Sachan
 | Dr. Charles Hamilton | July 31, 2001 | Dr. Randy Bresee
Law | Ms. D. Cheryn Picquet | July 31, 2003 | TBD
Nursing | Dr. Debra Wallace | July 31, 2001 | Dr. Martha Alligood
School of Information Sciences | Dr. Gretchen Whitney | July 31, 2003 | Dr. Carol Bean
Social Work | Dr. Tom Cruthirds | July 31, 2001 | Dr. John Orme
 | Dr. Bill Nugent | July 31, 2001 | Dr. Marys Staude
UT Space Institute | Dr. Basil Antar | July 31, 2001 | Dr. Kenneth Kimble
Veterinary Medicine | Dr. Patti Tithof | July 31, 2003 | Dr. John New
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

The University of Tennessee is the official land-grant institution for the State of Tennessee, with its main campus in Knoxville. UT is the state's largest and most comprehensive institution, and is the only state-supported "Research University I" (Carnegie classification) in Tennessee. The University of Tennessee is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools (1866 Southern Lane, Decatur, GA 30033-4097; Telephone number 404-679-4501) to award the bachelor's, master's and doctoral degrees.

A wide range of graduate programs leading to master's and doctoral degrees is available. The University offers master's programs in 76 fields, the Educational Specialist degree, doctoral work in 44 fields, and 2 professional programs. More than 6,000 graduate and professional students are enrolled on and off campus under the tutelage of 1,500 faculty members.

The University of Tennessee is the official land-grant institution for the State of Tennessee, with its main campus in Knoxville. UT is the state's largest and most comprehensive institution, and is the only state-supported "Research University I" (Carnegie classification) in Tennessee. The University of Tennessee is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools (1866 Southern Lane, Decatur, GA 30033-4097; Telephone number 404-679-4501) to award the bachelor's, master's and doctoral degrees.

The Graduate School brings together faculty and graduate students as a community of scholars with a common interest in creative work and advanced study. Programs are available to individuals desiring work toward the master's and doctoral degrees or professional certification, those interested in continuing education for updating and broadening their knowledge, and those pursuing postdoctoral research. Serving the needs of students engaged full-time in intensive study and pursuit of a degree continues to be a major emphasis of UT's graduate effort. Increasingly 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 Dean's Office and the Office of Graduate Student Services; administrators of the various graduate programs; the graduate faculty; and the graduate student body. The Graduate Council is composed of elected faculty representatives from each college, the Space Institute, and the Graduate Student Association. Ex-officio members include the Dean and the Associate and Assistant Deans of The Graduate School, the Chair of the Research Council, the Dean of Libraries, the Dean of Continuing Education, and the administrative officer having primary responsibility for the graduate curriculum in each college or school.

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

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

The graduate student body is composed of those persons admitted to graduate study by The Graduate School, upon recommendation of the academic unit, and currently enrolled in The Graduate School.

Graduate education has been conducted at The University of Tennessee since 1821. The first known master's degree was awarded in 1827. In 1879 the Board of Trustees created a graduate department with authority to confer the Master of Arts, the Doctor of Philosophy, Civil Engineer, and Mining Engineer degrees. The Graduate Department was renamed The Graduate School in 1912. Although a Ph.D. degree was awarded in 1886 and in 1887, formal doctoral programs were not instituted until 1929 for Biological Sciences at Memphis and 1943 for Chemistry on the Knoxville campus. A Committee on Graduate Study was appointed in 1904 and coordinated the graduate programs until the Graduate Council was formed in 1949. More than 8,900 doctoral degrees and 52,300 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 UT.
Graduate Majors and Degree Programs

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

<table>
<thead>
<tr>
<th>MAJOR</th>
<th>DEGREE</th>
<th>GRE</th>
<th>RATING</th>
<th>DEPT. REQ.</th>
<th>THESIS REQ'D</th>
<th>LANGUAGE REQ'D</th>
<th>CONCENTRATIONS AVAILABLE/ EVALUATION DATES/PHONE (AREA CODE: 865)</th>
</tr>
</thead>
<tbody>
<tr>
<td>College of Agricultural Sciences &amp; Natural Resources</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Agricultural &amp; Extension Education*</td>
<td>MS</td>
<td>3</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>Agriculture, educational extension education. (974-7371, <a href="mailto:fressly@utk.edu">fressly@utk.edu</a>)</td>
</tr>
<tr>
<td>Agricultural Economics*</td>
<td>MS G</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MS-agribusiness, agricultural economics, rural sociology. (974-7231, <a href="mailto:jbrooker@utk.edu">jbrooker@utk.edu</a>)</td>
</tr>
<tr>
<td>Animal Science*</td>
<td>MS G</td>
<td>3</td>
<td>X X</td>
<td></td>
<td></td>
<td></td>
<td>MS &amp; PHD-animal breeding, animal management, animal nutrition, animal physiology, PHD only-animal anatomy. (974-7268, <a href="mailto:samashew@utk.edu">samashew@utk.edu</a>)</td>
</tr>
<tr>
<td>Biosystems Engineering*</td>
<td>MS G</td>
<td>3</td>
<td>X X</td>
<td></td>
<td></td>
<td></td>
<td>PHD-agricultural electrical &amp; electronic systems, agricultural power &amp; machinery, agricultural structures &amp; environment, food &amp; process engineering, soil &amp; water conservation engineering. (974-7266, <a href="mailto:abed@utk.edu">abed@utk.edu</a>)</td>
</tr>
<tr>
<td>Biosystems Engineering Technology*</td>
<td>MS G</td>
<td>3</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>(974-7266, <a href="mailto:abed@utk.edu">abed@utk.edu</a>)</td>
</tr>
<tr>
<td>Entomology &amp; Plant Pathology*</td>
<td>MS G</td>
<td>3</td>
<td>X X</td>
<td></td>
<td></td>
<td></td>
<td>Entomology, plant pathology. Evaluate Mar 15 for Fall and Summer, Oct 15 for Spring. (974-7135, <a href="mailto:rgerhard@utk.edu">rgerhard@utk.edu</a>)</td>
</tr>
<tr>
<td>Food Science &amp; Technology*</td>
<td>MS PHD</td>
<td>3</td>
<td>X X</td>
<td></td>
<td></td>
<td></td>
<td>PHD-food chemistry, food microbiology, food processing, sensory evaluation of foods. (974-7247, <a href="mailto:dgolden@utk.edu">dgolden@utk.edu</a>)</td>
</tr>
<tr>
<td>Forestry*</td>
<td>MS G</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(974-7126, <a href="mailto:ghopper@utk.edu">ghopper@utk.edu</a>)</td>
</tr>
<tr>
<td>Natural Resources</td>
<td>MS PHD</td>
<td>3</td>
<td>X X</td>
<td></td>
<td></td>
<td></td>
<td>Pending THEC approval. (974-7126, <a href="mailto:ghopper@utk.edu">ghopper@utk.edu</a>)</td>
</tr>
<tr>
<td>Ornamental Horticulture &amp; Landscape Design*</td>
<td>MS</td>
<td>3</td>
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<tr>
<td>Plant &amp; Soil Sciences*</td>
<td>MS PHD</td>
<td>3</td>
<td>X X</td>
<td></td>
<td></td>
<td></td>
<td>MS &amp; PHD-crop physiology &amp; ecology, plant breeding &amp; genetics, soil science. (974-8528, <a href="mailto:dboyd@utk.edu">dboyd@utk.edu</a>)</td>
</tr>
<tr>
<td>Wildlife &amp; Fisheries Science*</td>
<td>MS G</td>
<td>3</td>
<td>X X</td>
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<td></td>
<td>(974-7126, <a href="mailto:ghopper@utk.edu">ghopper@utk.edu</a>)</td>
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<tr>
<td>College of Architecture &amp; Design</td>
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<tr>
<td>Architecture*</td>
<td>MArch</td>
<td>+ G</td>
<td>3 X</td>
<td></td>
<td></td>
<td></td>
<td>First professional degree. Admit Summer and Fall only. Evaluate Feb 1. (974-5205, <a href="mailto:jcodding@utk.edu">jcodding@utk.edu</a>)</td>
</tr>
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<td>MA PHD</td>
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<td></td>
<td>MA &amp; PHD-archaeology, biological anthropology, cultural anthropology, zooarchaeology. Admit Fall only. Evaluate Jan 15. (974-4406, <a href="mailto:dpatton@utk.edu">dpatton@utk.edu</a>)</td>
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<td>Art*</td>
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<td>Ceramics, drawing, graphic design, media arts, painting, printmaking, sculpture, watercolor, inter-area studies. Portfolio required. (974-3408, <a href="mailto:blyons@utk.edu">blyons@utk.edu</a>)</td>
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<td>Audiology*</td>
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<td>Admit Fall only. (974-5148, <a href="mailto:rganguly@utk.edu">rganguly@utk.edu</a>)</td>
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<td>MS &amp; PHD-anatomy, bryology, cytogenetics, cytology, ecology, genetics, lichenology, morphology, mycology, photobiology, physiology, physiology, plant graphite, taxonomy. Evaluate for Fall Jan 7. (974-2265, <a href="mailto:brmulin@utk.edu">brmulin@utk.edu</a>)</td>
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<td>MS &amp; PHD-analytical chemistry, environmental chemistry, inorganic chemistry, organic chemistry, physical chemistry, polymer chemistry, PHD only-chemical physics (in cooperation with Physics Department), theoretical chemistry. (974-3141, <a href="mailto:fcheng@utk.edu">fcheng@utk.edu</a>)</td>
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<td>Computer Science*</td>
<td>MS PHD</td>
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<td></td>
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<td>(974-5067, <a href="mailto:straight@csc.utk.edu">straight@csc.utk.edu</a>)</td>
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<td>MS &amp; PHD-behavior, ecology, evolutionary biology. (974-3065, <a href="mailto:gnicollecker@utk.edu">gnicollecker@utk.edu</a>)</td>
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<td>English*</td>
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<td>MA-writing. Degree-seeking students only. Admit Fall only. Evaluate Feb 15. (974-5933, <a href="mailto:pepke@utk.edu">pepke@utk.edu</a>)</td>
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<td>French*</td>
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<td>See Modern Foreign Languages for PHD. (974-7602, <a href="mailto:jromeise@utk.edu">jromeise@utk.edu</a>)</td>
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<td>Evaluate assistantship applications Feb 15. (974-2418, <a href="mailto:utkgeog@utk.edu">utkgeog@utk.edu</a>)</td>
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<td>Geology*</td>
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<td>Evaluate Feb 15. (974-6002, <a href="mailto:adriese@utk.edu">adriese@utk.edu</a>)</td>
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<td>See Modern Foreign Languages for PHD. (974-3421, <a href="mailto:hoeyng@utk.edu">hoeyng@utk.edu</a>)</td>
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<td>X</td>
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<td>PHD-american, european. Admit Fall only. Evaluate Feb 15. (974-5421, <a href="mailto:phamilton@utk.edu">phamilton@utk.edu</a>)</td>
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<td>Life Sciences*</td>
<td>MS</td>
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<td>X</td>
<td>MS &amp; PHD-genome science and technology, plant physiology &amp; genetics. Admit Fall only. (974-1531, <a href="mailto:nusseig@utk.edu">nusseig@utk.edu</a>)</td>
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<td>Mathematics*</td>
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<td>MS-applied mathematics. PHD-mathematical ecology. (974-2464, <a href="mailto:gradprogram@math.utk.edu">gradprogram@math.utk.edu</a>)</td>
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<td>(974-3441, <a href="mailto:gstoey@utk.edu">gstoey@utk.edu</a>)</td>
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<td>X</td>
<td>First concentration-French, German, Spanish. Second concentration-applied linguistics, French, German, Italian, Portuguese, Russian, Spanish. (974-3421, <a href="mailto:jromeise@utk.edu">jromeise@utk.edu</a>)</td>
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<td>Music*</td>
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<td>Accompanying: choral conducting, composition, instrumental conducting, jazz, music education, music theory, musicology, performance, piano pedagogy &amp; literature. Audition required. (974-3331, <a href="mailto:caneder@utk.edu">caneder@utk.edu</a>)</td>
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<td>Philosophy*</td>
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<td>MA &amp; PHD-medical ethics, philosophy. MA only-religious studies. Admit Fall only. (974-3255, <a href="mailto:nolt@utk.edu">nolt@utk.edu</a>)</td>
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<td>MS &amp; PHD-astrophysics, atomic &amp; low temperature physics, biophysics, chemical physics, condensed matter &amp; surface physics, elementary particle physics, molecular spectroscopy, nuclear physics, theoretical physics. MS only-geophysics, health physics. Rating forms required only for consideration for teaching assistantships. (974-3342, <a href="mailto:cosilh@utk.edu">cosilh@utk.edu</a>)</td>
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<td>Planning*</td>
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<td>Environmental planning, land use planning, real estate development planning, transportation planning. Admit Summer and Fall only. (974-6227, <a href="mailto:japeno@utk.edu">japeno@utk.edu</a>)</td>
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<td>Political Science*</td>
<td>MA</td>
<td>G</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>MA-experimental psychology, general psychology. PHD-clinical psychology, experimental psychology. Admit Fall only. Evaluate Feb 15. (974-3328, <a href="mailto:cjogle@utk.edu">cjogle@utk.edu</a>)</td>
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<td>Psychology*</td>
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<td>X</td>
<td>Dual JD-MPA program available. (974-2261, <a href="mailto:dfolz@utk.edu">dfolz@utk.edu</a>)</td>
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<td>Public Administration*</td>
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<td>MA &amp; PHD-criminology; energy, environment &amp; resource policy; political economy. Admit Fall only. Evaluate Feb 15. (974-7023, <a href="mailto:thompson@utk.edu">thompson@utk.edu</a>)</td>
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<td>See Modern Foreign Languages for PHD. (974-7005, <a href="mailto:kross@utk.edu">kross@utk.edu</a>)</td>
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<td>Spanish*</td>
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<td>Audiology, hearing science, speech &amp; language pathology, speech-language science. (974-5019, <a href="mailto:kross@utk.edu">kross@utk.edu</a>)</td>
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<td>Admit Fall only. (974-5019, <a href="mailto:kross@utk.edu">kross@utk.edu</a>)</td>
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<td>Costume design, performance, lighting design, scene design, theatre technology. Audition required. (974-6011, <a href="mailto:deicuir@utk.edu">deicuir@utk.edu</a>)</td>
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<td>Theatre*</td>
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<td>3</td>
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<td>Assurance, systems, taxation. Admit Fall only. Evaluate Mar 1. (974-2551, <a href="mailto:rtownsend@utk.edu">rtownsend@utk.edu</a>)</td>
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**College of Business Administration**

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<td>Statistics*</td>
<td>MS</td>
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**College of Communications**

| Communications*                             | MS     | + G   | 3 | X |
|                                             | PHD    | + G   | 3 | X |
| MS & PHD-advertising, broadcasting, journalism, public relations, speech communication. PHD only-information sciences. Admit Fall only. (974-6601, colcomgs@utk.edu) |
### College of Education

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**College of Engineering**

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**Notes**

- **MS Track 1 (those who are already licensed)**: Art education; curriculum; education of the deaf and hard of hearing; elementary education; English education; foreign language/ESL education; instructional technology; mathematics education; modified & comprehensive special education; reading education; science education; social foundations; social science education; special education; early childhood; MS Track 2 (those who are seeking initial license): art education; education of the deaf & hard of hearing; elementary teaching; modified & comprehensive special education; secondary teaching; special education; early childhood; EDS-curriculum; educational administration & supervision; elementary education; English education; foreign language/ESL education; instructional technology; mathematics education; reading education; school counseling; school psychology; science education; social science education; special education. EDD-curriculum, educational research, and evaluation; educational administration and policy studies; educational psychology; instructional technology; literacy, language, education and ESL education; teacher education. PHD-curriculum, educational research, and evaluation; educational administration and policy studies; educational psychology; exercise science; instructional technology; literacy, language, education and ESL education; school psychology; socio-cultural foundations of sport and education; teacher education. Evaluate Jan 1 and Feb 1. (974-0906, mhl@utk.edu)

- Educational administration & supervision. Evaluate Jun 1. (974-0906, mhl@utk.edu)

- Adult education, individual & collaborative learning. (974-0906, mhl@utk.edu)

- Exercise science, sport management, sport studies. (974-0906, mhl@utk.edu)

- MS & PHD-aeroacoustics, aerodynamics & performance, energy conversion & utilization, flight & aerospace mechanics, gasdynamics, heat transfer & fluid mechanics, propulsion, space engineering, structures & stress analysis, thermodynamics. (974-5115, maesinfo@engr.utk.edu)

- MS & PHD-advanced control systems, chemical bioengineering, chemical engineering, polymer science & engineering. Evaluate Feb 1 for financial aid. Qualified applicants are encouraged to apply directly to the PhD program. PhD applicants receive financial aid preference. (974-2421, cheinfo@utk.edu)

- MS & PHD-construction engineering, environmental engineering, geotechnical/materials engineering, public works engineering, structural engineering, transportation engineering. (974-2503, cee@utk.edu)

- PhD-circuit theory; communication theory; computers, control systems, electro-optics, electromagnetic theory, plasma engineering, power electronics, power systems, solid-state electronics. (974-3461, mp@pace@utk.edu)

- MS & PHD-biomedical engineering, computational mechanics, fluid mechanics, mechanics of composite materials, optical engineering (UTSI only), solid mechanics. MS only-advanced intelligent product development and manufacturing. PhD only-industrial engineering. Dual MS-MBA program available. (974-5115, maesinfo@engr.utk.edu)

- Air quality, environmental risk assessment, mixed waste management, waste management, water quality, water resources. See Civil Engineering for PhD. (974-2503, cee@utk.edu)

- Industrial engineering, engineering management, manufacturing systems engineering, product development and manufacturing. Evaluate March 1 for financial aid. (974-2503, cee@utk.edu)

- MS & PHD-materials, metallurgy, polymers. (974-5336, pr@utech.utk.edu)

- MS & PHD-dynamics, control & robotics; energy conversion & utilization; gasdynamics; heat transfer & fluid mechanics; machine design; power generation; propulsion; space engineering; stress analysis; thermodynamics. MS only-product development and manufacturing. Dual MS-MBA program available. (974-5115, maesinfo@engr.utk.edu)

- MS & PHD-composite materials; mechanical, physical & chemical behavior of polymers; polymer morphology; rheology & polymer processing. (974-5336, pr@utech.utk.edu)
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<td>3</td>
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<td>Child and family studies, early childhood education. Evaluate Feb 1, Jun 1, Nov 1. (974-5316, <a href="mailto:cfs@utk.edu">cfs@utk.edu</a>)</td>
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<td>3</td>
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<td>Evaluate Feb 1, April 1 and Sept 1. (974-5041, <a href="mailto:pzemel@utk.edu">pzemel@utk.edu</a>)</td>
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<td>Human Ecology*</td>
<td>PHD</td>
<td>G</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Child and family studies, community health, human resource development, nutrition science, retail &amp; consumer sciences, textile science. Evaluate Feb 1, Jun 1, Nov 1. (974-5224, <a href="mailto:bcollier@utk.edu">bcollier@utk.edu</a>)</td>
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<tr>
<td>Human Resource Development</td>
<td>MS</td>
<td>G</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>Teacher licensure (does not require test scores or ratings forms, but does require admission to teacher education), training and development. Evaluate Feb 1, Jun 1, and Nov 1. (974-2574, <a href="mailto:hrd@utk.edu">hrd@utk.edu</a>)</td>
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<tr>
<td>Nutrition*</td>
<td>MS</td>
<td>G</td>
<td>3</td>
<td>X</td>
<td></td>
<td></td>
<td>Nutrition science, public health nutrition. Evaluate Feb 1, May 1 and Oct 1. Dual MS-MPH program available. (974-5446, <a href="mailto:cyates1@utk.edu">cyates1@utk.edu</a>)</td>
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<tr>
<td>Public Health*</td>
<td>MPH</td>
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<td>3</td>
<td>X</td>
<td></td>
<td></td>
<td>Community health education, gerontology, health planning/administration, Admit Summer and Fall only. Fall deadline - Apr 1, Summer deadline - Feb 1. Dual MS-MPH program available. (974-6674, <a href="mailto:ccbharianon@utk.edu">ccbharianon@utk.edu</a>)</td>
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<tr>
<td>Recreation, Tourism, &amp; Hospitality</td>
<td>MS</td>
<td>G</td>
<td>3</td>
<td>X</td>
<td></td>
<td></td>
<td>Hospitality management, recreation administration, therapeutic recreation, tourism. Evaluate Feb 1, Jun 1, Nov 1. (974-2141, <a href="mailto:nbfair@utk.edu">nbfair@utk.edu</a>)</td>
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<tr>
<td>Management</td>
<td>MS</td>
<td></td>
<td>3</td>
<td>X</td>
<td></td>
<td></td>
<td>Emergency management, safety management. (974-5041, <a href="mailto:smrsmith@utk.edu">smrsmith@utk.edu</a>)</td>
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<tr>
<td>Safety</td>
<td>MS</td>
<td></td>
<td>3</td>
<td>X</td>
<td></td>
<td></td>
<td>Retail and consumer sciences, textile science. Evaluate Feb 1, Jun 1, Nov 1. (974-2141, <a href="mailto:nbfair@utk.edu">nbfair@utk.edu</a>)</td>
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<tr>
<td>Textiles, Retailing &amp; Consumer Sciences*</td>
<td>MS</td>
<td>G</td>
<td>3</td>
<td>X</td>
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<tr>
<td><strong>College of Law</strong></td>
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<tr>
<td>Law*</td>
<td>JD</td>
<td>LSAT</td>
<td>2</td>
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<td>Advocacy &amp; dispute resolution, business transactions. Contact College of Law for Bulletin. Dual JD-MBA and JD-MPA programs available. (974-4131)</td>
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<td><strong>College of Nursing</strong></td>
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<tr>
<td>Nursing*</td>
<td>MSN</td>
<td>G</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td></td>
<td>MSN-adult health nursing, family nurse practitioner, mental health nursing, nurse anesthesia, nursing administration, nursing of women and children. Evaluate Oct 1 and Feb 1. For nurse anesthesia-Sept 1. Post-master's certificate in adult health nursing, family nurse practitioner, mental health nursing, nursing administration, nursing of women and children also available. (MSN-974-7606, <a href="mailto:stuservices@cn.gw.utk.edu">stuservices@cn.gw.utk.edu</a>) (PHD-974-7581, <a href="mailto:sthomas@utk.edu">sthomas@utk.edu</a>)</td>
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<td>PHD</td>
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<td>3</td>
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<td><strong>College of Social Work</strong></td>
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<tr>
<td>Social Work*</td>
<td>MSSW</td>
<td>G</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td></td>
<td>MSSW-clinical social work practice, social welfare management &amp; community practice. Programs offered in Knoxville, Memphis and Nashville. Evaluate Mar 1. Post-master's certificate in management and community practice also available. (MSSW-974-6697, <a href="mailto:sthomas@utk.edu">sthomas@utk.edu</a>) (PHD-974-6646, <a href="mailto:ckillion@utk.edu">ckillion@utk.edu</a>)</td>
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<td>PHD</td>
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<td>3</td>
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<td><strong>College of Veterinary Medicine</strong></td>
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<td>Veterinary Medicine*</td>
<td>DVM</td>
<td>VCAT</td>
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<td>Contact College of Veterinary Medicine for application. (974-7263, <a href="mailto:jbrace@utk.edu">jbrace@utk.edu</a>)</td>
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<td><strong>School of Information Sciences</strong></td>
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<tr>
<td>Information Sciences*</td>
<td>MS</td>
<td>G</td>
<td>3</td>
<td>X</td>
<td></td>
<td></td>
<td>Distance education available. Evaluate July 1 and Dec 1. See College of Communications for PHD. (974-2148, <a href="mailto:katwood@utk.edu">katwood@utk.edu</a>)</td>
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<tr>
<td><strong>Intercollegiate</strong></td>
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<tr>
<td>Aviation Systems*</td>
<td>MS</td>
<td></td>
<td>2</td>
<td></td>
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<td>Only offered at UT Space Institute, Tullahoma, Tennessee.</td>
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<tr>
<td>Comparative &amp; Experimental Medicine*</td>
<td>MS</td>
<td>G</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Basic science, applied science. Evaluate Apr 15 - Summer, Jul 1 - Fall, Nov 15 - Spring. Will accept early applications. (974-5576, <a href="mailto:potgieter@utk.edu">potgieter@utk.edu</a>)</td>
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<td></td>
<td>PHD</td>
<td>G</td>
<td>3</td>
<td>X</td>
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</table>

| a Contact academic program for specific requirements. |
| b Foreign or computer language. |
| c International applicants only. |
| d American applicants only. |
| * Non-degree students must obtain permission from the department/program head to register for courses in these fields. |
| ** Available for the Academic Common Market to residents of reciprocal states. See Fields of Instruction. |
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 constitute acceptance into a specific degree program or admission to candidacy for the degree desired.

The Graduate School requires a minimum grade-point average of 2.7 out of a possible 4.0, or a 3.0 during the senior year of undergraduate study. Applicants with previous graduate work must have a grade-point average of 3.0 on a 4-point scale or equivalent on all graduate work. Many programs require a higher average. Applicants with work experience or who are entering graduate school after a number of years away from an educational institution, usually 5 years, will be given consideration with greater flexibility relative to GPA. An international student graduating from a U.S. institution must meet the same requirements as those for domestic students.

An applicant whose GPA falls between 2.5 and 2.7 may be admitted on probation, upon recommendation of the academic unit. The probationary status will be removed after completion of nine or more hours of graduate credit with a minimum GPA of 3.0. Failure to maintain a 3.0 while in this status will result in dismissal from The Graduate School. An international student may not be admitted on probation.

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

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

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

Application Procedures

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

To apply for admission, the following materials must be sent to The Graduate School:

1. The completed Graduate Application for Admission (inside front cover of the Graduate Catalog or at http://web.utk.edu/~gsinfo).
2. A $35 non-refundable application fee.
3. One official transcript from all colleges and universities attended.
4. Additional departmental/program requirements (refer to Majors and Degree Programs chart in front of Graduate Catalog).
   a. Reference letters or rating forms. All program forms should be sent to the college or department.
   b. Scores from the Graduate Record Examination (GRE) or Graduate Management Admission Test (GMAT).
   c. Scores from Test of English as a Foreign Language (TOEFL) if native language is not English (refer to section on English Certification).
   d. Application forms for the above tests can be obtained by applying to the Educational Testing Service, Princeton, NJ 08450.

UT is an approved testing center for all examinations. Examination results reach the Office of Graduate Student Services within 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.

Admission Classifications

To earn graduate credit, a student must be admitted by the Dean of Graduate Studies 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 seniors and professional students.

International students should also refer to the section on Admission of International Students.

DEGREE ADMISSION

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

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

A student must maintain a 3.0 grade-point average to continue enrollment in a degree program (see Academic Standards). An applicant may not be admitted simultaneously to more than one degree program. Two or more applications cannot be considered concurrently. For admission to dual programs, applications are processed consecutively.

NON-DEGREE ADMISSION

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

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

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

A major area must be declared if the intent is to seek an advanced degree. If no degree is desired, a major area need not be declared, but some departments do not permit non-degree students to register for graduate courses (see Majors and Degree Programs chart for information on restricted programs).

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

1. apply and be admitted to a specific degree program (see Revision of Admission Classification for procedures); or
2. submit a Plan of Study form to the Office of Graduate Student Services 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 limits specified for the degree.

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

A student 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 constitute admission to a degree program. The student who seeks to enter a degree program will be directed to the appropriate department.

An international student on a non-immigrant visa may not enroll in a non-degree status.
GRADUATE CERTIFICATE OF CREDIT ADMISSION

Admission to a graduate certificate of credit program requires that a person meet the minimum requirements of The Graduate School and any additional program requirements (see Admission Requirements). Refer to the appropriate field of instruction for specific requirements for admission to the certificate program. Admission to a graduate certificate of credit program does not constitute admission to a degree program. To receive a graduate certificate of credit, students must be classified as degree-seeking students or as certificate-seeking students, but may not be classified as non-degree.

TRANSIENT ADMISSION

A student who is enrolled in good standing in a graduate degree program at another institution and who wishes to take courses for transfer to that institution may be admitted after submitting a completed Graduate Application for Admission, the $35 application fee, and a Transient Student Certification 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 Student Services.

POST-DOCTORAL ADMISSION

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

Admission of International Students

The Graduate School accepts only students who have superior records. An international student must have an equivalent 4-year Bachelor's degree with at least a B average on all previous coursework and a B+ on all previous graduate work. On various grading scales, this corresponds to:

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

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

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

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

The Office of Graduate Student Services 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 Graduate Application for Admission.
2. A $35 non-refundable processing fee. Payment should be made in United States dollars by a cashier's check, money order, or personal check. If payment is by personal check, it must be drawn on a United States bank to be honored in United States currency. Checks drawn on overseas banks are not accepted. International money orders are suggested.
3. Official or attested university records, with certified translations if the records are not in English (Notarized copies are not accepted).
4. Confirmation of degree(s). Confirmation must be received by the Office of Graduate Student Services at least 2 months prior to term of first enrollment.
5. Certification of English proficiency. Refer to section on English Certification.
6. Documented evidence of financial resources sufficient to support the student, as stated on the financial statement form supplied to the applicant. This form is supplied to the applicant after receipt of application.
7. Additional departmental/program requirements (refer to Majors and Degree Programs chart in front of Graduate Catalog).

- a. Reference letters or rating forms. All program forms should be sent to the college or department.
- b. Scores from the Graduate Record Examination (GRE) or Graduate Management Admission Test (GMAT). Admission must be granted, and financial documentation and degree confirmation must be received, prior to issuance of an I-20 or IAP-66 form needed to obtain a visa. The Graduate School will not issue these forms after the following dates:
  - Fall: 15 June
  - Spring: 1 November
  - Summer: 15 March

The University will not enroll any student who has not been approved initially, or for transfer, by the Immigration and Naturalization Services (INS) to attend UT. An international student may not enroll as a non-degree student nor on probation.

English Certification

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

All students whose native language is not English must take an English proficiency examination after arrival at UT. Refer to section on English Proficiency.

Admission of Faculty and Staff Members

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

Faculty members of UT or the Institute of Agriculture at the rank of assistant professor or above, and members of the administrative staff at UT, 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. 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 Dean of Graduate Studies.

Readmission

A student who has not attended The Graduate School at UT for three consecutive terms (including summer) must apply for readmission. A readmission application should be submitted to the Office of Graduate Student Services at least two weeks prior to the desired reentry date. A student who has attended another institution since enrollment at UT 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 Student Services. 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 Graduate Studies and enrolled in an appropriate status as a graduate student. The registration must reflect the desire for graduate credit, and the course must have been approved by the Graduate Council. Coursework taken in any other status is unacceptable for graduate credit and cannot be changed retroactively to graduate credit. Special privileges are accorded UT seniors and professional students, as stated in the section on Undergraduates and Professional Students.

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

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

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

### Undergraduate and Professional Students

#### UT SENIORS

Subject to approval by The Graduate School, a senior at UT 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. The student must register for law courses.

#### UT VETERINARY MEDICINE STUDENTS

A student in good standing in the College of Veterinary Medicine may enroll in UT 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 Student Services. The student's progress is subject to review and approval each semester by the Associate Dean, College of Veterinary Medicine.

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

#### UT LAW STUDENTS

Subject to approval by The Graduate School and the College of Law, a law student at UT may enroll in graduate courses for graduate credit. Approval must be obtained each semester at the Office of Graduate Student Services 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 is 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/NC grade. If the student earns a 2.0 or better, an S will be recorded on the transcript. Below 2.0, an NC will be recorded, and the course cannot be used toward meeting degree requirements.

Grades for law courses will not be reflected in the cumulative grade-point average, as law courses do not carry graduate credit.

Different rules apply to students enrolled in the Dual J.D.-MBA and J.D.-MPA programs. Graduates 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 via the arrangement described under Business Administration.

### Graduate Certificate of Credit Programs

A graduate certificate of credit program is a series of academically coherent graduate credit courses offered by the university as a planned program that does not lead to a degree. A candidate for a graduate certificate of credit program must be a fully admitted graduate student who has satisfactorily completed (minimum 3.0 grade-point average) the minimum requirements for a certificate described in the Graduate Catalog under Fields of Instruction. A candidate must be a graduate student in good standing and comply with all other applicable policies of The Graduate School. Graduate certificate programs require a minimum of 12 semester credit hours taken at UT. Use of credits to fulfill requirements for a graduate degree will be at the discretion of the academic department.

To receive the certificate, students must submit an application endorsed by the academic department to The Graduate School for approval. Only those certificate programs that are officially approved by the Graduate Council will be posted on student transcripts. Graduate students in non-degree classification are not eligible to receive a graduate certificate.

### Senior or Disabled Citizens

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

Persons who wish to attend certain classes regularly, without taking examinations or receiving grades or credit, may do so by completing a graduate application as a non-degree student, paying the application fee, registering as an auditor, and paying regular fees. Graduate students paying regular fees also are entitled to audit courses.

The names of all auditors properly registered will appear on the intermediate class rolls, but will be removed from the final grade report. No record of audited coursework will appear on the permanent record. Persons may not attend class without being properly admitted to the University and registered in the class.

Courses in Non-Standard Format

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

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 for work done by correspondence study at any university.

Proficiency Examinations

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

English Proficiency

Applicants whose native language is not English must pass an English proficiency examination given by the University prior to initial registration. Students whose performance on the examination indicates a need for additional English study should immediately for English 121 English Grammar Review for Non-Native Speakers (or another course assigned by the English Department) for undergraduate credit and pass with a grade of C or better. A student may not take more than 6 additional hours of course work while enrolled in English 121. Students whose scores indicate that they are not prepared to enter English 121 will be referred to a program of intensive English study prior to enrolling in an academic program.

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

Prerequisites

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

Advisor/Major Professor

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

Departmental Liaison

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 nondepartmental students with course selection and other academic matters.

Registration

Registration is required of all graduate students when using University facilities and/or faculty time. The minimum number of hours for registration is three. Registration allows use of services such as library checkout, laboratories, and recreation facilities not open to the public.

Information concerning registration is available in the Graduate School News and Timetable of Classes each term. Registration is accomplished via telephone or web. During priority registration, a schedule and bill is mailed to the registrant. Payment is due by the deadline noted on the bill. A graduated late fee is assessed to any student who fails to register during priority registration. Additional information can be obtained from the University Registrar's Office, (865) 974-2101.

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

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

Conditional Registration

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

Registration for Use of Facilities

Students using University facilities, services or faculty time, including summer term, must be registered. Normally, students are registered for coursework or thesis/dissertation credit. Non-thesis students or those who have not begun research, but who have completed all coursework requirements, must register for course 502.

Course Description

Each course listed in the Graduate Catalog contains information in abbreviated form. The course number indicates the level at which the course is taught. All 500- and 600-level courses are graduate courses. The 400-level courses are upper division courses available for graduate credit only if listed in the Graduate Catalog. To receive graduate credit for these, a student must request registration. The official course title appears following the course number. Numbers in parentheses indicate the credit hours assigned. The minimum and maximum are shown (e.g., 2-4). The credit earned in a course is computed into the grade point average (GPA). Courses audited are not counted toward minimum graduate hours required for financial assistance.

Grade-Point Average and Grades

A cumulative grade-point average of 3.0 is required on all graduate coursework attempted at UT to remain in good standing and to receive any graduate degree or certificate from the University. All coursework taken for graduate credit is computed into the GPA. Grades in 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 will not meet 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 Student Services at the end of the semester, the I will be changed to an F. The course will not be counted in the cumulative grade-point average until a final grade is assigned.
Academic Standards

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

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

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

ACADEMIC PROBATION

Upon completion of nine hours of graduate coursework, a graduate student will be placed on academic probation when his/her cumulative GPA falls below 3.0. A student will be allowed to continue graduate study in subsequent semesters if each semester's grade-point average is 3.0 or greater. Upon achieving a cumulative GPA of 3.0, the student will be removed from probationary status.

DISMISSAL

If a student is on academic probation, the degree or non-degree status will be terminated by the Dean of Graduate Studies if the student's semester GPA falls below 3.0 in a subsequent semester. When the particular circumstances are deemed to justify continuation, and upon recommendation of the appropriate academic unit and approval of the Dean of Graduate Studies, a student on probation whose semester GPA is below 3.0 may be allowed to continue on a semester-by-semester basis.

Dismissal of a graduate student by a department or program is accomplished by written notice to the student, with a copy to the Graduate Student Services. Normally, grievances can be obtained at the Office of Graduate Affairs. Normally, grievances related to race, sex, color, national origin, age, disability or veteran status should file a formal complaint with the Office of Diversity Resources and Educational Services (DRES).
Definition of Graduate Terms

Major: The principal educational interest of a student as represented by one of the curricula prescribed by the various units at UT. The major specifies the minimum requirements for a course.

Minor: An area of interest secondary to the major that is represented by a specified set of hours and/or courses. Differs from "concentration" in that a minor is not a subdivision of the major.

Concentration: A collection of courses within a major that focuses on a particular subject area. The term "concentration" describes the nature of the set of courses.


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

Specialization: A sub-collection of courses within a concentration that focuses on specific subject matter. The term "specialization" describes the nature of the set of courses.

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

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

Minors

For the master's degree at UT, 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 Student Services from all institutions previously attended before any credit will be considered.

To be transferred into a master's or Ed.S. program at UT, a course must:
1. be taken for graduate credit.
2. carry a grade of B or better.
3. be a part of a graduate program in which the student had a B average.
4. not have been used for a previous degree.
5. be approved by the student's graduate committee and The Graduate School on the Admission to Candidacy form.

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

MASTERS DEGREE

A minimum of one-half of the total hours required for a master's degree must be taken at UT. 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 transcript only after admission to candidacy.

ED.S. DEGREE

A maximum of six semester (nine quarter) hours of coursework beyond the master's degree may be transferred to an Ed.S. program. Transferred courses in the most recent 30 hours taken for the degree must have been completed within the six-year period prior to the receipt of the degree. The courses must be listed on the Admission to Candidacy form and will be placed on the student's UT 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 transcript.

Theses and Dissertations

All theses and dissertations are submitted to the Office of Graduate Student Services Thesis/Dissertation Consultant for examination. The Consultant will review the material and assure that it is attractively presented, free of technical errors in format, suitable for binding, and reflects credit upon the University and The Graduate School. If the thesis or dissertation is not acceptable, the student must make corrections and resubmit the material.

The student, major professor and committee share responsibility for the accuracy and professionalism of the final product of the student's research. The student should confer with the Thesis/Dissertation Consultant regarding problems and questions in advance of preparing the final copy. The UT Knoxville Guide to the Preparation of Theses and Dissertations (5th 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 system. Under exceptional circumstances, another language may be used if prior approval is obtained from the Dean of Graduate Studies. A request to write in a language other than English should be submitted to the Dean of Graduate Studies by the student's thesis committee, with endorsement by the Department Head and Dean of the College, prior to Admission to Candidacy for the degree sought. The request should include a proposal and justification for the exception. In all cases, one thesis/dissertation abstract must be written in English.

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 research, it is intended to lead toward a thesis or dissertation, prior approval should be secured from the Department Head and Dean, and from the Dean of Graduate Studies. Should the research become classified in the course of a project, these same persons should be notified immediately so that proper procedures can be assured. Failure to comply with these requirements may lead to rejection of a thesis or dissertation manuscript.

Master's Degrees

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

Master's degree programs are available with thesis and non-thesis options. These programs require 30 or more graduate hours of coursework. In addition to the M.A. and M.S. degrees, other degrees are offered, including the MBA and the M.S.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 these programs, 6 semester hours of credit in the major (9-12 in some approved programs) must be earned in course 500 while the student is preparing the thesis. Hours applied to the master's degree may be entirely from one major subject or may be distributed to include one or two minor areas. In a 30-hour program, the major subject must include at least 12 hours of graduate coursework, exclusive of course 500, and a minor must include not fewer than 6, nor more than 12, hours of graduate credit.

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

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

SECOND MASTER'S DEGREES

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

MASTER'S COMMITTEE

A committee composed of the major professor and at least two other faculty members, all at the rank of assistant professor or above, should be formed as early as possible in a student's program, and must be formed by the time a student applies for admission to candidacy (refer to Advisor/Major Professor). The responsibility of this committee is to assist the student in planning a program of study and carrying out research, and to assure fulfillment of the degree requirements. If the student has a 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 satisfactory progress has been made toward a degree. This action usually connotes that all prerequisites to admission have been completed and a program of study has been approved.

The application for the master's degree is made as soon as possible after the student has completed any prerequisite courses and nine hours of graduate coursework with a 3.0 average or higher in all graduate work.

The Admission to Candidacy form must be signed by the student's committee and list all courses to be used for the degree, including transfer coursework. The student must submit this form to the Office of Graduate Student Services 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 the actual 12-hour minimum requirement for the thesis, including a minimum of 3 hours the semester in which the thesis is accepted by The Graduate School. Six hours of 500 are required for the thesis option. After receiving the master's degree, a student is no longer permitted to register for Thesis 500.

THESIS

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

FINAL EXAMINATION FOR THESIS AND PROBLEMS IN LIEU OF THESIS

A candidate presenting a thesis or problems in lieu of thesis must pass a final comprehensive oral (or oral and written) examination on all work offered for the degree. The examination, which is concerned with coursework and the thesis or problems, measures the candidate's ability to integrate material in the major and related fields, including the work presented in the thesis or problems. The final draft of the thesis must be distributed to all committee members at least two weeks prior to the date of the final examination. Except with prior approval from The Graduate School, the examination must be given in University-approved facilities. This examination must be scheduled through the Office of Graduate Student Services in accord 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 equal to one hour of graduate credit instead of registering. In case of failure, the candidate may not apply for reexamination until the following semester. The result of the second examination is final.

TIME LIMIT

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

Specialist in Education Degree

The Specialist in Education (Ed.S.) degree is offered with a major in Education.

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

COURSE REQUIREMENTS

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

A student admitted to the program with a master's degree, or with acceptable work beyond the master's degree, may have program requirements modified upon recommendation of the student's committee. However, no modifications will be permitted in examination and research requirements, nor in the minimum 6 graduate hours required outside the major. All prior coursework accepted toward the degree must be related to the student's program objectives. A maximum of 6 hours beyond the master's degree may be transferred from another institution to an Ed S. program (refer to section on Transfer Credits).

Courses numbered at the 400 level required for certification through UT 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,
THE UNIVERSITY OF T Exclusively of thesis coursework, must be in 500-

or 600-level courses.

ED.S COMMITTEE

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

RESIDENCE REQUIREMENTS

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

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

ADMISSION TO CANDIDACY

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

The Admission to Candidacy form must be signed by the student’s committee and list all courses to be used for the degree, including transfer coursework. This form is submitted to the Office of Graduate Student Services 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 within two years or more prior to admission to the program. This examination may be written and/or oral.

RESEARCH REQUIREMENTS

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

1. In the non-thesis program, a candidate will study research methods and findings and will demonstrate skill in adapting them to the student’s major and related fields. Each examination must be scheduled through the Office of Graduate Student Services before the deadline and will be conducted in University-approved facilities by the student’s committee. Final examinations must not be scheduled the following semester. The result of the examination is final.

TIME LIMIT

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

Doctoral Degrees

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

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

PROGRAM OF STUDY

The student’s program of study is subject to Graduate Council policies and individual program requirements. The program of study as listed by the student on the Admission to Candidacy form must be approved by the doctoral committee. Doctoral programs include a major field or area of concentration and, frequently, one or more cognate fields. Cognate fields are defined as a minimum of 6 semester hours of graduate coursework in a given area outside the student’s major field. A candidate for a doctoral degree must complete a minimum of 24 hours of graduate coursework beyond the major’s degree, which is a prerequisite for entry into most doctoral programs. If the doctoral program does not require a master’s degree, the candidate must complete a minimum of 48 hours of graduate coursework beyond the baccalaureate degree. A minimum of 12 of the 24 hours, or 30 of the 48 hours, must be graded A-F. A minimum of 6 semester hours of the student’s coursework must be taken in UT courses at the 600 level, exclusive of dissertation.

In addition, 24 hours of course 600 Doctoral Research and Dissertation are required (see Continuous Registration). For coursework taken prior to admission to the doctoral program, refer to section on Transfer Credits.

DOCTORAL COMMITTEE

The major professor directs the student’s dissertation research and chairs the dissertation committee. The student and the major professor identify a doctoral committee composed of at least four faculty members holding the rank of Assistant Professor or above, three of whom, including the chair, must be approved by the Graduate Council to direct doctoral research. At least one member must be from an academic unit other than that of the student’s major field. This committee is nominated by the department head or college dean and approved by The Graduate School.

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

DOCTORAL EXAMINATIONS

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

Diagnostic Examination

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

Qualifying Examination

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

Comprehensive Examination

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

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

**Defense of Dissertation Examination**

A doctoral candidate must pass an oral examination on the dissertation. The dissertation, in the form approved by the major professor, must be distributed to the committee at least two weeks before the examination. The examination must be scheduled through the Office of Graduate Student Services at least one week prior to the examination and must be conducted in University-approved 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 Student Services in accordance with the dates and times for the examinations printed in the Graduate School News.

Students are required to pass at least one foreign language in which the dissertation is written or to substitute an oral examination for the language requirement. 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 student's dissertation examination must be completed within eight years, from the time of a student's first enrollment in a doctoral degree program. The candidate must maintain a B average in all graduate work and fulfill any language requirements (for Ph.D.), and maintaining at least a B average in all graduate coursework. Each student is responsible for filing the admission to candidacy form, which lists all courses to be used for the degree, including courses taken at UT or at another institution prior to admission to the doctoral program, and is signed by the doctoral committee. Admission to candidacy must be 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, admission to candidacy is accepted, 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, 8th 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 the candidate has examined the final copy and found that its form and content demonstrate scholarly excellence. Microfilm Agreement form, Survey of Earned Doctorates, and Abstract form are also submitted at this time. The student should check with the department head concerning additional required copies of the dissertation.

**TIME LIMIT**

Comprehensive examinations must be taken within five years, and all requirements must be completed within eight years, from the time of a student's first enrollment in a doctoral degree program.
### 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 Student Services 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>
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<tr>
<td>Approval of admission to candidacy</td>
<td>The Graduate School</td>
<td>Prior to graduation</td>
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### Graduation Requirements for Non-Thesis Option

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<th>PROCEDURE</th>
<th>UNDER DIRECTION OF</th>
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<tbody>
<tr>
<td>Submission of application for diploma</td>
<td>Office of Graduate Student Services</td>
<td>At beginning of term of graduation*</td>
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<tr>
<td>Payment of graduation fee</td>
<td>Bursar's Office</td>
<td>At beginning of term of graduation*</td>
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<tr>
<td>Scheduling of Final Examination</td>
<td>Student, Committee and Office of Graduate Student Services</td>
<td>Not later than one week prior to Final Examination*</td>
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<tr>
<td>Final Examination</td>
<td>Master's/Ed.S. Committee</td>
<td>Not later than three weeks prior to Commencement*</td>
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<tr>
<td>Removal of Incomplete(s)</td>
<td>Instructor of Course</td>
<td>Not later than one week prior to Commencement*</td>
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</table>

### Graduation Requirements for Thesis/Problems Option

<table>
<thead>
<tr>
<th>PROCEDURE</th>
<th>UNDER DIRECTION OF</th>
<th>DATE</th>
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</thead>
<tbody>
<tr>
<td>Submission of application for diploma</td>
<td>Office of Graduate Student Services</td>
<td>At beginning of term of graduation*</td>
</tr>
<tr>
<td>Payment of graduation fee</td>
<td>Bursar's Office</td>
<td>At beginning of term of graduation*</td>
</tr>
<tr>
<td>Submission of thesis/ problems to master's/Ed.S. committee</td>
<td>Student</td>
<td>At least two weeks prior to Final Examination</td>
</tr>
<tr>
<td>Scheduling of Final Examination</td>
<td>Student, Committee and Office of Graduate Student Services</td>
<td>Not later than one week prior to Final Examination*</td>
</tr>
<tr>
<td>Final Examination</td>
<td>Master's/Ed.S. Committee</td>
<td>Not later than four weeks prior to Commencement*</td>
</tr>
<tr>
<td>Approval and acceptance of final copy of thesis</td>
<td>Master's/Ed.S. Committee and The Graduate School</td>
<td>After Final Examination and not later than two weeks prior to Commencement*</td>
</tr>
<tr>
<td>Removal of Incomplete(s)</td>
<td>Instructor of Course</td>
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</table>

*Deadline dates are printed in the Graduate School News each semester, in addition to a separate publication of Deadline Dates for Graduation. Both are available on the Graduate School Web Page (http://web.utk.edu/~gsinfo).*
### Summary of Procedures for Doctoral Degrees

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

### GRADUATION REQUIREMENTS

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<td>At beginning of term of graduation***</td>
</tr>
<tr>
<td>Payment of graduation fee</td>
<td>Bursar's Office</td>
<td>At beginning of term of graduation***</td>
</tr>
<tr>
<td>Submission of dissertation to doctoral committee</td>
<td>Student</td>
<td>At least two weeks prior to Defense of Dissertation Examination</td>
</tr>
<tr>
<td>Scheduling of Defense of Dissertation Examination</td>
<td>Student, Committee and Office of Graduate Student Services</td>
<td>Not later than one week prior to Defense of Dissertation Examination***</td>
</tr>
<tr>
<td>Defense of Dissertation Examination</td>
<td>Doctoral Committee</td>
<td>Not later than four weeks prior to Commencement***</td>
</tr>
<tr>
<td>Approval and acceptance of final copy of dissertation and doctoral forms</td>
<td>Doctoral Committee and The Graduate School</td>
<td>After Defense of Dissertation Examination and not later than two weeks prior to Commencement***</td>
</tr>
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</tr>
</tbody>
</table>

*The order of these items varies with individual programs.

**Not required in some programs.

***Deadline dates are printed in the Graduate School News each semester, in addition to a separate publication of Deadline Dates for Graduation. Both are available on the Graduate School Web Page (http://web.utk.edu/~gsinfo).
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 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 Student Services.

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

RULES OF RESIDENCY CLASSIFICATION

Intent

It is the intent that the public institutions of higher education in the State of Tennessee shall apply uniform rules, as described in these regulations, to determine whether students shall be classified "in-state" or "out-of-state" for fees and tuition purposes and for admission purposes.

Definitions

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

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

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

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

(5) "Parent" shall mean a person's father or mother. If there is a non-parental guardian or legal custodian of an unemancipated person, then "parent" shall mean such guardian or legal custodian; provided, that there are not circumstances indicating that such guardianship or custodianship was created primarily for the purpose of conferring the status of an in-state student on such unemancipated 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 shall not have attended summer sessions or other such inter-sessions beyond the normal academic year in order that his or her enrollment be continuous. Enrollment shall be deemed continuous notwithstanding lapses in enrollment occasioned solely by the scheduling of the commencement and/or termination of the academic years, or appropriate portion thereof, of the public higher educational institutions in which such person enrolls.

Rules for Determination of Status

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

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

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

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

(1) An unemancipated, currently enrolled student shall be reclassified out-of-state should his or her parent, having 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 shall be continuous.

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

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

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

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

(6) A person who is domiciled in the Kentucky counties of Fulton, Hickman, or Graves shall be classified out-of-state but shall not be required to pay out-of-state tuition at The University of Tennessee at Martin if qualified for admission. This exemption is on condition that the student is an in-state resident seeking admission to the University of Tennessee in accordance with the University's admissions procedures.

(7) Any dependent child not domiciled in Tennessee but who qualifies and is selected to receive a scholarship under the Dependent Children Scholarship Act (T.C.A. 49-4-704) because his or her parent is a law enforcement officer, firefighter, or other emergency medical service technician who was killed or totally and permanently disabled while performing duties within the scope of employment, shall be classified out-of-state but shall not be required to pay out-of-state tuition.

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

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

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

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

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

Evidence to be Considered for Establishment of Domicile

If a person asserts that he or she has established domicile in this State he or she has the burden of proving that he or she has done so. Such a person is entitled to provide to the public higher educational institution by which he or she 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 quarter or semester during which reclassification is sought and obtained unless application for reclassification is made to the classification officer on or before the last day of regular registration of that quarter or semester.

University Fees

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

All tuition, maintenance and course-related charges and refunds will be made to the nearest even dollar. All charges are subject to subsequent audit and verification. The University reserves the right to correct any error by appropriate additional charges or refunds.

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

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

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

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

**APPLICATION FEE** ........................................... $35

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

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

**VOLXpress**

VOLXpress is the University of Tennessee's centralized accounting system that allows students to pay all of their fees and charges with one check by mail. Through VOLXpress, students are mailed statements that include their class schedule, drop/add activity, current tuition and fees, fee waiver information, fines and past-due amounts,pending financial aid that can be credited toward their accounts, any excess funds from scholarships and/or loans, and choices about how to receive them.

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

Each student must submit any change of billing address to the Enrollment Data Services Office to ensure timely receipt of a VOLXpress statement. Each Timetable of Classes lists the dates of registration and when and if statements will be mailed.

### IN-STATE FEES

<table>
<thead>
<tr>
<th>Fall 2000</th>
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<tbody>
<tr>
<td><strong>MAINTENANCE FEE</strong></td>
</tr>
<tr>
<td>Full Time (9 hours or more)</td>
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<tr>
<td>Per Semester</td>
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<tr>
<td>Part Time (8 hours or less)</td>
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### OUT-OF-STATE FEES

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<tr>
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<tbody>
<tr>
<td><strong>MAINTENANCE FEE AND TUITION</strong></td>
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<tr>
<td>Per Semester</td>
</tr>
<tr>
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</table>

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

### UNIVERSITY PROGRAMS AND SERVICES FEE

| Full Time (9 hours or more) | $150 |
| Per Semester | $10 |
| Per Summer Term | $7 |

### TECHNOLOGY FEE

| Full Time (9 hours or more) | $100 |
| Part Time (8 hours or less) | $12 |

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

Knoxville campus students taking a course load of 6-8 hours may elect to pay the full programs and services fee or may elect to pay the student health fee ($48 for fall and spring, $36 for summer) plus the appropriate part-time programs and services fee up to the maximum of $150.

Knoxville campus students taking 5-3 hours may elect to pay the student health fee ($48 for fall and spring, $36 for summer), plus the appropriate part-time programs and services fee.

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

All students enrolled in excess of eight semester hours per term are assessed a Programs and Services fee of $150. Part-time students taking fewer than nine semester hours will be assessed at the rate of $10 per semester hour or fraction thereof.

Graduate, teaching, and research assistants, teaching associates, and fellowship students, who may have a waiver of fees (tuition and/or maintenance), must pay the appropriate University Programs and Services Fee and late payment fee, if applicable.

Graduate, teaching, and research assistants, teaching associates, and fellowship students, who may have a waiver of fees (tuition and/or maintenance), must pay the appropriate Technology Fee.
FACILITIES FEE

The Facilities Fee is a mandatory fee assessed to all students enrolled in credit and audit courses. The fee is used to provide students with upgraded classroom facilities, expand information technology into the classroom, and fund campus infrastructure improvements. These revenues are targeted to assist in funding a backlog of campus and classroom projects that will enhance the University's facilities. The fee is $25 per semester for full-time, in-state students and $150 per semester for full-time, out-of-state students. The fee will be prorated for part-time students.

MUSIC FEE

One half-hour lesson per week per semester .............................................. $60
One hour lesson per week per semester ................................................... $120

Payable by students receiving individual instruction in music.

SPECIAL COURSE FEES

Academic areas, such as Art, Biology, Chemistry, Engineering, Bowling and Golf, charge fees per specific course sections. Refunds on these fees are determined by the department or on the same percentage as maintenance and tuition.

GRADUATION FEE

Master's degree candidates .................................................. $30
Doctoral degree candidates .................................................. $75
Doctoral hood rental (optional) ..................................................... $5

There are no additional charges for diploma, binding, or microfilming. The graduation fee is non-refundable and is valid for two semesters after the semester in which it is paid. The doctoral hood rental applies only to those students who have not purchased a doctoral hood and are participating in the graduation ceremony.

PROFICIENCY FEES

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

FEES FOR COURSES NOT TAKEN FOR CREDIT

Fees for courses audited are the same as for courses taken for credit. For fee purposes, courses listed for 0 credit hours are considered as one-hour courses.

DEFERRED PAYMENT PLAN SERVICE FEE ........................................... $20
(See Tuition Payment Plans)

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

Students are responsible for charges and fees which are to be paid by a third party. Non-Person Entity (NPE) accounts, which include government sponsored agencies and private organizations, are automatically assessed a $10.00 billing fee when an authorization is presented to the Bursar's Office. Late authorizations and payments are subject to late payment fees and University schedule cancellation policies and procedures.

PRIORITY REGISTRATION

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

FINAL REGISTRATION LATE FEE

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

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

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

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

REINSTATEMENT FEE .................................................. $45

VOLXpress accounts that have a balance due after mid-semester will be assessed a reinstatement fee of $45. Grades will be withheld until all past due amounts are paid.

RETURNED CHECK SERVICE FEE POLICY

All checks are deposited the day they are received. A $20 service charge will be assessed when checks fail to clear the bank on which they are drawn. Returned checks will not be redeposited. Cash or certified funds are required for payment of the returned check and service charges.

Any student who does not respond within 2 weeks from the date of the first notice may be assessed an additional $10 Service Charge.

Failure to clear returned checks will result in the forfeiture of all university services, including the receipt of grades, transcripts, and schedule of classes. Check cashing privileges may be suspended or terminated in accordance with University policy. Failure to pay may also result in additional late fees, collection costs and reasonable attorney fees.

RETURNED CHECK POLICY

Payments made by checks that are returned by the bank adhere to the following returned check guidelines:

1st returned check--Check writing/cashing privileges are suspended until the returned check and service charges are paid/cleared.

2nd returned check--If the 2nd returned check is not within 1 calendar year of the 1st returned check, check writing/cashing privileges are suspended for 6 months from the date of the second check. If the 2nd returned check is not within 1 calendar year of the first, check writing/cashing privileges are suspended until the returned check and service charges are paid/cleared.

3rd returned check--Check writing/check cashing privileges are suspended for 1 year from the date of the third check.

4th returned check--Check writing/check cashing privileges are permanently suspended.

TUITION PAYMENT PLANS

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

Deferred Payment Plan

Students in good financial standing will be offered a deferment of up to 50% of the total charges on their VOLXpress statement. The first payment is due on the published due date and the second payment is due approximately 45 days after the first. All financial aid must be applied toward fees before a deferment will be considered. A deferred payment service fee of $20 is assessed when any portion of tuition, fees, and other charges are deferred, including third party deferments, with the approval of the Bursar's Office. An additional $35 late payment charge will be assessed if the second installment is not paid on or before the due date. Failure to receive a statement does not relieve students of their obligation to pay on or before the due date. An additional $45 reinstatement fee will be assessed if fees are not paid by mid-semester.

Room Plan

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

REFUNDS

Refunds are defined as the portion of maintenance and/or tuition and University housing/meal charges due as a rebate when a student withdraws or drops for one or more class hours. Refunds are also processed as a rebate on some fines/penalties paid such as parking fines, library fines, etc. A refund is determined to be appropriate, all amounts will be applied toward other outstanding fees/fines owed to the University at the time the refund is issued, including outstanding fees due on the Deferred Payment Plan. Any remaining refund balance
Refund/Charge of Fees for Withdrawal

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

The effective date of withdrawal is the date the Office of Graduate Student Services 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 Graduate Student Services Office promptly when withdrawing could result in a larger fee assessment. Withdrawal does not cancel fees and charges already incurred. All charges and refunds will be made to the nearest even dollar.

The drop/add procedure cannot be used to withdraw from school for the semester.

For a regular academic semester, withdrawal within 5 business days beginning with the first official class start date of the semester permits a 90% refund/10% charge. Specific dates will be printed in the Time Table of Classes. The first class start date is the date on which all classes begin. Withdrawals between 6 and 10 business days beginning with the first class start date of the semester permits an 80% refund/20% charge. Withdrawal between 11 and 15 business days permits a 50% refund/50% charge. Withdrawal between 16 and 20 business days permits a 40% refund/60% charge. A 100% charge is assessed for courses dropped after 20 business days. Refunds, in accordance with the withdrawal refund policy, will be made after the drop deadline.

Fees and Financial Assistance

Refund/Charge of Fees for Dropped Courses (continue with a reduced course load)

Students pay fees computed at the appropriate semester-hour rate as indicated in the fee section. No charge is made for courses dropped during the first 8 business days following the day before the first official semester class begins. An 80% refund/20% charge is made for courses dropped between 9 and 10 business days following the day before the first class begins. A 60% refund/40% charge is assessed for courses dropped between 11 and 15 business days. A 40% refund/60% charge is made for courses dropped between 16 and 20 business days. A 100 percent charge is made for courses dropped after 20 days.

Students who drop courses and continue with a reduced load are eligible for a refund only if the sum of charges computed at the semester-hour rate for the hours continued, plus the percentage assessed for the hours dropped, results in an amount less than that paid. A course on a student's schedule is officially dropped, and the drop becomes effective, on the date that the charge of registration form is processed or the date the drop was entered on the Registration System. Any refund due for dropped courses will be made after the drop deadline.

SUMMER TERM FEES AND EXPENSES

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

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

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

WAIVER OF FEES

Graduate assistants, teaching assistants and associates, research assistants, staff, and others whose fees are billed, prepaid, waived, or partially waived confirm their attendance by making payment or signing a Confirmation of Attendance Form by the due date as published in the Time Table of Classes or the schedule will be cancelled. If an appointment terminates during the term, the student owes the appropriate fees from the termination date until the end of the term.

Graduate students are not eligible for UT spouse/dependent discounts.

STUDENT HEALTH INSURANCE

The University makes available, by contract with an insurance company, group health insurance expressly for students. The program is designed to supplement the care provided by the campus Student Health Service and provide basic benefits at low group premium rates. Primary emphasis is placed on hospitalization benefits, since inpatient 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 after admission at the appropriate University level or anytime during the year to all students. The VolCard is used in nearly all aspects of campus life to obtain services including meals, vending machines, computers, laundry machines, check cashing, sporting events, cultural attractions, residence halls access, library, recreational facilities and equipment, University Bookstore, and much more. Many students have established debit or charge accounts which are accessed through 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. Failure to notify the VolCard office will make the student liable for any unauthorized charges to the debit on charge accounts the student may have.

To obtain a new VolCard or replace a lost or stolen card, report to the VolCard Office, Room 472, S. Stadium Hall (between gates 12 & 13 at Neyland Stadium) on Stadium Drive. There is a minimum charge of $10.00 for replacement of a VolCard.

FEES FOR SPONSORED INTERNATIONAL STUDENTS

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

Financial Assistance

UT 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 Fellowships and the UT Graduate Student Fellowships. These awards are for full-time study at UT, and awardees are selected on the basis of high achievement, broad intellectual ability and potential for significant career contributions. Candidates from any field of study are invited to apply for the Hilton A. Smith and the Graduate Student awards if they have a 3.7 grade-point average or above in all previous academic work. Candidates for graduate study in the humanities are invited to apply for the Herman E. Spivey fellowships if they have a 3.7 grade-point average or above in all previous academic work. The Hilton A. Smith and the Herman E. Spivey fellowships include monthly stipends, tuition, and maintenance fees. The Graduate Student Fellowships include a monthly stipend. Application packets are available from November through January in the Office of Graduate Student Services and on The Graduate School website. Completed applications, including all supporting materials, must be submitted by February 14. Offers of awards are announced on or after March 14.

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 to enroll on an in-state tuition basis if these programs are not available in the state of residence.

Cooperating states in the Academic Common Market are Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia. Fifteen doctoral and twenty-four master’s programs at UT are approved by the Academic Common Market for residents of these states to enroll at in-state tuition rates.

Students must be admitted into the appropriate degree program and the letter of certification must be received in the Office of Graduate Student Services no later than the first day of classes for the effective semester.

Residents of member states who seek further information should contact the Sr. Admissions Specialist in the Office of Graduate Student Services, 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, e-mail ann.creech@sreb.org or info@sreb.org visit the SREB website at http://www.sreb.org.

EMPLOYMENT

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

GRADUATE STUDENT TRAVEL FUND

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

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

- Summer Term: April 20
- Fall Semester: September 4
- Spring Semester: November 10

LOANS

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

Students must be admitted into a degree program and be enrolled for a minimum of 6 credit hours each semester to receive student loans.

Four types of loan programs are administered by the Financial Aid Office: 1) Federal Perkins Loan (Student Aid Report, SAR, must be on file); 2) subsidized Federal Stafford Loan (SAR must be on file); 3) unsubsidized Federal Stafford Loan (SAR must be on file); and 4) The University of Tennessee Loan.

Processing time varies from one loan program to another.

Students who have attended any post-secondary institution other than UT may have to provide a Financial Aid Transcript to the Financial Aid Office even if no financial aid was received from the previous institution if entrance is at mid-year.

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

VETERANS BENEFITS

Veterans, reservists and widows or children of certain deceased or disabled veterans, who have been admitted to a degree program, may apply for benefits by contacting the Veterans Affairs Office in Room 209, Student Services Building. Maximum benefits are paid by the Department of Veterans Affairs for course loads of 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 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 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 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 ratings 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, does not discriminate on the basis of sex or disability in its educational programs and activities, pursuant to requirements of Title VI of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Public Law 92-315, Section 504 of the Rehabilitation Act of 1973, Public Law 93-112, and the Americans with Disabilities Act of 1990, Public Law 101-336. This policy extends both to employment by and admission to the University.

Inquiries concerning Title VI, Title IX, Section 504, and the ADA should be directed to the Office of Diversity Resources and Educational Services (DRES); 2110 Terrace Avenue; The University of Tennessee, Knoxville, TN 37996-3850; or telephone (865) 974-2496 (V/TTY). Charges of violation of the above policies should also be directed to DRES.

Security Information

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

Drug-Free Campus and Workplace

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

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

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

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

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

Employees and their families needing treatment information should call their local Personnel Office, Employee Assistance Program, or the State of Tennessee Employee Assistance Program (800-468-8585). Students needing treatment information should contact their campus Student Affairs Office, student health center or counseling center.

ALCOHOL ABUSE HEALTH RISKS

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

DRUG USE HEALTH RISKS

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

Policy for the Administration of Graduate Assistantships

PREAMBLE

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

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

- Tennessee Conference of Graduate Schools

**DEFINITION**

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

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

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

**TYPES OF ASSISTANTSHIPS**

It is imperative that each department adhere to the UT Faculty Handbook's four categories of assistantships. All departmental guidelines should reflect the descriptions provided in the Handbook (1998, p. 35):

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

2. **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.

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

4. **Graduate Teaching Associate**
   - Graduate Teaching Associates work under the direct supervision of regular faculty members and may be assigned only to duties related directly to instruction. These include such activities as assisting in the preparation of lectures, leading discussion sections, conducting laboratory exercises, grading papers and keeping class records. Assistants may also, on a contract basis, perform primary teaching and/or evaluation responsibilities nor should they be given duties to support faculty research or those basically clerical in nature.
   - In consultation with the supervisor, the Teaching Assistant works to gain teaching skills and an increased understanding of the discipline.

prior approval of the Graduate School. The 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 5-11 semester hours of coursework. A one-fourth time graduate assistant in each of the four categories of assistantships normally should take 9-13 semester hours. Exceptions to the above must have prior approval of the Head of the student's academic home unit. A student on a one-half time assistantship who takes at least six semester hours will be considered full-time.

The student's academic home unit is responsible for implementing these policies, regardless of the assignment or responsible account. It is therefore essential that the home unit be notified by any other unit employing the student of any assistantship awarded at the time of its initiation or renewal. The academic home of a graduate student who has not declared a major is the Graduate School.

**QUALIFICATIONS OF GRADUATE ASSISTANTS**

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

**SACS Requirement**

Regulations specifically addressing the 18-hour requirement are excerpted from Section 4.8.4 of the SACS publication, Criteria for Accreditation, (Atlanta, 1996, p. 50) and read as follows:

- Graduate teaching associates who have primary responsibility for teaching a course for credit and/or for assigning final grades for such a course, and whose professional and scholarly preparation does not satisfy the provisions of Section 4.8.2 (which relate to exceptions) must have earned at least 18 graduate semester hours in their teaching discipline, be under the direct supervision of a faculty member experienced in the teaching discipline, receive regular in-service training, and be evaluated regularly.

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

**Implementation of the SACS 18-hour Requirement at UT**

The appropriate Department Head has responsibility for certifying that the 18-hour requirement is met either through coursework or by documentation that the graduate assistant meets the requirement as an exception (e.g., experience in the performing arts). The Dean and Department Head must sign the appropriate form (APR Form 1-88) that is attached to the PAF form.
COMPETENCY IN ENGLISH

The University of Tennessee requires all graduate assistants to be competent in spoken English. The specific policy, as it relates to graduate assistants, is as follows: Since a certain level of competency with English as a spoken language is necessary for effective communication and teaching, all graduate assistants are required to demonstrate an appropriate level of comprehensibility for classroom teaching by taking the SPEAK Test administered by The Graduate School. The Test of Spoken English (TSE) may be taken in lieu of the SPEAK Test. The results of this test will be forwarded by The Graduate School to the appropriate department to be used in determining the nature and extent of instructional or other duties assigned to the Graduate Teaching Assistant or Graduate Teaching Associate. Suggested modes of remediation will be given to the department and graduate assistant as deemed appropriate.

New international students who have been offered an appointment as Graduate Teaching Assistant or Graduate Teaching Associate will take the SPEAK test after their arrival at UT, 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 graduate assistants who teach. 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 105-Pr2, 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 scholarly 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 committee in the home unit or college, and the Dean of the College/
ORIENTATION/TRAINING OF GRADUATE
TEACHING ASSISTANTS AND GRADUATE
TEACHING ASSOCIATES

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

There are several kinds of training that should occur beyond the initial orientation/training. Such training is usually specific to a particular job function. The Graduate School provides a graduate assistant, graduate teaching assistants, and graduate teaching associates who will be teaching at the University of Tennessee. Presented in several formats, this seminar includes attention to styles of learning and other student characteristics, communicating in the classroom, leading discussions, direct laboratory work, using media and computers, designing syllabi, constructing and using tests, grading, evaluating courses and instructors, and similar topics. Special programs are offered for international GTAs. Supervisors of GTAs are responsible for informing them about departmental and college policies on attendance at these programs.

The Graduate School also offers the GTA Mentoring Program, "Developing Future Faculty as Teacher-Scholars," which is a year-long program of workshops, team meetings, and other activities to support the professional development of UT GTAs.

ORIENTATION/TRAINING OF GRADUATE
ASSISTANTS AND GRADUATE RESEARCH
ASSISTANTS

Graduate Assistants and Graduate Research Assistants must also participate in a thorough, systematic orientation and training program. This training is usually at the department or college level, but the Office of Research at the University level is available to assist 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." Grants who work in laboratories may receive initial orientation, followed by work experiences which constitute training. In such instances, the "on-the-job" training period should be clearly known by the student assistant.

ACCEPTING/DECLINING AN
ASSISTANTSHIP

The University of Tennessee adheres to the following resolution by the Council of Graduate Schools:

Acceptance of an offer of financial aid (such as graduate scholarship, fellowship, traineeship, or assistantship) for the next academic year by an actual or prospective graduate student completes an agreement which both student and graduate school expect to honor. In those instances in which the student accepts the offer before April 15, and subsequently desires to withdraw, the student may submit in writing a resignation of the appointment at any time through April 15. However, an acceptance given or left in force after April 15 commits the student not to accept another offer without first obtaining written release from the institution to which a commitment has been made. Similarly, an offer by an institution after April 15 is conditional on presentation by the student of the written release from any previously accepted offer. It is further agreed by the institutions and organizations subscribing to the above resolution that a copy of this resolution should accompany every scholarship, fellowship, traineeship, and assistantship offer.

Student Services

Black Cultural Center

The Center is an integral part of The University of Tennessee. The Center provides academic, cultural and social outlets through programming and services as an ongoing part of the University's retention efforts. The Tutorial and Early Alert Programs, along with the Resource Library and Computer Lab, serve as an extension to services provided across campus. The Center houses several student organizations that plan activities ranging from Brown Bag Lecture Series, Black History Month activities, the Welcome Week Splash Party, carnivals and renowned speakers such as Maya Angelou, Tavis Smiley, Cornel West and Alice Walker.

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

Career Services

Career Services, located in Dunford Hall, 974-5435, is a university-wide department providing career-related assistance to UT students through a wide range of programs and services. Included in the services offered are two annual career fairs providing opportunity to speak informally with representatives from over 100 different companies about their entry level jobs and hiring practices; a nonprofit career fair involving representatives from numerous area nonprofit organizations; employer information which includes types of majors sought, job descriptions, career profiles, annual reports and other pertinent information for hundreds of companies that recruit at UT; a website containing valuable links to dozens of career-related web resources; a part-time employment service for students seeking such positions; and workshops providing instruction in skills and tactics for successful interviewing, resume preparation, business and dining etiquette, and other topics.

On-campus jobs are scheduled during the year, and require registration via a web-based resume system. Hundreds of interviews are scheduled each year which include approximately 500 companies, government agencies and school systems.

Interviews are scheduled by registrants on the web. Many job listings are also available from the department's website. 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. A web-based resume book is made available to employers.

Career Services registrants have access to video conference interviewing, resume access via the World Wide Web, and other state-of-the-art forms of placement assistance. Visit the website at http://career.utk.edu.

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, both for American students and faculty and for students and faculty from other countries. The administration of official linkage agreements between UT 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 students, including the exchange programs it administers between UT 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. CIE also administers the UT portion of the University of Bonn's Transatlantic Summer Academy for graduate students and upper-division undergraduates. 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 requirements for international students, and to UT academic policies and registration procedures. It publishes The Link, a newsletter for UT's international students and scholars, and administers the insurance policy required of all international students at the University. International student advisors are available to discuss academic and personal concerns. 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 International House, 1623 Melrose Avenue, is CIE's on-campus social, recrea-
Dining Services

UT Dining Services recognizes that campus dining is a large part of the college experience. Students have the choice of the following meal plan options depending on the type of dining desired. Meal plans are available to all students living on or off campus.

UNLIMITED ACCESS PLUS PLAN*

Unlimited Access means just that! Students may enter Presidential Court Cafe, Sophie's Place, and Morrill dining facilities as many times as they like and eat as much as they want, full meals or snacks. Students also receive $300 bonus bucks per semester.

THE ANY TEN PLAN*

Students choose up to 10 meals weekly that may be eaten at Presidential Court Cafe, Sophie's Place, and Morrill dining facilities. Students also receive $500 bonus bucks per semester.

UNLIMITED ACCESS PLAN*

This plan allows students to eat as much as they want as often as they like at Presidential Court Cafe, Sophie's Place, and Morrill dining facilities. Students also receive $100 bonus bucks per semester.

THE ANY TEN PLAN*

Students choose up to 10 meals weekly to be eaten at Presidential Court Cafe, Sophie's Place, and Morrill dining facilities. Students also receive $300 bonus bucks per semester.

THE VARSITY INN FIFTEEN PLAN+

Fifteen meals per week are provided to be eaten exclusively at Varsity Inn Dining. These 15 meals include breakfast, lunch, and dinner, Monday through Friday. Bonus bucks are not included with the Varsity Inn Fifteen Plan.

*+Rates subject to final University approval.
+Local sales tax is added to the price of off-campus meal plans.
+Meal plan contract covers the entire academic year (i.e. fall and spring semesters). Meal plan is not valid between semesters and during Spring Break.
+Meal week begins on Monday at breakfast and ends on Sunday after lunch.
+Bonus bucks may be used whenever students choose any Dining Services' facility on campus, including convenience stores. Unused bonus bucks are forfeited at the end of the semester.
+Meal equivalency is another feature of the meal plan that may be used at select retail dining facilities. Certain restrictions apply at these locations.
+Any Ten Plus and Any Ten meal plan participants can elect to eat all meals exclusively at Varsity Inn Dining. Please contact Dining Services at (865) 974-4111 for more information.
+Students living in North Carrick, South Carrick, Humes, Reese, Gibbs and Morrill Halls are required to select a meal plan.
+The AllStar Account and The Diner's Club may also be used in Dining Services' facilities. Please call the VoCard office at (865) 974-3430 for more information on these accounts.
+To initiate or amend a meal plan, call UT Dining Services at (865) 974-4111.

Disability Services

Disability Services (DS) seeks to eliminate the barriers that students and employees with disabilities encounter and to work with them to achieve and maintain autonomy. The primary objective of the services offered is to provide these individuals with access to the academic, social, cultural, and recreational opportunities offered within the University.

Prospective students with disabilities are encouraged to contact the Office of Disability Services in advance of their arrival so that they can be assured that the campus facilities and services are adequate to meet their needs. Contact with the students prior to registration enables DS staff to better assess the need for interpreters, readers, accessible facilities and other support services. Van service is also provided to those individuals with mobility limitations, whether permanent or temporary. Recent documentation of a disability from an attending physician or psychologist is required.

Students with learning disabilities, deaf and hard of hearing students, and blind and visually impaired students are encouraged to contact the Office of Disability Services one month prior to the semester in which they plan to attend to ensure appropriate services in a timely manner. The office is located at 191 Hoskins Library. VITDD (865) 974-8087.

Early Education Programs

The Child Development Laboratories, operated by the Child and Family Studies department within the College of Human Ecology, currently offer early education 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. For application and enrollment information, call (865) 974-0843.

The UT Child Care Referral Center, (865) 974-8911, offers free assistance in finding state-licensed child care in a 15-country area surrounding Knoxville.

Graduate Student Association

The Graduate Student Association represents the student body in all matters relating to graduate and professional students. The GSA participates in the establishment of policies and regulations relating to graduate programs. The GSA also makes recommendations to the appropriate decision-making officials in matters concerning graduate and professional students. In addition, the GSA receives funding through the Student Activities Fee and coordinates the delivery of travel monies for graduate students attending conferences.

The voting membership of the Graduate Student Association consists of the President and Vice President of the GSA and representatives from every department offering a graduate degree program. The President and Vice President are elected in the spring in the annual SGA elections. The representatives are elected by the students in their program either in the spring or fall.

GSA is the official voice of graduate students at UT and is the organization that the administration turns to when the graduate student body's opinion is desired.

For more information on the GSA, call (865) 974-237, email: gsa@utk.edu, or check the website at http://web.utk.edu/~gsa.

Hearing and Speech Services

The Hearing and Speech Center, located at the corner of Peyton Manning Pass and Phil Fulmer Way, 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. A fee for special testing may be charged.

The Center serves as a clinical observation and education facility for students majoring in Speech-Language Pathology or Audiology. It also serves as a community hearing and speech center providing diagnostic and treatment services for persons of all ages exhibiting communication disorders/differences.

Housing

UNIVERSITY APARTMENTS

The University has provided excellent apartment facilities in several locations for married students with or without families. Apartments not needed to house married students are made available to single graduate and professional students. Information and application for these facilities may be secured from the Department of University Housing, 405 Student Services Building.
RESIDENCE HALLS

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

A limited number of Assistant Hall Director positions are available for single graduate students. This position assists the Hall Director in coordinating and supervising all aspects of the hall operation. This is a live-in position with part-time responsibilities for a nine- and-a-half month period. For additional information, contact the Department of University Housing at 974-2671.

OFF-CAMPUS HOUSING

A list of off-campus housing available to students is provided by the Department of University Housing, 405 Student Services Building. This list may be found at the University Housing website at http://web.utk.edu/-reshalls. The University does not inspect or approve these facilities. The terms and conditions for the rental of off-campus housing are between the student and the landlord. Students living in off-campus housing are expected to observe the same rules of conduct and standards applicable to all 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 (SCSC) provides services designed to help students with educational, vocational, personal, and social problems. Professional counselors work with students in a setting that allows for confidential discussion of concerns. Services include: crisis intervention, group therapy, individual therapy, academic counseling, consultation with faculty/staff/students, and various workshops and presentations.

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

The Center is located at 900 Volunteer Blvd. and can be reached at 974-2196 or see our web page at http://web.utk.edu/~counsel/.

Student Health Service

Health services provided by the University are available to any student who has paid the health fee (either through paying the full University Programs and Services Fee or, if taking fewer than 9 hours but at least 3 hours, paying the optional health fee). These outpatient services are available continually throughout every term.

The Health Services has a regular staff of primary care physicians, nurses, laboratory and x-ray technicians of Tennessee licensure. Outpatient services in the fields of family practice, internal medicine, pediatrics, sports medicine and psychiatry are available on a full-time basis while 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.

Students traveling abroad may receive information, health alerts, and immunizations through the Travel Clinic (974-6467).

Most medical services at the campus clinic are provided to eligible students at no additional cost.

The primary clinic at 1818 Andy Holt Avenue maintains scheduled daytime hours Monday through Friday. While urgent-care needs may be handled on a walk-in basis, appointments should be made in most instances (appointment line: 974-3648). After-hours care (nights, weekends, and holidays) is available through the emergency room at The University of Tennessee Memorial 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 and the Escort Van Service.

The State of Tennessee requires that all students born after January 1, 1957 must provide proof of immunization with two doses of Measles, Mumps and Rubella vaccine for attendance at all universities and colleges. This documentation must be provided to the Student Health Service. In addition, the University of Tennessee Student Health Service recommends that entering college students assure immunity to Tetanus/Diphtheria, Polio, Hepatitis B, and Chicken Pox. The American College Health Association recommended that students, particularly freshmen living on campus, consider receiving meningitis immunizations.

Students requiring hospitalization are generally admitted by an appropriate specialist to The University of Tennessee Memorial Hospital unless other arrangements are desired. Since inpatient care is sometimes necessary, it is important for the student to have hospitalization insurance. Student group health insurance is available and may be purchased 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 on the opposite side of Tyrone Moore. Also, bus service is provided to the Student Union Apartments 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 parking permits may park in unreserved staff areas from 5 p.m. to 3 a.m. After this time, vehicles without permits for these areas may be towed.
2. Parking is not permitted in the Student Commuter Parking Areas nor in the Student Aquatic Center Parking Area between 3 a.m. and 6 a.m. except by special permit.
3. 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 the Parking Services Offices located in Room 24 of the University Center and at 2121 Stephenson Drive. Information is also available from Campus Information Center at Circle Park.

**Women's Center**

The Women's Center provides essential informational and referral services to UT students and faculty. The library's specialized collection provides books, journals, and brochures about issues and concerns of women from both a current and historical perspective. Information is available on a variety of topics including racism, violence against women, spirituality, and sex roles. The Women's Coordinating Council is the programming branch of the Center responsible for educational, social, and cultural events pertaining to women's issues. The Women's Center is located in 301 University Center. If you need more information or are interested in volunteering, please call 974-1029.
COLLEGES
Colleges

College of Agricultural Sciences and Natural Resources
C. A. Speer, Dean
Mary Lewnes Albrecht, Associate Dean
Thomas H. Klindt, Associate Dean
C. Roland Mote, Assistant Dean

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

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 but is (with the Agricultural Experiment Station, the Agricultural Extension Service and the College of Veterinary Medicine) one of the four units of The University of Tennessee's Institute of Agriculture.

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

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

The graduate student is expected to demonstrate a thorough knowledge of the subject matter in his/her specialized field of study and its relationship to the sociological, economic, and environmental impact on society. The student must demonstrate the ability to plan, conduct, analyze, and report original research. Emphasis is given to intellectual growth and the development of scholarly habits of study, reasoning and analysis so that the graduate will continue to grow and develop professionally throughout his/her career.

MASTER OF SCIENCE PROGRAMS

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

Both majors and minors are available in Agricultural Economics, Agricultural and Extension Education, Animal Science, Biosystems Engineering, Biosystems Engineering Technology, Entomology and Plant Pathology, Food Science and Technology, 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, Biosystems Engineering, Food Science and Technology, and Plant and Soil Science is offered in the college.

College of Architecture and Design
Marleen Davis, Dean
Max A. Robinson, Director
Jon P. Coddington, Graduate Program Head, Architecture

Schools
- Architecture

The College of Architecture and Design is committed to preparing students to work with the design or management of our built environment.

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 UT 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 offices of the dean and other college staff are located at 217B Art and Architecture Building.
College of Arts and Sciences

Lorayne Lester, Dean
Stuart Rigby, Associate Dean
Susan Martin, Interim Associate Dean

Departments
- Anthropology
- Art
- Audiology and Speech Pathology
- Biochemistry and Cellular and Molecular Biology
- Botany
- Chemistry
- Classics
- Computer Science
- Ecology and Evolutionary Biology
- English
- Geography
- Geological Sciences
- History
- Life Sciences
- Mathematics
- Microbiology
- Modern Foreign Languages and Literatures
- Music
- Philosophy
- Physics and Astronomy
- Political Science
- Psychology
- Religious Studies
- Sociology
- Theatre
- Urban and Regional Planning

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

The University of Tennessee began as a liberal arts institution. Before the turn of the century, less emphasis was placed on the liberal education. However, the liberal arts continued to thrive, emerging as a college in 1904. Thus, the College of Liberal Arts (now known as the College of Arts and Sciences) is one of the oldest established colleges in the University.

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

The College of Arts and Sciences offers programs in twenty-seven academic disciplines leading to eight advanced degrees: M.A., M.S., M.F.A., M.Math., M.Music, M.P.A., M.S.P., and Ph.D. See the Majors and Degree Programs chart for specific majors and degrees.

GENERAL INFORMATION

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

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

Independent Study
Certain educational goals may best be met through independent study by an individual under the direction of a faculty member. Students who wish to do such independent work should obtain the approval of the faculty members and the departments concerned prior to embarking upon their study. Credit per semester will vary from 1-15 hours. The maximum credit 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

Jan R. Williams, Acting Dean
David W. Schumann, Associate Dean for Research and Technology
Sarah F. Schumann, Associate Dean for Off-Campus Study

Facilities for Research and Service
- Center for Business and Economic Research
- Center for Executive Education
- Center for Research and Service

The College of Business Administration was originally the School of Commerce, dating back to 1919. Commerce was changed to Business in 1937 and gained college status in 1947. The college-wide MBA program was approved in 1965 and the doctoral program in 1976. 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.

The College of Business Administration has made a commitment to total quality management by integrating the principles of productivity through quality and statistical process control throughout the graduate curriculum. Interdisciplinary partnerships are encouraged among academic units in the College, with other University academic units and with the private sector, enhancing the process of inquiry and critical thinking which is crucial to total quality management.

The College of Business Administration is fully accredited by the American Assembly of Collegiates Schools of Business and is associated with other leading graduate...
societies to 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, Industrial and Organizational Psychology, and Management Science; the Master of Arts with a major in Economics; the Master of Science with majors in Management Science and Statistics; the Master of Accountancy; and the Master of Business Administration.

The two College-wide programs, the MBA and the Ph.D. in Business Administration, are described in Business Administration, Fields of Instruction. Descriptions of other degree programs are under the appropriate departmental or program headings.

FINANCIAL ASSISTANCE

A limited number of teaching and other assistantships that require from 10 to 20 hours of service per week are available through the departments of the College. Remuneration includes remission of fees and tuition as well as a monthly stipend. Awards are generally made on the basis of scholarship and performance on the appropriate (GMAT or GRE) admission test. Application forms may be obtained in any of the departments. Information on College-administered fellowships is available from the appropriate department or office.

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

College of Communications

Dwight L. Teeter, Jr., Dean
C. Edward Caudill, Associate Dean for Graduate Studies
Eric Haley, Associate Dean for Undergraduate Studies

Departments and Schools
Advertising
Broadcasting
Journalism and Public Relations
Speech Communication

Facility for Research and Service
Communications Research Center (CRC)

The College of Communications grew out of the School of Journalism, which was originally located in the College of Business Administration. The Department of Speech Communication became part of the College of Communications in 1997. 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 and interpersonal communications are vital forces in today's complex society. Specialization, gaps among segments of society, and the nature of world conflict point to the need for more understanding of how people communicate. Educating men and women in the perceptive understanding of the communications field 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, 425 Communications Building, The University of Tennessee, Knoxville, TN 37996-0347.

College of Education

C. Glennon Rowell, Dean
Thomas W. George, Associate Dean for Academic Programs and Administration
Lynn C. Cagle, Associate Dean for Professional Licensure Programs, Instructional Support and Faculty Development

Departments
Counseling, Deafness and Human Services
Educational Administration and Cultural Studies
Educational Psychology
Exercise Science and Sport Management
Instructional Technology, Curriculum and Evaluation

Theory and Practice in Teacher Education

Facilities for Research and Service
Bureau of Evaluation, Research, and Service
Center for Literacy Studies
Center for Physical Activity and Health

Center on Deafness
Curriculum Lab
Exercise Physiology Lab/Biomechanics Lab
Institute for Assessment and Evaluation
Institute for Educational Innovation
Instructional Services Center
Reading Center
Tennessee Internship Consortium in Professional Psychology

Education programs were first offered at the graduate level in 1965 by the School of Education. Through the Summer School of the South, the programs thrived, and the School became a College in 1926. The Ed.D. program was established in 1950, and the college-wide Ph.D. program began in 1979.

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

The College of Education is fully accredited by the Southern Association of Colleges and Schools. All teacher education and school-related licensure and degree programs are fully accredited by the National Council for Accreditation of Teacher Education (NCATE) and the Tennessee State Department of Education. Specific program accreditations are found under the respective Fields of Instruction.

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 internship.

Degree program requirements are described under Education, Fields of Instruction.

SPECIALIST IN EDUCATION PROGRAM

The College of Education offers a program leading to the Specialist in Education with a major in Education.

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 and the Doctor of Philosophy, both with a major in Education.

Degree program requirements are described under Education, Fields of Instruction.

TEACHER LICENSURE

Applicants for initial teacher license must gain admission to the college's Teacher Education Program. Further details concerning the teacher licensure program are
described under Education, Fields of Instruction, and are available through the College of Education Advising Center (Claxton Complex 332).

College of Engineering

Jerry E. Stoneking, Dean
Fred Gilliam, Associate Dean, Academic Affairs
Fred D. Tompkins, Associate Dean, Administration

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

Facilities for Research and Service
Measurement and Control Engineering Center
Center of Excellence for Materials Processing
Maintenance and Reliability Center

The College of Engineering provides opportunities for professional engineers.

Graduate programs of the College of Engineering provide opportunities for advanced study leading to the Master of Science and the Doctor of Philosophy degrees. For a listing, consult majors and degrees available on the Majors and Degree Programs chart.

GRADUATE PROGRAM AT THE UT SPACE INSTITUTE

At the University of Tennessee Space Institute near Tullahoma, graduate-level courses are offered in engineering fields such as aerospace, chemical engineering, electrical engineering, engineering science, industrial engineering including engineering management, materials science and engineering, mechanical engineering, and mathematics and physics. All programs lead to the Master of Science degree. Also, Ph.D. programs are available in many of these fields. Information may be obtained from the Registrar, The University of Tennessee Space Institute, Tullahoma, TN 37388.

College of Human Ecology

James D. Moran III, Dean
Billie J. Collier, Associate Dean for Research and Graduate Studies
Delores Smith, Assistant Dean for Outreach and Undergraduate Studies

Departments
Child and Family Studies
Consumer and Industry Services
Management
Health and Safety Sciences
Human Resource Development
Nutrition

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

Human Ecology brings together the natural and social sciences to enhance the well-being of individuals, families and communities 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 managerial positions in government, business, and industry.

The Master of Science degree is offered with majors in Child and Family Studies, Health Promotion and Health Education, Human Resource Development, Nutrition (including public health nutrition), Recreation, Tourism and Hospitality Management, Safety Education and Service, and Textiles, Retailing and Consumer Sciences; the Master of Public Health degree is offered with a major in Public Health; and the Doctor of Philosophy degree is offered with a major in Human Ecology and concentrations in child and family studies, community health, human resource development, nutrition science, retail and consumer sciences, and textile science. For additional information, contact the Associate Dean, College of Human Ecology, The University of Tennessee, Knoxville, TN 37906-1900, (865) 974-5224.

FACILITIES FOR RESEARCH AND SERVICE

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

The College of Human Ecology participates with the College of Engineering in the Center of Excellence for Materials Processing. These research efforts in Textile Science are also supported by the Textiles and Nonwovens Development Center (TANDEC).

The Child Development Laboratory (CDL) serves as a research and training facility for students in the College.

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

The Nutrition Institute provides a communication link for all efforts in nutrition sciences, coordinates collaborative research efforts and provides a forum for interchange with the larger nutrition community.

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

College of Law

Thomas C. Galligan, Jr., Dean
John L. Sobieski, Jr., Associate Dean
Rachel E. Inman, Assistant 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
The general purpose of the M.S.N. program is to prepare nurses at the graduate level to function as advanced practitioners, teachers, or managers in a variety of health care or educational settings. The program is accredited by the National League for Nursing Accrediting Commission that may be contacted at 61 Broadway, New York, NY 10006, Tel: 1-800-669-9656, and is unconditionally approved by the Tennessee Board of Nursing. Students admitted to the program select a concentration in adult health nursing, family nurse practitioner, mental health nursing, nurse anesthesia, nursing administration, and nursing of women and children.

THE DOCTORAL PROGRAM

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

College of Social Work

Karen Sowers, Dean
William J. Bell, Associate Dean, Nashville
David R. Dupper, Associate Dean, Knoxville
Hugh Vaughn, Associate Dean, Memphis
Paul M. Campbell, Director, Office of Social Work Research and Public Service
Charles Glisson, Director, Children's Mental Health Services Research Center

The College of Social Work began as the Nashville School of Social Work, founded in 1942 under the auspices of Vanderbilt University, Scarritt College, and George Peabody College. It joined the University of Tennessee in 1951. By 1974 the three branches, located in Nashville, Memphis and Knoxville, offered the two-year master's program. The doctoral program was inaugurated in 1983. In 1985 the B.S.S.W. program was added, and the School achieved collegiate 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. The College also offers a post-master's certificate program in management and community practice.
Fields of Instruction

Accounting and Business Law

(College of Business Administration)

MAJORS

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

DEGREES

Keith G. Stanga, Head

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

Associate Professors:
Behn, Bruce K., CPA, Ph.D. ..... Arizona State
Carcello, Joseph V., CPA, Ph.D. Georgia State
Murphy, Daniel, CPA, Ph.D. ..... North Carolina
Poyre, Imogene A. (Emeritus), CPA, Ph.D. (Tennessee)
Townsend, Richard L., CPA, Ph.D. ..... Texas
Woodroof, Jonathan B., CPA, Ph.D. (Texas Tech)

Assistant Professors:
Rose, Anna S., CPA, Ph.D. ..... Texas A&M
Rose, Jacob M., Ph.D. ..... Texas A&M

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.

The M.Acc. degree program is a full-time, weekday program. The nature of the program precludes students from simultaneously working full-time outside of classes. UT's accounting undergraduate and graduate programs are accredited by the American Assembly of Collegiate Schools of Business and are among the initial programs in the nation to receive this accreditation.

Admission Requirements

Application deadlines for international applicants are accepted for fall semester only, and the application deadline is March 1. Applications received after March 1 will be considered as space allows. The program is designed both for students who have completed an accredited baccalaureate degree program with a major in Accounting and others. Those with outstanding undergraduate records in areas other than accounting may earn the M.Acc. degree by completing prerequisites in accounting and related disciplines to supplement the applicant's undergraduate background.

The student's education experience should 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.

For admission to the M.Acc. program, consideration is given to (1) applicant's academic records with particular attention to the last two years of undergraduate work, (2) scores on the GMAT, and TOEFL for those whose native language is not English, (3) internships and/or work experience and other activities that demonstrate potential for leadership, and (4) recommendations from professors and/or work supervisors. The admission decision is based on all factors that make up the total application; therefore, there is no automatic cut-off for either grade-point averages or GMAT scores.

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.

Applications received after March 1 will be considered as space allows. The program is designed both for students who have completed an accredited baccalaureate degree program with a major in Accounting and others. Those with outstanding undergraduate records in areas other than accounting may earn the M.Acc. degree by completing prerequisites in accounting 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 principles of accounting and introductory economics.

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

*As approved by the Director of the Master of Accountancy Program.
Transfer Credits
A maximum of six semester hours taken at other AACSB accredited institutions that otherwise conform to the transfer policy of The Graduate 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 program. The student must satisfactorily demonstrate his/her ability to recognize, analyze, and solve accounting policy problems and integrate concepts from the various areas of accounting by passing a comprehensive written examination. This examination is included in the capstone courses in each concentration as follows: 519 Seminar in Business Risk and Assurance Methodology and 539 Multi-Jurisdictional Tax Planning and Policy.

BUSINESS ADMINISTRATION

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

This degree provides a research-oriented terminal qualification for those seeking entry-level faculty positions in accounting. Students take approximately three years of coursework beyond the bachelor's degree, including a doctoral sequence designed to expose students to various areas of accounting research. Courses in accounting and other areas are selected to supplement the student's individual background and to prepare the student in an area of accounting specialization (financial, managerial, auditing, tax or systems). The final year is normally spent completing the doctoral dissertation.

Minimum course requirements are 12 hours including 611, 612, 619, and one other accounting course to be approved by Ph.D. accounting program advisor.

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

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

Accounting

GRADUATE COURSES
415 Governmental and Nonprofit Accounting (3) Advanced study of governmental and nonprofit entities. Governmental accounting principles, revenues and expenditures, budgeting, and governmental and nonprofit accounting principles and reporting models of nonprofit organizations. Prereg: Financial Reporting by Business and Nonprofit Organizations or consent of instructor.
451 Operational Auditing and Consulting (3) Approaches to evaluate an entity's efficiency and effectiveness in various settings and techniques used in consulting to provide entity competitive advantage.
502 Registration for Use of Facilities (3-15) Required for students 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
506-07 Professional Accounting Practice I, II (3,3) Various advanced accounting and auditing topics to meet complex and changing needs of profession. Prereg: Admission to M.Acc. program.
514 Risk Management in Networked Business Environments (3) Security, integrity, and cost management-oriented risks and controls for variety of different business system platforms and applications: centralized mainframe environments, distributed client/server environments, intranets, extranets, electronic commerce, and ERP systems. Prereg: Admission to M.Acc. program or information management concentration, or consent of instructor. (Same as Information Management 511.)
518 Professional Standards (3) Basic standards and contemporary issues relevant to assurance providers. Actual practice cases to illustrate application. Prereg: Admission to graduate programs or consent of instructor.
519 Seminar in Business Risk and Assurance Methodology (3) Business risk and emerging methodology used by assurance providers. Prereg: Admission to graduate programs or consent of instructor.
521 Seminar in Advanced Managerial Cost Accounting (3) Analysis of conceptual and current issues; impact on development and practice of managerial and cost accounting. Approaches to management accounting, decision and control models, and planning and control under conditions of uncertainty. Prereg: Cost and Managerial Accounting and admission to a graduate business program or consent of instructor.
532 Corporate Taxation and Reorganizations (3) Organization and structure, distribution, income, mergers, acquisitions, recapitrizations, and special problems in taxation of corporations and shareholders. Prereg: Admission to M.Acc. program or consent of instructor. Prereg 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 contribution of partnerships and S Corporations. Prereg: Admission to M.Acc. program or consent of instructor. Prereg or coreq: 531.
534 Family Tax Planning (3) Review and analysis of laws pertaining to inter vivos and postmortem property transfers, charitable transactions, and other family planning techniques and strategies used to accomplish family planning objectives. Prereg or coreq: 531.
535 Multi-Jurisdictional Tax Planning and Policy (3) Analysis of international, state and local tax law as it pertains to business transactions. Identification of tax planning opportunities and design of strategies to accomplish tax planning objectives. Policy issues related to multi-jurisdictional taxation. Prereg or coreq: 531.
541 Database Systems (3) Design, implementation, and use of database systems for effective decision making and distribution of organizational information about organization. Prereg: Accounting Information Systems and admission to a graduate program or consent of instructor.
542 Electronic Commerce (3) Essential technological, strategic, and information security issues for conducting business-to-business and business-to-consumer electronic commerce. Effects of internet on business and society. Prereg: 541 or Business Administration 506, or consent of instructor. (Same as Information Management 512.)
549 Systems Issues and Policies (3) Seminar in emerging topics in management systems and knowledge-based systems. Prereg: 541 and admission to a graduate program or consent of instructor. Prereg or coreq: 542.
592 Graduate Internship in Accounting (3) Full-time professional employment for one academic semester involving qualified job experience, written report of responsibilities, and evaluation of student performance. Prereg: Admission to M.Acc. program or consent of M.Acc. advisor. May be repeated. Maximum 6 hrs.
600 Doctoral Research and Dissertation (3-15) P/ NP only. E
619 Doctoral Research in Accounting (3) Study of research methodology and application of various research methods in accounting literature. Prereg: Consent of Ph.D. program advisor.
621-22 Accounting Colloquium (1,1) Research and discussion of contemporary issues in practice of accounting. Prereg: Consent of Ph.D. program advisor. May be repeated. S/NC only.
693 Independent Study (3) Directed research in topic of mutual interest. Prereg: Admission to doctoral program with concentration in accounting. May be repeated. Maximum 6 hrs.

Business Law

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

Advertising

(Extension of Communications)

MAJOR
Communications .................................. M.S., Ph.D.
(Extension of Communications)
Ronald E. Taylor, Head
Professors:
Hovland, Roxanne, Ph.D. ....................... Illinois
Taylor, Ronald E., Ph.D. ....................... Illinois
Aerospace Engineering  
See Mechanical and Aerospace Engineering  

Agricultural and Biosystems Engineering  
(College of Agricultural Sciences and Natural Resources)  

MAJORS DEGREES  
Biosystems Engineering ..................... M.S., Ph.D.  
Biosystems Engineering Technology ........ M.S.  

Ronald E. Yoder, Head  

Professors:  
Bledsoe, B. L. (Emeritus), PE, Ph.D. ............... Oklahoma State  
Henry, Z. A. (Emeritus), Ph.D. ............... NC State  
Luttrell, D. H. (Emeritus), Ph.D. ............... Iowa State  
McDow, J. J. (Emeritus), Ph.D. ............... Michigan State  
Mote, C. R., Ph.D. ....................... Ohio State  
Sewell, J. I. (Emeritus), Ph.D. ............... NC State  

Associate Professors:  
Shellon, 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. ....................... Tennessee  
Yoder, R. E. (Liaison), PE, Ph.D. ............... Colorado State  

Graduate programs leading to the Master of Science and Doctor of Philosophy with a major in Biosystems Engineering are available to graduates of a recognized curriculum in engineering, mathematics, or one of the physical or biological sciences. A graduate program leading to the Master of Science in Biosystems Engineering Technology is available to graduates of a recognized curriculum in agriculture or other related fields. These programs emphasize the application of engineering and engineering technology to agricultural and other biological systems. Major focus areas of the program are machinery systems; environmental quality and resource conservation; instrumentation, sensor, and control systems; and bioprocessing. Prerequisite courses may be required depending upon the applicant’s academic background and interest area within the program.  

A completed departmental data sheet and three completed Graduate School Rating Forms are required in addition to the Graduate School application. International students must submit scores from the GRE general examination. Each applicant will be advised about any prerequisite courses before entering a program. The student’s program of study must be approved by his/her advisory committee and must comply with the requirements of The Graduate School.  

A significant aspect of graduate education beyond formal courses and thesis projects is active participation in the professional community which exists within academic departments at universities. Student/faculty seminars are one of the professionally rewarding activities of the community. Accordingly, all graduate students are encouraged to participate in Biosystems Engineering 505 and other departmental seminars regardless of whether they are registered for seminar credit.  

THE MASTER’S PROGRAMS  
Biosystems Engineering  

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. Other specific requirements for the 30 hours are:  

Biosystems Engineering 504 (1) or 507 (1), 505 (1), and other major subject courses  
Coursework in computational methods (mathematics, computer science, statistics, or any course containing appropriate computational components that may be approved by the department)  
Program electives  
Thesis 500  

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.  

Biosystems Engineering Technology  
Thesis Option: 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:  

Biosystems Engineering Technology 504 (1) or 507 (1), 505 (1), and other major subject courses  
Coursework in computational methods (mathematics, computer science, statistics, or any course containing appropriate computational components that may be approved by the department)  
Program electives  
Thesis 500  

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 Biosystems Engineering Technology is available to qualified students. 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:  

Biosystems Engineering Technology 504 (1) or 507 (1), 505 (1), and other major subject courses  
Coursework in computational methods (mathematics, computer science, statistics, or any course containing appropriate computational components that may be approved by the department)  
Program electives  
Capstone Experience (project and report, typically 508)  

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.

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

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

In addition to completing the minimum 75 hours of graduate credit required for a degree, each doctoral student must also pass a comprehensive examination as required by The Graduate School.

Biosystems Engineering

GRADUATE COURSES

403 Machine and Component Design (3) Nature of design; functional analysis; creativity; geometric and kinematic requirements; plane mechanisms, force, stress, deflection; finite element analysis; time analyses applied to design project components and assemblies. Prereq: Power Units and Machinery or consent of instructor. 1 hr and 2 labs. F

423 Irrigation and Waste Management System Design (3) Design of irrigation and agricultural waste management systems with consideration given to livestock waste characteristics, climate, water quantity, system characteristics, and impact on crop yield and water quality. Prereq: 315 Soil and Water Conservation, Engineering Science 341 Fluid Mechanics I, and Civil and Environmental Engineering 390 Hydraulics. 1 hr and 2 labs. F

430 Mobile Hydraulic Power System Design (3) Functional and operational characteristics of mobile hydraulic system components: pumps, valves and actuators; analysis and synthesis of power transmission and control circuits. Prereq: Fluid Mechanics or Hydraulics. 2 hrs and 1 lab. F

433 Bioprocess System Design and Analysis (3) Design of processing, storage and handling systems for biological materials. Mass and energy balances, production and quality, characterization, equipment specifications, economic analysis, safety, and human factors. Design content: 3 hrs. Prereq/coreq: Processing Food and Biological Materials I and II. 1 hr and 2 labs. F

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

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

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

504 Professional Development Seminar I (3) Planning and executing research program; ethics and professionalism; departmental procedures and resources. (Same as Biosystems Engineering Technology 504.) S/NC only. F

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

507 Professional Development Seminar II (Same as Agriculture and Natural Resources 507, Animal Science 507, Biosystems Engineering Technology 507, Food Science and Technology 507, Ornamental Horticulture and Landscape Design 507, and Plant and Soil Sciences 507.) S/NC only. F

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

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

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

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

543 Instrumentation and Measurement (3) Modern instrumentation techniques and dynamic response of instrumentation; signal conditioning; temperature, moisture, optical radiation, displacement, strain, pressure, velocity, acoustics, and flow measurements; digital data acquisition and control. Prereq: 451 or Electronics and Computer Circuits or equivalent. 2 hrs and 1 lab. (Same as Environmental Engineering 453.) F/A

545 Monitoring Hydrologic Phenomena (3) Application of instrumentation theory to monitoring hydrologic phenomena; strengths and weaknesses of current equipment and strategies; equipment operation and solution of environmental monitoring problems. Prereq: 543 and knowledge of basic hydrology. 2 hrs and 1 lab. (Same as Environmental Engineering 454.) Sp/A

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

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

555 GIS and GPS Applications to Biosystems (3) Theory and applications of Geographical Information Systems (GIS) and Global Positioning Systems (GPS); acquiring, managing, and analyzing spatially-registered data. Site-specific agriculture, environmental site assessment, natural resource management, and hydrology. Prereq: Graduate standing in engineering, biological or physical sciences. (Same as Biosystems Engineering Technology 555.) 2 hrs and 1 lab. F

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

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

620 Computer Simulation of Agricultural Systems (3) Scientific approach to digital simulation; system definitions and boundaries, formulation of models, algorithms and solution techniques, encoding of prediction equations models, algorithms and solution techniques, encoding of prediction equations and model output; verification and calibration of simulation model results. Prereq: Knowledge of computer programming language. 2 hrs and 1 lab. F/A

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

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

Biosystems Engineering Technology

GRADUATE COURSES

442 Food and Process Engineering Technology (3) Application of basic engineering principles to agricultural and food processes. Fluid handling, drying, evaporation, thermal processing, heating and cooling, refrigeration systems, and radiation handling. Prereq: Basic physics. 2 hrs and 1 lab. F

432 Agricultural Machinery and Tractors (3) Functions, selection, matching, and management of agricultural machinery systems. Tractor power ratings, engine and transmission system design, hitching, and ballasting. Field and material capacity, field efficiency, cost analysis, and machinery replacement strategies. Functional analysis of tillage operations, planters and drills, no-tillage systems, hay harvest systems, forage and small grain harvesting, and cotton harvesting. Crop drying processes, off-road machinery safety considerations, and operator ergonomics. Prereq: Mathematics 123 Basic Calculus or 125 Finite Mathematics or consent of instructor. 2 hrs and 1 lab. Sp

442 Agricultural Waste Management and Pollution Control (3) Waste minimization; feed, and gaseous agricultural chemicals; system components; operational characteristics; calibration; selection; management; safety considerations; material handling and disposal methods. Prereq: Basic calculus or finite mathematics or equivalent or consent of instructor. 2 hrs and 1 lab. Sp

462 Agricultural Chemical Application Technology (3) Equipment for application of liquid, solid, and gaseous agricultural chemicals; system components; operational characteristics; calibration; selection; management; safety considerations; material handling and disposal methods. Prereq: Basic calculus or finite mathematics or equivalent or consent of instructor. 2 hrs and 1 lab. Sp

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

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

504 Professional Development Seminar I (Same as Biosystems Engineering 504.) S/NC only. E

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

506 Physical Phenomena (3) Properties of materials, fundamentals of hydraulics, principles of electricity, thermal phenomena, applications in biological sys-
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.

THE DEGREE

Agricultural and Extension Education
(College of Agricultural Sciences and Natural Resources)

MAJOR

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

Professors:
Lessly, Roy R. (Chair) 
Ed.D. ............................... Oklahoma State
Waters, Randol G. Ph.D. ........................ Penn State

Assistant Professor:
Delnero, Jennifer A., Ph.D. ....................... Oklahoma 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, legislative movement, farmer organizations and programs, Cooperative Extension Service, origin, legislation and growth and nature of objectives and programs, Prereq: 211 Foundations of Agricultural and Extension Education or consent of instructor. Sp

521 Extension Program Planning and Evaluation (3) The extension educational programs of program development and evaluation and their use in extension education; planning and conducting needs assessments; planning, organizing, implementing and evaluating extension educational programs content and learning activities; development and interaction of county, state and federal extension plans of work; and principles, techniques and instruments used to identify, gather and analyze information to evaluate extension programs. Prereq: 211 Foundations of Agricultural and Extension Education, 511, or consent of instructor. Sp

522 Educational Technology in Agricultural and Extension Education (3) Advanced concepts and methods relevant to both formal and non-formal instructional methodologies. Processes by which professionals influence, adopt, and diffuse of technological change. Prereq: 435, 436 Student Teaching in Agricultural and Extension Education or consent of instructor. F

524 Research Methodology (3) Behavioral science research methods related to agricultural and extension education issues. Research design, reliability and validity in measurement, sampling procedures, analysis of variance, correlation, multiple regression, and selection and interpretation of appropriate inferential tests of significance. Prereq: 436 Student Teaching in Agricultural and Extension Education, 511 or consent of instructor. S

525 Curriculum Development in Agricultural and Extension Education (3) Models, principles and procedures for developing curricula in agricultural and extension educational programs and scheduling learning activities used to implement these planned programs. Prereq: 435, 436 Student Teaching in Agricultural and Extension Education, or consent of instructor. Sp

526 Agricultural Education for First-Year Teachers (2) Developing competencies needed by first-year teachers for planning, organizing, and conducting program of vocational agriculture in local community. Group meetings in selected centers and visits by instructor. Prereq: 435, 436. Sp

527 Adult Education Strategies in Agricultural and Extension Education (3) Methods of developing and implementing educational programs for adults in agricultural and extension education and related contexts: different learning of adults and children (andragogy vs. pedagogy); understanding and determining adult needs, priorities and motivation for participating in educational programs; adoption of new ideas by adult learners; methods and materials effective in teaching adults; developing favorable attitudes toward post-secondary education and life-long learning; Prereq: 211 Foundations of Agricultural and Extension Education, 511 or 346 Instructional Strategies for Teaching Agricultural Education or consent of instructor. Sp

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

532 Managing Organizations, Programs and Personnel (3) Theory and principles of management for individual and organizational effectiveness of agricultural organizations. Prereq: 511, 521, or consent of instructor. Sp

533 Agricultural Leadership Development (3) Identification of styles, and roles of leadership; development of leadership techniques and skills required in working with organizations and youth groups. Methods of resolving conflict, of communicating, of guiding and evaluating; ethical considerations for leaders. Prereq: 436 Student Teaching in Agricultural and Extension Education, 521 or consent of instructor. Sp

540 Communications Techniques in Agriculture (3) Elements of effective use of mass media in agricultural and extension education. Effective technical writing, persuasiveness and excellence in communication. Prereq: 436 Student Teaching in Agricultural and Extension Education, 521 or consent of instructor. Sp

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

501 Creative Component in Lieu of Thesis (3) Prerequisite: 500 Thesis (1-15). 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 student is in difficulty before degree is completed. May not be used toward degree requirements. May be repeated. S/N only. E

511 Extension History, Philosophy and Objectives (3) Historical and philosophical foundation of adult education in Agriculture, key figures, issues,
Agricultural Economics

(Major of Agricultural Sciences and Natural Resources)

MAJOR DEGREES

Agricultural Economics ................................................................. M.S.

D. L. Mclemore, Head

Professors:

Badenhop, M. B. (Emeritus), Ph.D. Purdue
Brooker, J. R. (Liaison), Ph.D. Florida
Cleland, C. L. (Emeritus), Ph.D. Wisconsin
Cross, T. L., Ph.D. Oregon State
Eastwood, D. B., Ph.D. Tufts
English, B. C. Ph.D. Iowa State
Garland, C. D., Ph.D. Tennessee
Gerloff, D. G., Ph.D. Texas & M & Jensen, K. L. Ph.D. Oklahoma State
Keller, L. H. (Emeritus), Ph.D. Kentucky
Kenkel, P. L. Ph.D. Kentucky
Kildow, 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
Or, R. H., Ph.D. Illinois
Park, W. M., Ph.D. Virginia Tech
Pentecost, B. H. (Emeritus), J. D. Tennessee
Rawls, E. L., Ph.D. Virginia Tech
Ray, D. E. (Blassingame Chair of Excellence), Ph.D. Iowa State
Riley, J. B., Ph.D. Oklahoma State
Roberts, R. K., Ph.D. Iowa State
Smith, G. F., Ph.D. Tennessee
Whitley, T. J. (Emeritus), Ph.D. Purdue
Williamson, H., Ph.D. Missouri

Associate Professors:

Barefield, D. A., Ph.D. Texas A&M
Lerson, J. A., Ph.D. Oklahoma State

Assistant Professors:

De La Torre Uguarte, D. G., Ph.D. Oklahoma State
Tiller, K. H., Ph.D. Tennessee

The Department of Agricultural Economics and Rural Sociology offers a program of graduate study leading to the M.S. degree. The M.S. program may be completed under a thesis option with concentrations in agricultural economics or rural sociology. For specific information, contact the department head.

THE MASTER'S PROGRAM

A candidate for the master's degree must complete a minimum of 30 hours of graduate credit in courses approved by the student's master's committee. At least 27 hours of graduate credit must be earned in courses numbered at or above the 500 level.

Agricultural Economics

The thesis option in agricultural economics is designed to prepare students for analytical and research careers in the public and private sectors, and to prepare students interested in entering a Ph.D. program. In the thesis option, 15 hours of agricultural economics, 6 hours of economic theory, 6 hours of quantitative methods, and 6 hours of thesis are required. Each student must pass a final oral examination.

In the non-thesis option, 24 hours in agricultural economics, 6 hours of economic theory, and 6 hours of quantitative methods are required. Each student must pass both written and oral comprehensive examinations.

Agribusiness

The agribusiness concentration is designed to prepare students to succeed in the public or private sectors of agriculture, including product manufacturing and marketing, natural resource management, farm management, and financial analysis. Fifteen hours of agricultural economics, 3 hours of economic theory, 6 hours of quantitative methods, 6 hours of business, statistics, or communications electives, and 6 hours of internship are required. Each student must pass both written and oral comprehensive examinations.

Rural Sociology

The rural sociology concentration is designed to prepare students for careers in the social sciences related to rural areas. Nine hours of rural sociology in the department, 6 hours of sociological theory, 3 hours of research methods, 3 hours of statistics, and 6 hours of thesis are required. Each student must pass a final oral examination.

MINOR IN ENVIRONMENTAL POLICY

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

Agricultural Economics

GRADUATE COURSES

412 Agricultural Finance (3) Macro-finance, financial objectives, acquisition of debt and equity funds, capital investments, capital allocation, credit analysis, borrower and lender loan application analysis, insurance strategies, computer applications, kind and sources of agricultural credit, and financial intermediation. Prereq: Introductory Economics.

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

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

442 Agribusiness Management (3) Applications of advanced decision analysis concepts and tools to analyze management decision problems in farm and nonfarm agriculture settings. Case study work on strategic planning; assessing cost structure using budgeting and break-even analysis; evaluating profitability, liquidity, and solvency using financial statements; analyzing investments using capital budgeting. Prereq: Farm Business Management or consent of instructor.

450 Agricultural Industry Analysis and Forecasting (3) Application of statistical tools and techniques in analyzing agricultural sector; analysis of commodity supply and demand conditions; economic modeling; market forecasting, analysis of temporal and spatial patterns. Prereq: Agricultural Microeconomics and Introduction to Statistics or consent of instructor.

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

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

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: Principles of Microeconomics or consent of instructor.

510 Macroeconomic Analysis (3) Application of statistical methods to agricultural economic models; estimation of supply, demand and production functions; microeconomic forecasting models; interpretation of results. Prereq: Regression and Correlation Methods or consent of instructor.

525 Agribusiness Operations Research Methods (3) Applications of operations research methods and concepts for agribusiness. Theoretical background and applied considerations of each technique with emphasis on applications. Prereq: Optimization and Correlation Methods.

530 Agricultural Policy Analysis (3) Evaluation of public policy as related to agricultural industry and rural areas. Prereq: 505 and Economics 510 or consent of instructor.

542 Advanced Agribusiness Production Decisions (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: 505 or equivalent.

550 Advanced Agribusiness Marketing (3) Use of economic concepts in agribusiness marketing decisions. Analysis of agricultural markets; buyer behavior in food and fiber markets; competitive environment. Profitability analysis of marketing and distribution decisions; market planning and strategy; product evaluation and new product development. Prereq: 505, Regression and Correlation Methods or equivalent.
580 Advanced Rural Sociology (3) Application of sociological concepts and theory to analyze changing structure and function of rural life in U.S. and developing countries. Demographic changes, rural social and community indicators, and rural development processes. Prereq: 380 or equivalent. (Same as Sociology 580.) Sp

593 Special Topics in Rural Sociology (1-3) Current sociological issues involving application of sociological theory. Prereq: 380 or consent of instructor. May be repeated. Maximum 6 hrs. E

Agriculture and Natural Resources (College of Agricultural Sciences and Natural Resources)

GRADUATE COURSES

507 Professional Development Seminar (1) Planning and executing graduate research programs; ethics and professionalism; graduate program procedures and resources. (Same as Animal Science 507, Biosystems Engineering 507, Biosystems Engineering Technology 507, Food Science and Technology 507, Ornamental Horticulture and Landscape Design 507, and Plant and Soil Sciences 507.) S/N/C only. F

509 Thesis Proposal Preparation (1) Guidelines for presenting thesis proposals in written and oral formats, introduction to slide presentation and graphics software. Oriented toward new graduate students. (Same as Animal Science 509, Food Science and Technology 509, Ornamental Horticulture and Landscape Design 509, and Plant and Soil Sciences 509.) S/N/C only. F

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
Blether, J. K. (Emeritus), Ph.D. ..... Ohio State
Chamberlain, C. C. (Emeritus), Ph.D. ..... Iowa State
Coker, G. E. (Emeritus), Ph.D. ..... Kentucky
Erickson, B. H. (Emeritus), Ph.D. ..... Kansas State
Fowler, H. C. (Emeritus), Ph.D. ..... Michigan State
Goedkirk, J. D. (Emeritus), Ph.D. ..... Massachusetts
Hall, G. O. (Emeritus), Ph.D. ..... Iowa State
Kattess, H. G. (Emeritus), Ph.D. ..... VPI
Kirkpatrick, F. D., Ph.D. ..... Tennessee
Lane, C. D., Ph.D. ..... Tennessee
Lidvall, E. R. (Emeritus), M.S. ..... Tennessee
McKenzie, F. B., Ph.D. ..... Kansas State
McDonald, T. P. (Emeritus), Ph.D. ..... Tennessee
McLaren, J. B. (Emeritus), Ph.D. ..... Auburn
Meadows, D. G., Ph.D. ..... Texas A&M
Miller, J. K. (Emeritus), Ph.D. ..... Georgia
Montgomery, M. J. (Emeritus), Ph.D. ..... Kansas State

Associate Professors:
Backus, W. R., Ph.D. ..... Tennessee
Grizzle, J. M., Ph.D. ..... Florida
Harper, F., Ph.D. ..... Rutgers
Heitmann, R. N., Ph.D. ..... Maine
Mathew, A. G. (Liaison), Ph.D. ..... Purdue
Schrick, F. N., Ph.D. ..... Clemson
Smith, M. O., Ph.D. ..... Oklahoma State
Wallr, J. C., Ph.D. ..... Nebraska

Assistant Professors:
Edwards, J. J., Ph.D. ..... Florida
Pighetti, C., Ph.D. ..... Penn State
Richards, C. J., Ph.D. ..... Kentucky
Salisbury, M. W., Ph.D. ..... New Mexico State

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. 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.

It is recommended that all first-year graduate students enroll in 507 and 599. All first- and second-year students are required to enroll in 548 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 required if the student has insufficient undergraduate background. If the student has an unsatisfactory grade-point average, acceptance may be on a probationary (non-degree) basis and a minimum of 9 hours of graduate coursework must be completed the first term with a minimum grade-point average of 3.0 for admission to the M.S. program.

The program requires an essay or project of study 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 500 level; and 6 hours of thesis. Included in the course requirements 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 Inter-collegiate 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 semester 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. At least 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 areas of nutrition, breeding, physiology, and anatomy concentration must complete at least 12 hours at the 500 and 600 level in the respective concentration or closely related area. Students in the management concentration must complete 12 hours at the 500 and 600 level in two non-management concentrations.
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 400-, 500-, or 600-level statistics courses approved for the ICGSP.

A minimum of five faculty members will constitute the student's advisory committee, of which at least one must be outside Animal Science. The major professor will be the chairperson. The student and the major professor select a program of study depending on the student's area of concentration and professional goal. The advisory committee approves the coursework and the dissertation research proposal and deter-
mines 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 ovum, spermatozoe and embryos; application of methods of artificial insemination and embryo transfer; herd sire and dam evaluation; pregnancy determination, 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, companion animals. Mathematical and computer solutions and applications to formulating complex rations with constraints. Prereq: 330 or equivalent and introductory computer science. 1 lab. Sp

481 Beef Cattle Production and Management (3) Integration of principles of nutrition, breeding, physiology, and marketing into complete production and management programs. Structure of industry, enterprise establishment, systems of production, production practices, and improvement programs. Management evaluated in terms of production response and economic returns. Comparisons made to small ruminant, forage-based production systems. Prereq: Completion of Animal Science sophomore and junior core courses or consent of instructor. 2 hrs and 1 lab. Sp

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

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

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

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


503 Animal Nutrition and Metabolism (4) Comparative digestive physiology, digestion, absorption, and metabolism of nutrients in ruminant and nonruminant species. Concepts and methodologies of animal growth and nutrient requirements, availabilities and efficiencies, nutrients and deficiencies of nutrients. Prereq: Animal Nutrition, Feeds, and Ration Formulation or consent of instructor. F

505 Ruminology (2) Anatomy, physiology, and microbiology of rumin ecosystem: microbial fermentation and metabolism of polysaccharides, lipids and nitrogen. Prereq: 503 or consent of instructor. Sp

511 Special Problems in Animal Science (1-4) Not to be used toward degree requirements. May be repeated. Maximum 6 hrs. E

520 Animal Physiology (4) Major body systems and interrelationships: nervous, muscle, blood, cardiovascular, kidney, respiratory, gastrointestinal, and endocrine. Concepts of metabolism, temperature regulation, and acid-base balance. Prereq: General, physiology, and graduate anatomy and physiology, and biochemistry, or consent of instructor. F

523 Advanced Mammalian Reproduction (3) Current topics and "new frontiers" in reproductive biology. Prereq: 322. Sp

530 Animal Nutrition and Metabolism (4) Comparative digestive physiology, digestion, absorption, and metabolism of nutrients in ruminant and nonruminant species. Concepts and methodologies of animal growth and nutrient requirements, availabilities and efficiencies, and deficiencies of nutrients. Prereq: Animal Nutrition, Feeds, and Ration Formulation or consent of instructor. F

551 Mammalian Organology (3) Microscopic study of structure of organs systems. Prereq: Embryology, histology and/or consent of instructor. 2 hrs and 1 lab. (Same as Comparative and Experimental Medicine--Veterinary Medicine 551.) Sp

552 Anatomy of Domestic Carnivores (4) Gross dissection by systems and regions of dog with comparison to cat. Prereq: Consent of instructor. 1 hr and 3 labs. (Same as Comparative and Experimental Medicine--Veterinary Medicine 552.) F

571 Design and Analysis of Biological Research (3) Experimental design and procedures; selection of experimental units; analysis and interpretation of data; statistical models; contrasts, one-way and two-way analyses of variance; covariates, treatment arrangements, mean separation and regression. Prereq: Plant and Soil Science 471 or equivalent; knowledge of software package on micro- or mainframe computer. (Same as Plant and Soil Science 571.) Sp

572 Least Squares Analysis (3) Least squares estimates and hypothesis testing procedures for linear models; mixed model methodology; full rank and nonfull rank situations; covariance structures; estimation of variance components. Prereq: 571 or equivalent. 2 hrs and 1 lab. F

580 Seminar (1) Advanced topics in animal science. Prereq: Required of all first- and second-year graduate students. Letter grade available only to those who make presentation. May be repeated. Maximum 4 hrs. S/NC or letter grade. F, Sp

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

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

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

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

651 Advanced Topics in Animal Anatomy (1-4) Current and future research methodology; laboratory situation, recent advances in qualitative techniques for gross and microscopic anatomy. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. (Same as Comparative and Experimental Medicine--Veterinary Medicine 651.) E

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

Animal Science--Veterinary Medicine

See College of Veterinary Medicine and Comparative and Experimental Medicine.

**Anthropology**

(Majors of Arts and Sciences)

**MAJOR**

**DEGREES**

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

Andrew Kramer, Head

Professors:

Bass, William M. (Emeritus), Ph.D. ......... Pennsylvania

Faulkner, Charles H., Ph.D. ............ Indiana

Harrison, Fay E., Ph.D. ............ Stanford

Howell, Benita M., Ph.D. ............ Kentucky

Jantz, Richard L., Ph.D. ............ Kansas

Klipfel, Walter G., Ph.D. ............ Missouri

Kongsberg, Lyle P., Ph.D. ............ Northwestern

Logan, Michael H., Ph.D. ............ Penn State

Parramore, Paul W. (Emeritus), Ph.D. ............ Texas A&M

Schoedel, Gerald F., Ph.D. ............ Washington State

Simek, Jan F., Ph.D. ............ SUNY Binghamton

Wheeler, Margaret C. (Emerita), Ph.D. ............ Yale

Assistant Professors:

Ferreira, Mariana, Ph.D. ............ California

Qirko, Hector N., Ph.D. ............ Tennessee

Research Associate Professor:

Chapman, J., Ph.D. ............ North Carolina

Research Assistant Professors:

Elam, J. Michael, Ph.D. ............ Missouri

Frankenberg, S. (Curator), Ph.D. ............ Northwestern

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

**THE MASTER’S PROGRAM**

Students wishing to enter the Master of Arts degree program with a major in Anthropology should have an undergraduate GPA of 3.5 in the major, 3.3 overall, and hold a bachelor's degree from an accredited university with a major in Anthropology. Applicants with a major in a related field (biology, sociology, geology, classics or geography) will be considered only if they have a formal minor in anthropology or its equivalent (at least five upper division anthropology courses).
All prospective M.A. students must make formal application to The University of Tennessee Graduate School. Copies of the application form, transcripts, and GRE scores that are sent to The Graduate School should also be sent directly to the Department of Anthropology, with the same time. In addition, the department will receive a letter of intent from the applicant indicating career goals and reasons for selecting the University of Tennessee, three letters of recommendation, and one sample of the prospective student's written work (a class paper or research report); these requests should be sent directly to the Graduate Secretary, Department of Anthropology, SSH 250, University of Tennessee, Knoxville, TN 37996-0720.

Graduate applications are considered once a year by the Graduate Committee. All application materials must be received in the department by January 15 for admission the following Fall. Because of the structure of first-year studies, 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 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 during regularly-scheduled final periods in each core class and are graded by 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 score.

4. All M.A. students must attend the graduate section of the visiting lecturer program. To insure compliance with this requirement, each student is required to register for one credit hour of Anthropology 550 in the fall semester of each year and fulfill all requirements for the course as defined by the instructor. Materials covered by visiting lecturers may appear on the GEE.

5. A graduate-level introductory statistics course, usually Statistics 537.

6. In the second year of the program, students pursue their concentration area and undertake thesis research. Coursework will be determined through consultation with the student's advisor and committee (composed of the advisor and at least one other member of the Anthropology faculty along with other mutually-agreed-upon members).

7. Successful completion of the thesis and final oral examination, normally, students will complete and defend their theses during the Spring semester of their second year.

8. 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 all members of the student's M.A. committee.

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

THE DOCTORAL PROGRAM

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

Admission: Admission to the Ph.D. program is contingent upon completion of ALL requirements prior to that level. Master's thesis candidates at UT who are conditionally accepted into the Ph.D. program can enroll as doctoral students the semester following conferment of the M.A. degree. Students holding Master's degrees from other institutions must apply by January 15 for admission the following Fall and must begin their studies in the Fall semester.

Admission to the Ph.D. program is based upon the applicant's academic record and credentials, but also on fit between an individual's interest and faculty areas of research. Applicants must complete a language examination administered by the appropriate language department. A student selecting this alternative should consult with the advisor or office of the department.

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

Doctoral Comprehensive Examination: Students must successfully complete a written and oral comprehensive exam.

1. Comprehensive Written Examination: When the Ph.D. aspirant has completed all of the foregoing requirements and is judged by the committee to be prepared in the field(s) of concentration, the student will be required to take a comprehensive written examination. The exam will consist of three sections and be given by the committee. All three sections must be taken within seven consecutive days.

2. Comprehensive Oral Examination: This examination follows shortly after successful completion of the comprehensive written exam. The major professor acts as chairperson of the committee.

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

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

**Defense of Dissertation Examination:** When the dissertation has been tentatively accepted by the committee, a final oral examination will be held. The committee conducts the exam, which is ordinarily held as a colloquium. The candidate will expound on the nature and significance of his/her contribution to anthropological knowledge as set forth in 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 on an in-state tuition basis. The M.A. program in Anthropology is available to residents of the states of Delaware, Georgia, Louisiana, Virginia, or West Virginia. The Ph.D. program is available to residents of Alabama, Delaware, Louisiana, Mississippi, South Carolina, or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Student Services.

**GRADUATE COURSES**

410 Principles of Cultural Anthropology (3) Exploration and illustration of major concepts, theories, and methods in cultural anthropology, with application to various aspects of ethnographies. Prereq: 130 Cultural Anthropology.

411 Linguistic Anthropology (3) Basic linguistic concepts applied to research in cultural anthropology; investigation of relationships between language and culture. Prereq: 130 Cultural Anthropology or Linguistics 210. (Same as Linguistics 411.)

412 Folkslore in Anthropology (3) Introduction to anthropological study of folklore, using folklore and folklife materials from various tribal, peasant, and complex societies. Prereq: 130 Cultural Anthropology 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 living cultural settings through use of archaeological, ethnographic, and historical case studies. Prereq: 130 Cultural Anthropology or consent of instructor.

414 Political Anthropology (3) Organization and dynamics of power and politics in both stateless and present-day cultures and their environments: ecology, political systems, and social groups. Prereq: 130 Cultural Anthropology or consent of instructor.

416 Applied Anthropology (3) Introduction to principles of applied anthropology. Prereq: 130 Cultural Anthropology or consent of instructor.

417 Field and Laboratory Research in Anthropology (3) Lecture and laboratory course in research methods, including descriptive techniques and data analysis. Prereq: 130 Cultural Anthropology or consent of instructor.

418 Ethnographic Research (3) Advanced research design and methodology for finding and analyzing data in cultural anthropology; emphasis on methodology and research design. Prereq: 130 Cultural Anthropology or consent of instructor.

420 Special Topics in Cultural Anthropology (3) Seminar for advanced students on topics of special interest. Prereq: 130 Cultural Anthropology or consent of instructor.

421 Rarefied Anthropology (3) Special topics in anthropology. Prereq: 130 Cultural Anthropology or consent of instructor.

430 Historical Archaeology Laboratory (3) Laboratory procedures for processing, identifying, and interpreting of artifacts from historical sites. Prereq: 130 Cultural Anthropology or consent of instructor.

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 review of selected case studies. Prereq: 120, 130, 410, or consent of instructor.

462 Early European Prehistory (3) Origins and evolution of human culture in Europe from the Stone Age. Prereq: 120 or consent of instructor.

463 Rise of Complex Civilizations (3) Development of complex societies in Old World from origins of agricultural economy to rise of States. 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. Prereq: 120 or consent of instructor.

465 Urban Archaeology (3) Field archaeology and interpretation of archaeological remains on historic urban sites in the U.S. Prereq: 120 or consent of instructor.

480 Human Osteology (4) Intensive examination of human skeletal remains. Prereq: 120 and consent of instructor.

481 Paleontological Resource Management (3) Fed- eral legislation and regulations affecting identification, protection, and management of archaeological resources. Prereq: 120 or consent of instructor.

482 Museology I: Museums, Purpose and Function (3) Survey of museum work and history of exhibition theory, methods, and findingstocom- pare and contrast. Prereq: 120 or consent of instructor.

484 Museology II: Field Projects (1-12) Prereq: Consent of instructor. May be repeated.

500 Thesis (1-15) Prereq: Consent of instructor. May be repeated.

510 Graduate Research (1-99) Independent investiga- tion of special problems in anthropology. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

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

513 Field and Laboratory Research in Anthropology (3) Applied anthropology. Prereq: 130 Cultural Anthropology or consent of instructor.

514 Anthropology of Development (3) Application of anthropological theory, methods, and applications to community and national development programs. Prereq: 130 Cultural Anthropology or consent of instructor.

515 Medical Anthropology (3) Socially pathological conditions, theories of disease causation, and models of therapy. Prereq: Consent of instructor.

517 Forms of Social Inequality (3) Anthropological perspectives on sociopolitical concepts of rank, caste, race, ethnicity, and class; inequalities engen- dered by sex role structure. Prereq: 130 Cultural Anthropology or consent of instructor.

520 Seminar in Zoarchaeology (3) Approaches to analysis and interpretation of faunal remains. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

521 Laboratory Studies in Zoarchaeology (4) Examination and comparison of skeletons of major vertebrate groups, shells of terrestrial and aquatic molluscs, in relation to animal remains from archaeo- logical contexts. Prereq: 130 Cultural Anthropology or consent of instructor. May be repeated. Maximum 6 hrs.

522 Seminar in Anthropology (3) Theoretical and applied issues in contemporary anthropology: theory, methodology, and applications. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.


524 Theory in Anthropology (3) Detailed consideration of theory in contemporary anthropology: models of social process, and methods of analysis and interpretation. Prereq: Consent of instructor.

541 Archaeological Resource Management (3) Federal legislation and regulations affecting identification, protection, and management of archaeological re- sources. Prereq: Consent of instructor.

542 Paleoanthropology (4) Fossil record from origin to modern human and hominid species. Prereq: 120 or consent of instructor.

546 Principles of Zooarchaeology (3) Basic osteological studies of major vertebrate groups; aboriginal use of animals in subsistence and culture. Prereq: 120 or consent of instructor.


552 Paleoanthropology (4) Fossil record from origin of hominids to modern human species. Prereq: Consent of instructor.

553 Skeletal Biology (3) Practical and theoretical approaches to analysis of prehistoric human skeletal remains. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

555 Laboratory Studies in Biological Anthropology (3) Laboratory methods in biological anthropology. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

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


**Masters of Architecture Program**

The School of Architecture offers two tracks leading to the Master of Architecture degree. Track 1 is for students seeking the first-professional degree who already hold a Bachelor's degree or an advanced degree in another field. Track 2 is for students with at least one year of professional experience in architecture.

**Admission Requirements**

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

- For Track 1 applicants, a bachelor’s degree with a 3.0 GPA from a regionally accredited college or university is required. International applicants must have an equivalent 4-year degree and a minimum GPA of 3.0. 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 courses in mathematics, science, and social science.
- Applicants must submit a portfolio of their work, including recent projects and written statements.
- International students must also demonstrate proficiency in English.

**Degree Requirements**

Track 2 requires a minimum of 30 semester hours of graduate coursework. Both tracks require 500 hours of Thesis work with a public presentation and oral defense of the thesis. Retention in the program is contingent upon evidence of satisfactory progress toward the degree. Student's progress will be reviewed each semester by the Graduate Program Committee.

**Academic Common Market**

An agreement among Southern institutions for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT on an in-state tuition basis. The M.Arch. program in Architecture is available to residents of the states of Arkansas, Delaware, Kentucky, Mississippi, or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Student Services.

**Graduate Courses**

- 403 Introduction to Preservation (3) History, theory, and legal aspects of architectural preservation and restoration.
- 404 Preservation Technology (3) Techniques of preservation: methods of analysis, history of materials and technology used in old buildings.
- 405 Descriptive Analysis of Historic Buildings (3) Identification and analysis of the physical characteristics of buildings from various architectural periods.
- 410 History and Theory of Urban Form (3) Patterns of community development. Selected historical and contemporary examples.
- 411 History and Theory of Urban Form (3) Patterns of community development. Selected historical and contemporary examples.
- 412 Non-Western and Indigenous Architecture (3) Building responsive to climate, material availability, and economic level, as designed by anonymous builders. Prehistoric times to present.
- 414 History of Architectural Technology (3) Building materials and construction techniques from antiquity to present.
- 415 Medieval Architecture (3) History of architecture from the decline of Rome to the beginning of Renaissance.
- 417 The International Style (3) Survey of architectural development from early modern movements, including the influence of America, Europe, and Africa.
- 419 American Architecture (3) Development of American architecture from the time of the colonists.
- 420 American Architecture, 1840-1940 (3) Historical periods from Gothic Revival to twentieth century.
- 421 History of Landscape Architecture (3) Intelectual, societal, and geographical influences that provide theoretical basis for design throughout history.

**Architecture (College of Architecture and Design)**

**Major**

Architecture

**Degree**

M.Arch.

Professors:

Conley, G., Emeritus, B.Arch., Harvard

Davis, Marleen, M.Arch., Harvard

Debelius, C., M.Arch., Harvard

Drin, A., MDesS., Harvard

Dodd, C., M.Arch., Cranbrook

Moir-McCleen, T., M.Arch., Michigan

Schiemmenti, M., M.Arch., Florida

Assistant Professors:

Allwicker, M., B.Arch., Cornell

Betanzos, C., M.Arch., Cornell

DeKay, M., M.Arch., Oregon

Dodds, G., Ph.D., Pennsylvania

French, R. C., B.Arch., Tennessee

Klinkhammer, B., M.Arch., RWTH (Aachen)

Stach, E., IPMA, Bauhaus

Thurflou, A., M.Arch., Columbia

Ware, S. M., M.F.A., Tennessee

**Academics**

- 591 Foreign Study (1-15) P/ NP only. E
- 592 Off-Campus Study (1-15) See College of Arts and Sciences.
- 593 Independent Study (1-15) See College of Arts and Sciences.
- 600 Doctoral Research and Dissertation (3-15) P/ NP only. E
- 601 Advanced Graduate Research (1-6) Independent investigation of special problems in anthropology by advanced graduate students. May be repeated. Maximum 12 hrs. Only 3 hrs may count toward 600-level requirement.
- 650 Advanced Seminar in Archaeology (3) Selected topics in prehistoric and historic archaeology. May be repeated. Maximum 6 hrs.
- 651 Selected Topics in Paleopathology (3) May be repeated. Maximum 6 hrs.
- 690 Selected Topics in Physical Anthropology (3) For doctoral students in biological anthropology. May be repeated. Maximum 6 hrs.
- 691 Selected Topics in Paleopathology (3) May be repeated. Maximum 6 hrs.
- 695 Gross Human Anatomy (9) Skeletal, muscular, and cardiovascular system. Dissection of cadavers. Prerequisite: 480 or Human Biology. 5 hrs and 5 labs.
Art

(College of Arts and Sciences)

MAJOR

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

Norman Magden, Director

Professors:
Blain, Sandra J., M.F.A. ............. Wisconsin
Brakke, P. M., M.F.A. ............. Yale
Daehnert, R. H. (Emeritus), M.F.A. ............. Wisconsin
Darrow, J. F. (Emeritus), Ed.D. ............. Illinois State
Falsetti, Joseph S. (Emeritus), M.S. Ohio State
Goldstein, M. B., M.F.A. ............. Nebraska
Habel, Dorothy, Ph.D. ............. Michigan
Kennedy, William C., M.F.A. ............. Wisconsin
Lea, B., M.F.A. ............. Yale
Loland, W. E., M.F.A. ............. Tennessee
Livingston, P. R. (Emeritus), M.F.A. ............. Wisconsin
Lyons, B. (Liaison), M.F.A. ............. Arizona State
Magden, Norman, Ph.D. ............. Case Western Reserve
Martinson, Fred (Emeritus), Ph.D. ............. Chicago
Metros, Susan E., M.F.A. ............. Michigan State
Moffett, F., Ph.D. ............. Chicago
Peacock, D. (Emeritus), M.F.A. ............. Iowa
Riesing, T. J., M.F.A. ............. Nebraska
Stewart, F.C., M.F.A. ............. Claremont
Wilson, D., M.F.A. ............. California (San Diego)
Yates, S., M.F.A. ............. North Carolina (Greensboro)

Associate Professors:
Brogden, Sally B., M.F.A. ............. NY College of Ceramics (Alfred)
Hiles, Timothy, Ph.D. ............. Penn State
Neff, A., Ph.D. ............. Pennsylvania
Staples, Carolyn, M.F.A. ............. Michigan State

Assistant Professors:
Eversen, Kevin, M.F.A. ............. Ohio
Jung, A., M.F.A. ............. Wisconsin
Odem, Jennifer, M.F.A. ............. Florida State
Wright, S. E., Ph.D. ............. Stanford

The Master of Fine Arts is the terminal degree in studio art. It is offered in the concentration areas of ceramics, graphic design, drawing, media arts, painting, printmaking, 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 School of Art. In addition to the admission requirements of The Graduate School, the School 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 undergraduate major in art or evidence of equivalent proficiency.
4. A portfolio to be evaluated by the faculty.
Further information is available by writing to the School of Art.

M.F.A. Requirements
A minimum of 60 hours is required:
1. Successful completion of 20 hours of studio in a concentration area. An inter-area program must be approved by the graduate faculty only after the second semester in residence. Ten hours of concentration must be in second year courses (512, 514, etc.).
2. A minimum of 9 hours of graduate level academic (non-studio) courses of which at least 6 hours are to be in art history.
3. Eleven hours of electives which may consist of any combination of courses offered by the University for graduate credit.
4. Art 599, Project in Lieu of Thesis (20 hours). A third year of semi-independent study. The student must have completed all other coursework prior to registration.

Four semesters (normally the first 40 hours) beyond 599. The student's degree is required in residence. An exception is made for working professional designers who may complete their first 20 hours, with the permission of the faculty, on a part-time basis. Residence is defined by the School of Art as (1) a minimum enrollment of 6 hours per semester and (2) use of School of Art facilities so that students are available for discussion and criticism.

The candidate's committee will consist of a minimum of 3 members and a maximum of 6 members and will be appointed prior to registration for 599. The committee must consist of one faculty member from the candidate's concentration area (designated as chairperson) and a faculty member from outside the concentration area. The inclusion of an Art History faculty member on each committee is encouraged.

Exhibition and oral examination: With the completion of all requirements for the M.F.A., the student must produce an exhibition and, in the presence of that work, must satisfactorily complete an oral examination.

Academic Standards
1. First-year evaluation: At the end of the first 2 semesters in residence, the student must present a portfolio for evaluation by the faculty and receive permission to continue in the program.
2. Second-year evaluation: With completion of all coursework, the student must present work for evaluation by the faculty and receive permission to register for Projects in Lieu of Thesis.
3. If, in a review by the student's major area faculty, the student's progress is deemed insufficient, the faculty may recommend a work period without advancement toward the degree, probation with specific goals set for a specific time, or dismissal.

ACADEMIC COMMON MARKET
An agreement among southern states for sharing graduate programs allows legal residents of other states to enroll in certain programs at UT on an in-state tuition basis. The M.F.A. program in Art is available to residents of the state of Kentucky (concentration in graphic design only). Additional information may be obtained from the Admissions Specialist in the Office of Graduate Student Services.

GRADUATE MINOR IN THE HISTORY OF ART
A graduate minor in Art History may be arranged with consent of the student's committee, the instructor 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.

Art

GRADUATE COURSES
481 Museology I: 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, marketing and framing, shipping and storage. Prerequisite: 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. Prerequisite: 481 and 482, and consent of instructor. May be repeated. Maximum 12 hrs. (Same as Anthropology 484.)

499 Special Topics (3) Student- or instructor-initiated course offered at convenience of 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/NC only.

507 Professional Practices: Teaching Internship (1) Individual study in development of skills and methodology in teaching studio courses. For students who are not GTAs. Prerequisite: Consent of instructor. May not be used toward degree requirements. May be repeated. S/NC only.

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

592 Off-Campus Study (1-15) See College of Arts and Sciences.

593 Independent Study (1-15) See College of Arts and Sciences. Prerequisite: Consent of instructor.

599 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.

Art Ceramics

GRADUATE COURSES
421 Ceramics: Advanced Handbuilding (4) Continued investigation of ceramic form: development of individual direction. Prerequisite: Ceramics: Handbuilding and Throwing II. May be repeated. Maximum 12 hrs.

422 Ceramics: Advanced Throwing (4) Continued, in-depth investigation of ceramic form: development of individual direction. Prerequisite: Ceramics: Handbuilding and Throwing II. May be repeated. Maximum 12 hrs.

424 Ceramics: Clays and Glazes (3) Clay chemistry, clay bodies, glaze theory and calculation. Formulating, mixing and testing of clay bodies and glaze formulas. Prerequisite: Ceramics: Portfolio Review.

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

521 Graduate Ceramics I (2-5) May be repeated. Maximum 10 hrs.

525 Graduate Ceramics II (2-5) May be repeated. Maximum 10 hrs.

593 Independent Study (1-15) See College of Arts and Sciences. Prerequisite: Consent of instructor.

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

599 Projects in Lieu of Thesis (10) Prerequisite: All graduate course work and successful second year evaluation by graduate faculty. May be repeated. Maximum 20 hrs. S/NC only.

Art Design/Graphic

GRADUATE COURSES
405 Computer Enhanced Graphic Design (3) Exploration of new technologies and their signification to graphic design. Prerequisite: Intermediate Graphic Design I, Graphic Design Production with a grade of C or better, and consent of instructor. May be repeated. Maximum 6 hrs.

451 Advanced Graphic Design (3) Theory and techniques of visual problem-solving as applied to advanced applications of graphic design. Prerequisite: Intermediate Graphic Design II with a grade of C or better.

452 Graphic Design Seminar (3) Discussion of design and professional issues: politics, economics, and ethics for graphic designer. Culminates in student-initiated project. Prerequisite: 451 with a grade of C or better.

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

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

456 Graphic Design Practicum (3-12) Practical work experience in graphic design field. Only by prearrangement with department. Prerequisite: Consent of instructor. May be repeated. Maximum 12 hrs.

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

500 Studies in Graphic Design/Illustration History (3) Design and illustration ca. 1850 to present. Prerequisite: M.F.A. candidate or consent of department. May be repeated. Maximum 6 hrs.

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

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

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

593 Independent Study (1-15) See College of Arts and Sciences. Prerequisite: Consent of instructor.

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

599 Projects in Lieu of Thesis (10) Prerequisite: All graduate course work and successful second year evaluation by graduate faculty. May be repeated. Maximum 20 hrs. S/NC only.
Art Drawing

**GRADUATE COURSES**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Description</th>
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<tbody>
<tr>
<td>419</td>
<td>Special Topics in Drawing and Painting</td>
<td>3</td>
</tr>
<tr>
<td>511</td>
<td>Graduate Drawing I</td>
<td>2-6</td>
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<tr>
<td>512</td>
<td>Graduate Drawing II</td>
<td>2-6</td>
</tr>
</tbody>
</table>

593 Independent Study (1-15) See College of Arts and Sciences. Prereq: Consent of instructor.

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

599 Projects in Lieu of Thesis (10) Prereq: All graduate course work and successful second-year evaluation by graduate faculty. May be repeated. Maximum 20 hrs. S/NC only. E

Art History

**GRADUATE COURSES**

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<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>401</td>
<td>Art of South and Southeast Asia</td>
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<td>410</td>
<td>Art of China</td>
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<td>419</td>
<td>Art of Japan</td>
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<td>425</td>
<td>Early Christian and Byzantine Art</td>
<td>3</td>
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<td>431</td>
<td>Medieval Art of the West</td>
<td>3</td>
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<tr>
<td>441</td>
<td>Northern European Painting</td>
<td>3</td>
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<td>442</td>
<td>Art of Northern Europe</td>
<td>3</td>
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<td>451</td>
<td>Art of Italy</td>
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<tr>
<td>453</td>
<td>Art of Southeast Europe</td>
<td>3</td>
</tr>
<tr>
<td>454</td>
<td>Renaissance and Baroque Theory</td>
<td>3</td>
</tr>
<tr>
<td>461</td>
<td>Art of Southern and Eastern Africa</td>
<td>3</td>
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<td>462</td>
<td>Art and Archaeology of Ancient Africa</td>
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<td>463</td>
<td>Arts of the African Diaspora</td>
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<td>471</td>
<td>History of North American Art</td>
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<td>472</td>
<td>History of 20th-Century American Art</td>
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<td>473</td>
<td>19th-Century American Painting</td>
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<td>474</td>
<td>Theory of 20th-Century Art in Europe and America</td>
<td>3</td>
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<td>476</td>
<td>History of 20th-Century Painting and Sculpture</td>
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<td>477</td>
<td>Special Topics in Art History</td>
<td>3</td>
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<td>481</td>
<td>History of American Sculpture</td>
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<td>485</td>
<td>History of Printmaking</td>
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<td>486</td>
<td>Art of Indian Asia</td>
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<td>489</td>
<td>Studies in Art History</td>
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<td>517</td>
<td>Studies in Medieval Art</td>
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<td>522</td>
<td>Studies in Italian Renaissance Art</td>
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<td>523</td>
<td>Studies in Baroque Art</td>
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<td>524</td>
<td>Studies in Modern Western Art</td>
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<td>525</td>
<td>Studies in Modern American Art</td>
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<td>526</td>
<td>Studies in Asian Art</td>
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<tr>
<td>527</td>
<td>Special Topics in Art History</td>
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</tbody>
</table>

Art Media Arts

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<tr>
<td>433</td>
<td>History of Film and Modern Art</td>
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<tr>
<td>435</td>
<td>Cinematography</td>
<td>3</td>
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<td>440</td>
<td>Digital Photography</td>
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<td>442</td>
<td>Large Format Photography</td>
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<tr>
<td>512</td>
<td>Photography II</td>
<td>3</td>
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<tr>
<td>513</td>
<td>Media Arts I</td>
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<tr>
<td>514</td>
<td>Media Arts II</td>
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<tr>
<td>515</td>
<td>Media Arts III</td>
<td>3</td>
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<tr>
<td>571</td>
<td>Studies in Medieval Art</td>
<td>3</td>
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<tr>
<td>572</td>
<td>Studies in Italian Renaissance Art</td>
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<td>575</td>
<td>Studies in Modern American Art</td>
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</table>

Art Painting

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<thead>
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</thead>
<tbody>
<tr>
<td>413</td>
<td>Painting IV</td>
<td>3</td>
</tr>
</tbody>
</table>
Art Sculpture

GRADUATE COURSES

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

449 Special Topics in Sculpture (3-6) Instructor-initiated course offered at convenience of department. Prereq: Successful completion of any previous course. May be repeated. Maximum 12 hrs.

541 Graduate Sculpture I (2-6) Prereq: Consent of instructor. May be repeated. Maximum 10 hrs.

542 Graduate Sculpture II (2-6) Prereq: Consent of instructor. May be repeated. Maximum 10 hrs.

593 Independent Study (1-15) See College of Arts and Sciences. Prereq: Consent of instructor.

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

599 Projects in Lieu of Thesis (10) Prereq: Completion of 42 semester hours of academic content courses consisting of the completion of 32 semester hours of academic content courses and 10 semester hours of seminar courses. Students who have not completed an undergraduate course in each of the following three areas: articulation/phonological processing disorders, voice disorders, and fluency disorders, must complete an undergraduate course in each of the following three areas: articulation/phonological processing disorders, voice disorders, and fluency disorders. May not be used toward the degree, subject to the approval of the student's graduate committee. Prereq: Successful completion of any previous course. May be repeated. Maximum 12 hrs.

410 Drawing (2-4) Intermediate to advanced. May be repeated. Maximum 8 hrs.

420 Ceramics (2-4) Intermediate to advanced. May be repeated. Maximum 8 hrs.

430 Photography (2-4) Intermediate to advanced. May be repeated. Maximum 8 hrs.

440 Painting/Watercolor (2-4) Intermediate to advanced. May be repeated. Maximum 8 hrs.

450 Metal Design (2-4) Intermediate to advanced. May be repeated. Maximum 8 hrs.

460 Fiber (2-4) Intermediate to advanced. May be repeated. Maximum 8 hrs.

470 Fabric (2-4) Intermediate to advanced. May be repeated. Maximum 8 hrs.

480 Enameling (2-4) Intermediate to advanced. May be repeated. Maximum 8 hrs.

490 Wood (2-4) Intermediate to advanced. May be repeated. Maximum 8 hrs.

Astronomy

See Physics and Astronomy
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 on an in-state tuition basis.

The M.A. program in Audiology is available to residents of the state of South Carolina. The M.A. program in Speech Pathology is available to residents of the state of Delaware. The Ph.D. program in Speech and Hearing Science is available to residents of the state of Arkansas. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Student Services.

GRADUATE COURSES

431 Stuttering (3) Nature, appraisal and treatment. Prereq: 304 or consent of instructor.
433 Observation of Clinical Practice (1) Prereq: Speech and Hearing Science, the student is expected to demonstrate knowledge in the area and an examination of research environments. The M.A. program in Audiology is available to residents of the state of South Carolina. The M.A. program in Speech Pathology is available to residents of the state of Delaware. The Ph.D. program in Speech and Hearing Science is available to residents of the state of Arkansas. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Student Services.

THE DOCTORAL PROGRAM

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

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

The program normally consists 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 80 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 topi of major interest;
   b. a minimum of 6 semester hours in topic(s) of related interest;
   c. 3 semester hours, audiometry, and
   d. 3 semester hours in supervised teaching experience.
5. A comprehensive examination to demonstrate knowledge in the concentration area and an examination of research competence.
6. A final oral examination.

500 credit in the preparation of an acceptable thesis representing original independent work, and a final oral examination. Students in the non-thesis option may elect either the thesis or non-thesis option. Students in audiology are required to take 511. The master's program with thesis will include 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 must present a total of 39 semester hours in the audiology program of approved graduate credit and pass a final written examination.

514 Practicum in Verbo-Tonal Habilitation (1-4) Prereq: 494, 555, or consent of instructor. May be repeated. Maximum 6 hrs.
515 Practicum in Aural Rehabilitation (1-4) Prereq: 473 and 494. May be repeated. Maximum 6 hrs.
517 Instrumentation in Audiology and Speech Pathology (3) Principles of instrumentation in audiology and speech pathology; laboratory assignments for familiarization of students with instruments for measuring speech and hearing processes.
520 Aphasia (3) Historical review of aphasia literature, theories of brain functioning, aphasic classification and terminology, tests and rationale for testing, etiology, therapy considerations and prognosis for recovery. Prereq: 508 or equivalent or consent of instructor.
522 Seminar in Articulation and Phonological Processing Disorders (3) Current research in diagnosis and management of articulation and phonological processing disorders. Prereq: Articulation Disorders or equivalent or consent of instructor.
523 Seminar in Voice Disorders (3) Current research in diagnosis and management of voice disorders. May be repeated. Consent of instructor.
531 Seminar on Stuttering (3) Significant research in stuttering. Prereq: 431 or consent of instructor.
532-33-34 Advanced Clinical Practice in Speech-Language Pathology (1-4, 1-4, 1-4) Prereq: 534 or equivalent and consent of instructor. 534 may be repeated. Maximum 6 hrs. Enrollment for less than 2 hrs must have prior departmental approval.
535-36 Advanced Clinical Practice in Speech-Language Pathology: Off-Campus Sites (1-4, 1-4) Prereq: 100 hrs clinical experience, consent of instructor. May be repeated. Maximum 6 hrs each. Enrollment for less than 2 semester hrs must have prior departmental approval.
538 Advanced Clinical Practice in Speech-Language Pathology: Public Schools (1-4) May be repeated. Maximum 6 hrs. Enrollment for less than 2 hrs must have prior departmental approval.
539 Motor Speech Disorders (3) Neuromotor organization for speech production; types of motor speech disorders and associated neuromuscular syndromes; language and management of motor speech disorders. Prereq: SNC.
541 Pediatric Oromotor Disorders (3) Evaluation, diagnosis, and treatment of pediatric oromotor disabili ties that affect normal acquisition of feeding and pre speech skills. Prereq: 506 or consent of instructor.
542 Hearing Disorders (3) Effects of heredity, development, and age-related issues, and physical agents on hearing. Prereq: 473 or equivalent or consent of instructor.
543 Amplification Technology (3) Description of hearing aid circuits, components and performance characteristics. Electroacoustical and real-ear analysis of hearing aids. Coupler material and geometry effects, clinical experience in troubleshooting, repair, and construction of hearing aids. Prereq: 473 and 507 or equivalents or consent of instructor.
545 Sound Measurement Techniques and Hearing Conservation (3) Techniques of measurement and analysis of sound; hearing conservation in schools and industry. Prereq: Consent of instructor.

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

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

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

549 Hearing Science (3) Study of psychoacoustic phenomena and how they relate to perception and diagnostic audiometry. 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: 517 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.

561 Child Language Disorders (3) Current literature on assessment and intervention techniques for young language learners. Prereq: 541 or equivalent or consent of instructor.

563 Language Disorders: Birth to Three (3) Overview of family-focused, transdisciplinary intervention process. Assessment/treatment of infants, toddlers, and preschoolers. Description of disabilities and resulting communicative/conceptual implications. Prereq: 461 or equivalent or consent of instructor.

565 School-Age Language Disorders (3) Review of current literature on assessment and intervention techniques for school-age language learners. Prereq: 517 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, diagnosis, and determination of site(s) of lesion. Prereq: 473, 507, and 546, or equivalents or consent of instructor.

577 Vestibular Disorders (3) Anatomy, physiology, and pathophysiology of vestibular system and other systems that contribute to balance. Practicum in electронystagmography. Prereq: 507, 542, 546, and 576 or equivalents or consent of instructor.

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

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

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

592 Off-Campus Study (1-15) See College of Arts and Sciences.

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

594 Advanced Aural Habilitation/Rehabilitation of the Hearing-Impaired (3) Study of hearing process, counseling, group and individual amplification systems, classroom/speech acoustics, central auditory problems, therapy methods for habilitation and rehabilitation, speech reading, school-based programs, programs for adults and the elderly; student research project. Prereq: Phonetics and Audiology, 473 and 494 or equivalents or consent of instructor.

595 The Verbotonal System: Auditory/Speech Perception (3) Innovative therapy, therapy procedures, and SUWAG amplification/filters for diagnosis/evaluation/remediation of spoken language/listening skills of hearing-impaired children/adults: use of rhythms, movements and suprasegments; special audiological tests, acoustic filters, correcting misarticulations through optimal listening; central auditory treatment; second (foreign) language through listening/spoken language; relationship of concepts to conventional concepts/practice; student research reports. Prereq: Phonetics and Audiology, 473 and 494 or equivalents or consent of instructor.

600 Doctoral Research and Dissertation (1-15) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

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

602 Psychoacoustics (3) Auditory perception and reception of non-speech and speech stimuli. Prereq: 517.

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


608 Seminar in Speech Science (2) Experimental studies: speech physiology, acoustic analysis, recognition, perception and intelligibility of speech, communicative theory, and psycholinguistic measurement of speech and language. Topics vary. Prereq: 517 or consent of instructor. May be repeated. Maximum 6 hrs.

610 Seminar in Hearing Science (2) Advanced study of perception of non-speech acoustic signal, detectability, pitch, loudness, differential threshold, adaptation, and fatigue. Prereq: 507 or consent of instructor. May be repeated. Maximum 6 hrs.

611 Experimental Design in Speech and Hearing (3) Analysis of experimental design in theses and related journals. Generation of experimental designs. Prereq: Consent of instructor.

625 Advanced Seminar in Neurologically-based Communication Disorders (3) Topics vary. Prereq: 517 or consent of instructor. May be repeated. Maximum 6 hrs.

650 Directed 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: aberrations of voice, articulation, speaking time and rhythm, language development or use, and language symbolization. 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 3 hrs.

656 Directed Research (1-4) Participation in ongoing or non-dissertational research. Prereq: Consent of instructor. May be repeated. Maximum 8 hrs.

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

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

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

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

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

Aviation Systems

(UT Space Institute)

MAJOR

DEGREE

Aviation Systems

M.S.

Frank G. Collins, Co-Chair

Ralph D. Kimberlin, Co-Chair

Professors:

Collins, F.G., Ph.D. ...................... California

Kimberlin, R. D. (Liaison), Ph.D. ............... Tennessee

Collins, A.A. (Emeritus), Ph.D. ............... Tennessee

Mason, A.A. (Emeritus), Ph.D. ............... Tennessee

Paludan, C.T. (Emeritus), Ph.D. .......... Denver

Wu, J.M. (Emeritus), Ph.D. ............... Cal Tech

Young, R.L. (Emeritus), Ph.D. ............... Northwestern

Associate Professors:

Lewis, William D., Ph.D. .................. Georgia Tech

Solies, U.P., Ph.D. ......................... Tennessee

Research Assistant Professor:

Stellar, Frederick W., M.S. .............. Georgia Tech

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 emphases 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 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:
GRADUATE COURSES

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

501 Aviation Systems: An Overview (3) Aviation systems, present and future. Socioeconomic base, aerospace, propulsion technology, metereology, traffic control, airport community interface, and technological trends and developments pertinent to present status and future development of air transportation.

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


505 Governmental Policies for Aviation (3) Theoretical and legal basis for economic and governmental regulation of aviation. Historical and legislative development of aviation regulatory agencies, organizational structures, administrative and enforcement procedures. Prereq: 501.

506 Aircraft Design (3) Design process, compromise of conflicting requirements, economical, industrial, and legal aspects. Definition of mission requirements, synthesis and optimization techniques, safety and reliability, systems integration, standards and regulations, teamwork and decision-making process. Prereq: 505.

510 Special Topics in Aviation Systems (3) Current problems. Prereq: Consent of instructor. May be repeated with consent.


550 Project in Aviation Systems (3) Enrollment limited to Aviation System students in non-thesis program. May be repeated. Maximum 3 hrs allowed toward degree.

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 on an in-state tuition basis. The M.S. program in Aviation Systems is available to residents of the states of Arkansas, Florida, Mississippi, Virginia, or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Student Services.

Biochemistry and Cellular and Molecular Biology

(College of Arts and Sciences)

MAJOR DEGREES

Biochemistry and Cellular and Molecular Biology ......................... M.S., Ph.D.

Bruce D. McKee, Head

Requirements for Admission

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

1. One year of general biology or the equivalent;
2. A minimum of 8 semester hours of approved biology courses beyond the introductory level and including the subject areas of genetics, cell biology, and physiology;
3. Two years of chemistry including one year of general chemistry and one year of introductory Organic Chemistry with laboratory;
4. At least one semester of biochemistry;
5. One year of calculus;
6. One year of physics;
7. Graduate Record Examination scores; and
8. A minimum grade-point average of 3.0 out of 4.0.
Otherwise superior students, deficient in one or more of the above requirements, may be admitted at the discretion of the department's Graduate Recruiting Committee.

**THE MASTER'S PROGRAM**

1. Biochemistry and Cellular and Molecular Biology 511-12-13, 515-16, and 517.
2. Compilation of course requirements as determined by the candidate's faculty committee.
3. Achievement of a 3.0 or better GPA in all courses taken for graduate credit.
4. Participation in 601 and 603 during the entire period of residence. Participation in at least one journal club chosen from among 605-608 for three semesters.
5. Six hours of master's research and a thesis.
6. A final examination that covers both the thesis endeavor and the subject matter of the course requirements.

**THE DOCTORAL PROGRAM**

1. Biochemistry and Cellular and Molecular Biology 511-12-13, 515-16, and 517.
2. At least two additional approved graduate courses in the life sciences or chemistry, or physics, or other physical science to be determined upon consultation with the mentor and the dissertation committee. No survey courses will be accepted.
3. At least 6 hours of topics offered in 615 or its equivalent.
4. Participation in 601 and 603 during the entire period of residence. Participation in at least one journal club chosen from among 605-608 for six semesters.
5. Comprehensive examination, taken before the end of the third year of study.
6. A dissertation reporting the results of original and significant research carried out during the term of candidacy.
7. A final oral examination which will be concerned primarily with the student's dissertation.

**Petitioning for Master's Degree**

Students who have passed the comprehensive examination in the Ph.D. program and have completed at least 30 hours of approved coursework for graduate credit, at least two thirds of which must be at or above the 500 level, may petition the department for award of a master's degree. The additional requirements for such a degree are:

1. The preparation of a research manuscript suitable for submission for publication in a major scientific journal and oral defense of that manuscript before an examining committee of three faculty members appointed by the head of the department, at least two of whom shall be members of the department; or
2. Publication of at least one full-length paper in a major scientific journal as senior author.

**GRADUATE COURSES**

401-402 Biochemistry-Molecular Biology I, II (3,3)

401—Amino acid structure and chemistry, protein structure and chemistry, protein folding, enzyme behavior and function, reaction mechanisms, catalysis and energy transfer, synthetic metabolism including photosynthesis, and protein transport.


403 Advanced Genetics Laboratory (2) Experiments illustrating modern genetics techniques in classical, cyto-, molecular and developmental genetics. Model organisms, Drosophila and mouse. Prereq: General Genetics and Organic Chemistry.

410 Cellular and Comparative Biochemistry (4) Electron microscope, behavior, chemistry and structure of proteins; enzyme behavior and biological function, catalysis and energy capture, synthetic metabolism, nucleic acid function, and biochemical genetics: regulation of biological processes. May not be counted if credit received for 401. Prereq: Chemistry 350-360-369 Organic Chemistry and Lab. Biology 140 Organization and Function of the Cell, and Biology 240 General Genetics. 3 hrs and 1 discussion. S.


421 Cell and Tissue Structure and Function (4) Study of animal and plant cells and tissues at the light and electron microscope levels. Prereq: Biology 140 Organization and Function of the Cell. 2 hrs and 2 labs.

429 Cell Biology Laboratory (3) Series of open-ended, discovery-based exercises developed to design and test new contemporary cell and molecular biology labs and computer technologies. Experimental modules: techniques used in cell isolation, purification, culturing, fluorescent microscopy, receptor binding and signal transduction, apoptosis, cell cycle analysis, protein and steroid secretion, computer modeling, and state-of-the-art electron microscopy. Experiment design, execution, data analysis, and peer evaluation. Prereq or coreq: 401 or 410. F.


471-81 Biophysical Chemistry (3,3) Physochemical principles with applications to biological systems. 471—Thermodynamics, chemical equilibrium, solution chemistry, transport, electrochemistry, kinetics; enzyme catalyzed elementary quantum chemistry, interactions of light with biological molecules; optical and magnetic spectroscopy, light scattering, case studies of selected macromolecules. Prereq: Calculus, Organic Chemistry, General Biology or consent of instructor. (Same as Chemistry 471-81.) F,Sp.

480 Physiology of Exercise (3) (Same as Exercise Science 480).

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

502 Registration for Use of Facilities (3-15) Required at the semester is registered 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. SNC only. E

511 Advanced Protein Chemistry and Cellular Biology (3) Cellular structure and function at molecular and supramolecular level in progression: protein structure and function; membrane structure and function; genetic and biochemical aspects of the membrane system; protein turnover. Prereq: Prior knowledge of cell biology and biochemistry and/or consent of instructor. F

512 Advanced Molecular Biology (3) Regulation of nucleic acid expression and protein activity. Nucleic acid structure and function, replication and repair of nucleic acids; gene expression; protein synthesis; post-translational protein modification; mitosis and meiosis; cell cycle and cell growth. Prereq: 511 or consent of instructor. Sp.

513 Advanced Protein Biochemistry and Cell Biology II (3) Advanced topics of cellular function and regulation of cell division and growth, and structure and function of supramolecular structures, cytoskeleton and cell junctions and adhesions. Prereq: 511, Sp.

515 Experimental Techniques 1 (4) Modern experimental methodology and instrumentation lab. cell growth, spectrophotometry; microscopy; nucleic acid purification and analysis; protein assays; enzyme purification; electrophoresis; computer analysis of nucleic acid and protein sequences. Lecture on theory of laboratory and lab. lab. periods per week. Primarily for departmental graduate students. Prereq: Consent of instructor. F.


517 Physical Biochemistry (3) Physics and chemistry of biological systems and molecules. Thermodynamics, diffusion and transport, physical chemistry of macromolecules; enzyme kinetics; binding reactions; spectroscopy; electrophysiology. Prereq: 511 or consent of instructor. F.

520 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 6 hrs. S/NC only.

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

530 Experimental Design and Analysis (3) Development of skills in strategies of experimental design and interpretation of experimental results. Critical discussion of research articles illustrating issues in experimental design. Preparation of a final proposal in standard format to be read and discussed by class and by panel of faculty expert in area of proposal. Prereq: 511-12-13, 515-16-17. Sp.

550 Advanced Concepts in Neurobiology/Psychology (3) Concepts related to neurobiology and physiology with information taken from current literature. Predominantly lecture format with student participation. Specified subject area to be announced. Prereq: Consent of instructor. May be repeated.

552 Physiology of Hormones (3) Cellular and organismal action of hormones in vertebrate and invertebrate animals. Prereq: 450 or consent of instructor. Recommended preceding 3 hrs and 1 lab.

560 Advanced Concepts in Structural Biology/ Biochemistry (3) Concepts related to structural biology/biochemistry with information taken from current literature. Predominantly lecture format with student participation. Specific subject area to be announced. Prereq: Consent of instructor. May be repeated.

561 Environmental Toxicology (3) (Same as Ecology and Evolutionary Biology 561.)

562 Introduction to Electron Microscopy - Transmission Electron Microscopy (4) Practical application to techniques for preparation of biological samples for viewing in transmission electron microscopy. Use of microscope and ancillary equipment, darkroom techniques, preparation of materials for publication and special project. Admission limited only to departmentally approved graduate students. (Same as Botany 510.) 2-3 hrs labs. F,Sp.

564 Introduction to Electron Microscopy-Scanning Electron Microscopy (4) Practical introduction to techniques of electron microscopy and to scanning electron microscope. Use of microscope, introduction to darkroom techniques and digital image processing, preparation of samples for observation, and special project. Prereq: Consent of instructor, 2 hrs and 1 lab. Sp.

570 Advanced Concepts in Cellular/Molecular Biology (3) Concepts related to cellular molecular biology with information taken from current literature. Predominantly lecture format with student participation. Specified subject area to be announced. Prereq: Consent of instructor. May be repeated.
The Department of Botany offers the Master of Science and Doctor of Philosophy degrees. The Master of Science degree provides a solid background in botany and related fields, preparing students for careers in research, teaching, or related professions. The Doctor of Philosophy degree is designed for students who wish to pursue careers in academia, government, or industry, or who aspire to careers in positions requiring advanced research and teaching skills.

**ADMISSION REQUIREMENTS**

The Botany Department requires scores from the general portion of the Graduate Record Examination, at least three letters of recommendation, and a statement of purpose. The Department Head or the Graduate Coordinator will determine deficiencies and the manner in which they will be removed. The student's graduate program will be decided upon by the student's pro-tem committee during the first meeting with the student.

**THE MASTERS 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 thesis and an oral defense to the student's committee of a research proposal suitable for a thesis. This must be completed before enrollment in Botany 500.
2. Successful completion of 30 hours of graduate credit, at least two-thirds of which must be at the 500 level or higher.
3. Satisfactory completion of two hours at the 600 level.
5. Presentation of a 30 minute departmental seminar.
6. Educational service in the form of teaching and/or ancillary services; consult major professor and department head.

**Non-Thesis Option**

1. Satisfactory completion of 34 semester hours of approved graduate courses of which 30 semester hours must be in botany including Botany 503. At least two-thirds of the hours must be at the 500 level or higher.
2. Satisfactory completion of two hours at the 600 level.
3. Educational service in the form of teaching and/or ancillary services; consult major professor and department head.
4. Satisfactory performance on a final written examination on all work offered for the degree. The student's committee may also require that an oral examination follow the written examination.

**THE DOCTORAL PROGRAM**

The Doctor of Philosophy program is patterned to provide training that involves extensive independent research within the student's area of concentration. Although there is no formal program of coursework, the student's committee may require specific courses for the completion of the degree. Most students spend from three to five years working on their Ph.D.

Requirements for successful completion of the Ph.D. are as follows:

1. Satisfactory presentation of a research problem by means of a written proposal and an oral defense to the student's committee. This must be completed before enrollment in Botany 600.
2. Satisfactory performance on a written comprehensive examination.
3. 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 may be waived under exceptional circumstances. Specific stipulations or requirements such as additional foreign languages or an additional oral comprehensive examination may be required by the student's faculty committee.

MINOR IN ENVIRONMENTAL POLICY

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

GRADUATE COURSES

401 Field Studies in Botany (1-3) Field experience and taxonomy of special plant groups. Topics vary: Bryology, phycology, ecology, botany, systematics, biotechnology, and methodology. May be repeated under different topics. Maximum 8 hrs.


431 Plant Ecology (4) 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: Field Botany or equivalent. (Same as Ecology and Evolutionary Biology 431.) Sp.

451 Plant Tissue Culture (3) Cells, tissues and organs; development in vegetative and reproductive structures of various flowering plants. Prereq: General Botany or Biodiversity; Organization and Function of the Cell or equivalent. Recommended prereq: Botany 412; Plants: Evolutionary Survey; Introduction to Plant Physiology; Introduction to Microbiology and Lab; Plant Propagation; and Field and Forage Crops.

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

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/NP only.

503 Non-Thesis Research (2) Library, field, or laboratory research under supervision of staff member. Not for thesis candidates. May be repeated. Maximum 4 hrs.

506 Phycology (4) 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: 310 or consent of instructor. 3 hrs and 1 lab. F,A

507 Biological Illustration (3) Principles and applications of photography (BW and color) with a special emphasis on natural history. Prereq: Field Botany or equivalent. 3 hrs and 1 lab. F,A

510 Introduction to Electron Microscopy - Transmission Electron Microscopy (4) (Same as Biochemistry and Cellular and Molecular Biology 562.)


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.

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

585 Methods and Instrumentation in Field Investigation (1) Appropriate methods and instrumentation. Topics vary. May be repeated with consent of instructor. Maximum 5 hrs. S/NP only.

599 Advanced Evolutionary Ecology (3) Advanced concepts in evolutionary and ecological genetics. Topics vary. May be repeated with consent of instructor. Maximum 12 hrs.

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

606-07 Advanced Topics in Botanical Sciences (1-1,3-3) Experimental botanical science: nomenclature, morphology and systematics of vascular plants, genetic aspects of plant physiology, palynology and ecology. May be repeated. Maximum 12 hrs.

635 Environmental Assessment and Sustainable Development in Third World Countries (3) Same as Ecology and Evolutionary Biology 635 and Planning 635.

652 Seminar in the History of Botany (2) History of botanical exploration and advances from early civilization to modern periods. May be repeated. Maximum 4 hrs.

GRADUATE DEGREES

440 Corporate Video (3) Special requirements of business, industrial, educational, and medical uses of video. Management, budgeting, planning, producing, and evaluating projects. Prereq: 430 or consent of instructor.


460 Broadcast News Operations (3) Production of news programs for broadcast on television stations. Electronic news gathering, editing and writing news packages and studio production. Prereq: 410 or consent of instructor.

470 Cable Television and Emerging Technologies (3) History and structure of cable television industry. Cable regulations and programming. Entry of telephone companies in distribution video. Analysis of all relevant technologies: direct broadcast satellite, fiber optics cable, high definition television, and others. Prereq: Introduction to Radio and Television or consent of instructor.


560 Radio & Television Law and Regulations (3) Legal problems faced by broadcast managers. Philosophy of regulatory policy formulation. Efforts at self-regulation. Sociopolitical restraints, effects of laws and regulations, and public pressure on stations, networks, cable and new technologies. Unique situation of broadcasting among media in terms of regulations. Prereq: Consent of instructor or admission to program.

570 Radio & Television Research (3) Various techniques used by stations and consultants in broadcast research. Applied audience research. Deciding which method to use, interpreting results, and applying research to management decision making. Prereq: Communications 512 or 612, or consent of instructor. Sp.

580 Seminar in Radio and Television (3) Salient issues in broadcasting. Topics vary. International broadcasting, cable television, new technologies, corporate television, educational and public broadcasting, broadcasting and society. Prereq: Consent of instructor or admission to program. May be repeated. Maximum 6 hrs. (Same as Information Sciences 581.) F

should have two or more years of work experience beyond their undergraduate degree(s). The MBA program is a 17-month program with students beginning in early August of each year and graduating in December of the following year. During the summer between the second and third semesters, students must complete an internship with a company using those skills acquired during the first year of the MBA program.

The MBA program consists of a common core (32 hours) and a selection of concentration and elective courses (15 hours). The first-year core develops a general management foundation upon which specialization is developed in the concentration area.

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

**Admission Requirements**

Applications are accepted for fall semester only. The application deadline for fall semester is March 1. Applications by U.S. citizens and permanent residents received after March 1 will be considered as space allows.

To be considered for admission, the applicant's file must be complete. A completed file includes the Graduate School Application, transcripts, letters of recommendation, the GMAT score report. The first items should reach The Graduate School one month before the MBA application deadline to allow for processing. Additional information is required by The Graduate School for international students.

For admission to the MBA program, consideration is given to (1) applicant's academic record with particular attention to the last two years of undergraduate work and previous graduate studies, (2) scores on the GMAT and the Test of English as a Foreign Language (TOEFL) for those whose native language is not English, (3) work experience and other activities that demonstrate potential for leadership, and (4) recommendations from professors and work supervisors. The admission decision is based on all factors that make up the total application; therefore, there is no automatic cut-off for either grade point averages or GMAT scores. However, admission preference will be given to applicants with full-time work experience after obtaining the undergraduate degree.

**Prerequisites**

There are no specific course prerequisites for admission. However, undergraduate courses and work experience should demonstrate ability with both qualitative and quantitative work.

**MBA Core**

The MBA core (32 hours total) consists of: a 3-hour foundations course taken during the first three weeks of August of the first year; prior to the beginning of fall semester, a 15-hour core course and a 1-hour career development course taken in the first semester (Fall 1), a 9-hour core course taken in the second semester (Spring 1), a 3-hour distance course taken during the internship (Summer), and a 1-hour capstone in the third semester (Fall 2). The topics introduced within these courses follow three major themes. The first theme covers "what every manager needs to know," and includes such functional topics as finance, strategy, decision tools, environment learning bias, and leadership skills development. The second theme focuses on functions involved in the flows of product, information, and finances within an integrated value chain, to include, but not limited to, operations management, logistics management, demand management, customer relationship management, supplier management and resource management. The third theme involves integrating the content of the other two themes using information technology in an experiential setting. Throughout all three themes, significant emphasis is placed on learning the topics in an integrated fashion. Students will understand how various business functions are integrated within an organization, as well as how integration should occur across organizations within the context of a value chain.

Students in the first-year core undertake active learning within a team-based environment. Many core requirements are experiential exercises in which self-discovery within a team setting is an important element of the learning process. Individualized support is provided for developing both written and oral communication skills.

**Concentration and Electives**

A concentration area may be indicated on the MBA Program Application or this declaration may be deferred until after matriculation. In any event, selection should be made after the first semester and must be made after completion of the first year. Requests for changes in concentration area must be submitted for approval to the MBA Program Office.

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

- Finance
- Logistics and Transportation
- Marketing
- Operations Management

The first course in each concentration is designated to provide a foundation upon which the concentration can be built. These
 courses will be delivered in the latter part of the spring semester of the first year, after the Spring core course has been completed. They are intended to prepare students for their summer internships. However, these courses should not be thought of as simply the first three hours in a nine-hour elective. Rather, these courses are self-contained, intensive introductions to a specialty area of business. Students will choose two of these courses in the spring semester, which will permit them flexibility for choosing concentrations in their first year of the program. One of these two will count as an elective course. Two additional courses in the concentration area will be taken in the second fall semester to meet the 9-hour requirement for a concentration.

Elective courses may be chosen from any 500 level courses in the College of Business. Courses outside the College of Business Administration as well as courses listed in the Graduate Catalog numbered below 500 may be included as an elective only with written prior permission via formal petition to the MBA Program Office.

Transfer Credits

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

- Concentration Area: 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 Dean of the MBA Program and must meet all requirements of The Graduate School.

Other Requirements

The Application for Admission to Candidacy must be approved by three faculty members in the student's area of concentration and the Assistant Dean of the MBA Program. It should be submitted to the Graduate Student Services Office at least one full semester prior to the date the degree is conferred. (Admission to candidacy for the MBA degree must be submitted in the spring semester for graduation in the following fall semester.)

To qualify for the degree, the student must achieve a B average (3.0) or above in MBA core courses required in his/her program, a B average or higher in courses comprising the concentration area, and a B average or higher in the overall program.

THE EXECUTIVE MBA PROGRAMS

Each of the four programs of the executive track is designed to serve the needs of a different student group. The programs share a common course structure of 36 credit hours of classroom learning (BA 551, 552, 553). The credit hours of projects applied within the student's business organization (BA 551, 562 and 563). Students carry a full, 15-credit-hour load each semester. In each program, all participants begin and complete the program together.

The courses are functionally integrated, and the broad curriculum objectives are similar in each of the executive track programs. All are oriented toward applied learning and active, making extensive use of experiential learning techniques. Emphasis and depth of subject material within the curriculum varies somewhat from program to program depending on the intended student group. All programs result in the same Master of Business Administration degree as the full-time MBA.

Admissions Criteria: Primary consideration is given to the applicant’s professional achievements and recommendations from the applicant's organization. Applicants must meet the minimum requirements of The Graduate School and submit transcripts of all undergraduate and graduate work. Applicants must usually take the Graduate Management Admission Test (GMAT) (some exceptions are noted within the specific program descriptions). A minimum cut-off score exists for either grade-point averages or GMAT scores; however, admission is competitive, and applicants will be evaluated on their ability to operate on a par with other high achieving participants. Students whose native language is not English must take the Test of English as a Foreign Language (TOEFL) unless they are U.S. citizens or have earned a degree from an accredited U.S. college or university within the past two years. A minimum TOEFL score of 213 on the computer-based test is required for admission to The Graduate School.

Prerequisites: Although there are no specific course prerequisites for admission, undergraduates studies and professional experience should demonstrate ability with both qualitative and quantitative work.

Transfer Credit: Because of the integrated nature of the executive track curricula, no credit hours may be transferred as substitutes for program curriculum.

Other Requirements: Other requirements are the same as those for the full-time MBA program.

Professional MBA Program

The professional MBA program is provided for fully-employed managers within commuting distance of the University of Tennessee. The group of students for whom this program is designed has at least five years of work experience. The emphasis in this program is to provide a good grounding in the quantitative and qualitative tools of various business functions and a good basis in strategic thinking. Learning is expanded through applying these tools within the student's own organization through a structured project each semester. The professional MBA is the right choice for individuals who wish to enhance their position within their organization by broadening their business knowledge beyond the functional area in which they are currently employed.

The professional program is three consecutive semesters completed in 16 months. Classes meet all day on Saturdays and occasionally on Friday evening and/or Sunday afternoon. The program begins in August with an intensive week of classes, then continues with weekend classes. The final fall semester also includes an intensive week of courses in addition to weekend classes. Graduation is in December. Applications are accepted for fall semester only. The application deadline is April 10.

Additional information on the professional MBA can be found at www.promba.utk.edu.

Executive MBA Program

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

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

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

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

Physician Executive MBA

The physician executive MBA is provided for a national audience of physicians. The students for whom this program is designed have an M.D. or D.O. degree with five or more years of work experience. The curriculum objectives are the same as those for the executive MBA, but in the physician executive MBA, many of the functional skills are taught in the context of the health care industry and there is a specialized content related to the health care environment. The physician executive MBA is the right choice for physicians who want to have a voice in the health care industry and in their own careers and are seeking a program that allows them to continue their practice while earning their MBA degree.

The physician executive MBA is three consecutive semesters completed in 12
months. The class meets in Knoxville for 8-day residence periods in January, April, August and December. Between residence periods, synchronous distance learning classes are held each Saturday morning, and there are asynchronous internet learning sessions each week.

Applications are accepted for January entry only. The early application deadline is July 1, and the final application deadline is October 1. Applicants to the physician executive MBA are not required to take the GMAT test.

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

Taiwan Executive MBA
The Taiwan executive MBA is provided for managers in Taiwan and East Asia holding middle and upper-level management positions. Classroom work and reading materials are in the English language. The students for whom this program is designed have a minimum of 5 years of work experience and are currently in management positions. The emphasis in the Taiwan executive MBA is to provide a good grounding in the fundamentals of various western business functions and a good basis in strategic thinking. Learning is expanded through applying these tools within the student's own organization through structured projects each semester. The Taiwan executive MBA is the right choice for individuals in positions of broad responsibility who wish to have a knowledge of Western business practices and to improve their ability to think and carry out business activities in English.

The Taiwan executive MBA is a three semesters completed in 19 months. Teams of UT faculty travel to Taipei for five 8-day residence periods starting in May of the first year. The sixth and final residence period is two weeks in length and is held in Knoxville. Between residence periods students meet in regularly scheduled study classes to discuss project work and readings assigned for the next residence period.

Applications are accepted for May entry only. The application deadline is April 1. Taiwan executive MBA applicants are not required to take the GMAT. Students accepted into the program will receive materials for study preceding the May start date.

An applicant who has not taken the Test of English as a Foreign Language (TOEFL) within the previous two years must take and pass it with a score of 213 or higher on the computer-based test. This test may be taken after enrolling in the program but must be successfully completed prior to the final residence period in Knoxville. To allow for registration, delivery of scores and receipt of the I-20 visa, participants should arrange to take the TOEFL at least 5 months before the Knoxville residence period.

DUAL J.D.-MBA PROGRAM

The College of Business Administration and the College of Law offer a coordinated dual program leading to the conferral of both the Doctor of Jurisprudence and the Master of Business Administration. The dual program saves the student approximately 15 hours (one semester) over the time that would be required to earn both degrees independently.

The establishment of the dual program recognizes the increasingly complex body of knowledge necessary to the competitive 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.-MBA program must make separate application to, and be competitively and independently accepted by, the College of Law for the J.D., The Graduate School and College of Business Administration for the MBA degree, and by the Dual Program Committee.

Students who have been accepted by both colleges may apply for approval to pursue the dual program anytime prior to, or after, matriculation in either or both colleges. Such approval will be granted, provided that dual program students are admitted prior to entry into the last 28 semester hours of J.D. coursework and prior to the third semester of the MBA program. Students interested in entering the dual degree program should submit a letter of application to the Dual Program Committee. Upon receipt of the application, the Dual Program Committee will determine eligibility and assign students to advisors who will be responsible for course approval and supervision of the student's progress through the dual program.

Curriculum
A dual program candidate must satisfy the graduation requirements of each college.

Students withdrawing from the dual program before completion of both degrees will not receive credit toward graduation from either college for courses in the other college, except as such courses apply for credit without regard to the dual program.

The College of Law will award up to 9 semester hours of credit toward the J.D. for acceptable performance in approved graduate-level courses offered by the College of Business Administration. The College of Business Administration will award up to 6 semester hours of credit toward the MBA for acceptable performance in approved courses offered in the College of Law. The approval of courses is the responsibility of the 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. During the first year in the MBA program, students register as graduate students. After the first two years, any term in which students take law courses or a mixture of law and graduate courses, they are classified and registered as law students. If taking only graduate courses, they are classified and registered as graduate students.

Approved Dual Credit

MBA courses in which the student has earned a B or higher and are to be counted toward the J.D. program must include 9 semester hours approved by the College of Law. The 6 hours of law courses in which the student has earned a 2.3 or C+ grade or higher and are to be counted toward the MBA must be selected from those approved by the Asst. Dean of the MBA Program.

DUAL M.S.-MBA PROGRAM

The College of Business Administration and the College of Engineering offer an integrated program leading to the conferral of the Master of Business Administration degree with a major in Business Administration (concentration in operations management) and the Master of Science degree with a major in Engineering Science (concentration in product development and manufacturing), Industrial Engineering (concentration in manufacturing systems engineering or project development and manufacturing), or Mechanical Engineering (concentration in product development and manufacturing).

The Engineering Science program is intended to provide other engineering majors an opportunity to participate in this program with a flexible coursework plan based on their undergraduate degree. The Industrial Engineering program is also open to students with undergraduate engineering majors other than industrial engineering.

The establishment of the dual program addresses the critical need for personnel trained in both engineering and management who can integrate an increasingly complex body of knowledge for rapid introduction of new products to the marketplace. The objective of the dual degree program is to prepare graduates to take a leading management role in companies that must react quickly to a dynamic market where forces of competition require rapid changes in design and manufacturing and a short product development cycle.

Admission Requirements
Applications are accepted for fall semester only. Applicants for the M.S.-MBA program must make separate application to, and be competitively and independently accepted by, the Graduate School for the Master of Business Administration degree program and the Master of Science degree program with a major in Engineering Science, Industrial Engineering, or Mechanical Engineering, and by the Dual Program Committee.

Students will initially apply for the MBA program, indicating on their application the intent to pursue the dual M.S.-MBA program.
and the appropriate engineering major (refer to the MBA program for separate instructions). Students accepted for both the MBA and one of the engineering degree programs will be assigned to Dual Program Committee advisors, who will be responsible for course approval and supervision of the students' progress through the dual program.

Applications by U.S. citizens and permanent residents received after the MBA application deadline (March 1) will be considered as space allows. Additional information is required and different application dates are established by The Graduate School for international students.

Curriculum

All engineering students enrolled in the dual program must complete common coursework designed to provide them with an integrated, multidisciplinary teamwork experience. The MBA curriculum consists of 33 hours of common coursework in the College of Business Administration and 15 hours of common coursework in the College of Engineering. Engineering common coursework includes a culminating 3-hour integrated project course requiring a comprehensive report, and a final examination as required by the Dual Program Committee, to be taken during the first session of summer following the second year.

During the second year dual degree candidates will take courses in their engineering major. The coursework for each option is designed to provide students with a concentration in their major and advanced skills to accomplish their teamwork assignments.

Dual degree candidates enrolled in Engineering Science option are required to take 18 hours of graduate level engineering courses during the second year of the program. This option requires a coursework plan, approved by the Dual Program Committee, including a concentration such that the student can accomplish his/her teamwork assignments.

Curriculum for Dual M.S.-MBA Degree

August - First Year
- BA 511 MBA Core I 3
- IE/ME 504 Product Development Process 1

Fall - First Year
- BA 512 MBA Core II 15
- IE/ME 506 Product Development Process 1

Spring
- BA 513 MBA Core III 9
- IE/ME 506 Product Development Process 1
- IE/ME 508 Integrated Product, Process, and Manufacturing System Design 3

Summer
- Internship 3
- IE/ME 504 Project Management 1

Fall - Second Year
- IE 514 Integrated Business Simulation 3
- IE/ME 509 Project Management 1

Spring
- MBA "hub" course elective 3
- IE/ME 509 Project Management 1
- Engineering major 6-9

Summer (first session)
- IE/ME 594 Culminating Integrated Project Report 3

TOTAL 63-89

*Students in manufacturing systems engineering concentration may substitute other selected IE courses for these courses.

For additional requirements for Master of Science degree with majors in Engineering Science, Industrial Engineering, or Mechanical Engineering, refer to program descriptions for those majors.

The dual degree candidate must satisfy the curriculum and graduation requirements of the engineering major being pursued and the College of Business Administration. Students withdrawing from the dual degree program before completing both degrees will not receive credit toward graduation in either degree program for courses taken in the other degree program, except such courses qualify for credit without regard to the dual degree program. The M.S. and the MBA degrees will be awarded upon successful completion of the requirements of the dual program.

Approval Dual Credit
A maximum of 15 hours of the common program courses completed in the College of Engineering may be counted toward the MBA degree program.

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 college work, and additional information from international students. The college requires the Ph.D. application, scores from the GMAT, and four written recommendations. All materials should be received by the College of Business Administration no later than March 1. Late applications are considered only if space is available.

Under exceptional circumstances, a student may be considered for acceptance into the 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 four years of intensive study and research beyond the master's degree. Typically, the first two years of a student's program consist of coursework, writing, and research. The third and fourth years require completion of courses, the comprehensive exam, and completion of the dissertation. It is emphasized that the 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 in an undergraduate business class or as a research assistant to a senior faculty member. Students with strong teaching skills may be assigned their own classes. Typically, the College of Business Administration offers financial support for doctoral students during their tenure in the program.

The Ph.D. program is highly flexible, offering a wide array of concentrations and cognates. Moreover, heavy emphasis is placed on individualized instruction and close student-faculty interaction. Instruction takes the form of regular classes, doctoral seminars, and independent study and research. Students are also encouraged to attend lectures and discussions by visiting scholars throughout the year.

There are six concentrations offered in the Ph.D. program:

- Accounting
- Finance
- Logistics and Transportation
- Management (Operations Management and Strategic Management)
- Marketing
- Statistics

More detailed information concerning these specific areas is available by writing directly to each department or by accessing the College of Business Administration web page.

Degree Requirements

Doctoral students must file a program of study that has been approved by their doctoral committee within one year of completing their first year of doctoral studies. This committee is nominated by the department chairperson in a student's intended area of concentration, subject to the Graduate Council's policies and procedures. Following are specific degree requirements:

1. Students must complete at least three years of full-time coursework beyond the baccalaureate degree, with two years of residence on the Knoxville campus.
2. Students are required to have a sound and broad base on which to build their Ph.D. coursework. The departmental doctoral advisor will work with the student to determine what, if any, courses need to be completed. All such work is subject to approval by the temporary doctoral advisory committee and the Dean of the MBA Program. Specific concentrations may have prerequisites.
3. Research Tools: A minimum of 9 semester hours of graduate research methods must be completed. At least 6 semester hours in statistics courses beyond Statistics 531 are required. The remaining 3 semester hours may be completed in additional statistics courses (not to include Statistics 531) or in other areas such as

Business Administration 73
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 a dissertation embodying the results of original research demonstrating the ability to do scholarly writing. The dissertation is supervised by the candidate's doctoral committee, which must certify its completion and acceptability after oral defense of the candidate's research effort.

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

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 on an in-state basis. The Ph.D. in Business Administration is available to residents of Alabama, Florida, Kentucky, Louisiana, Texas, Virginia, or West Virginia.

Additional information may be obtained from the Office of Graduate Student Services.

ACADEMIC STANDARDS

A graduate student in the College of Business Administration whose grade-point average falls below 3.0 will be placed on academic probation. A student on probation will be dropped from the program unless her cumulative grade-point average is 3.0 or higher at the end of the probationary period. The probationary period is defined as the next semester's coursework as established by the degree program.

Business Administration

GRADUATE COURSES

501 MBA Career Development (1) Career opportunities available in each concentration. Prereq: Admission to MBA program or consent of Assistant Dean of MBA Program.


506 Enterprise Process Redesign (3) Enterprise Resource Planning (ERP) software as primary tool for redesigning business processes. Management methods required to facilitate redesign. Change management, consensus building, project management, and implementation methodologies. Configuration of ERP module and business processes using e-commerce tools. (Same as Information Management 501.)

510 Customer Responsive Management (3) Management methods that provide flexibility required to respond to diverse customer needs and to adapt to competitive, technological, and operational change. Mass customization, interactive marketing, capacity management, economics, and relationship management for services: health care, temporary services, professional services, repair services, truck load transportation, emergency response organizations, customer service centers and other responsive organizations.

511 MBA Core I (3) Essential skills of manager: basic information technology skills, teambuilding, and written and oral communication skills. Finance and accounting fundamentals, marketing, operations management, and human resource management. Prereq: Admission to MBA program or consent of Assistant Dean of MBA Program.


513 MBA Core III (9) Continuation of the functional fundamentals from 512. Information value chain: supply management and resource management. Capstone integrated experience using information technology. Prereq: 511 and 512 or consent of Assistant Dean of MBA Program.

514 Integrated Business Simulation (3) Computer simulation. Teams manage business within competitive marketplace. Prereq: 511, 512, and 513 or consent of Assistant Dean of MBA Program.


561 Management Project I (3) Company project. Preliminary investigation of significant strategic issue (new initiative, program or significant organizational change). Executive format includes international study. Prereq: 552.
Information Management

GRADUATE COURSES

431 Computer Mapping and Geographic Information Systems (3) (Same as Geography 411.)
501 Enterprise Process Redesign (3) (Same as Business Administration 508.)
511 Risk Management in Networked Business Environments (3) (Same as Accounting 514.)
512 Electronic Commerce (3) (Same as Accounting 542.)
521 Logistics and Supply Chain Analytical Techniques (3) (Same as Logistics and Transportation 509.)
522 Leveraging Information Through Descriptive and Prescriptive Modeling (3) (Same as Management Science 551.)
531 Geographic Software Design (3) (Same as Geography 510.)
532 Geographic Information Management and Processing (3) (Same as Geography 517.)

Chemical Engineering

(College of Engineering)

MAJOR

DEGREES

Chemical Engineering ....................... M.S., Ph.D.
John R. Collier, Head
Professors:
Bienkowski, Paul R., Ph.D. .................. Purdue
Collier, John R., Ph.D. ..................... Case Western
Counce, Robert M., Ph.D. .................. Tennessee
Cummings, Peter T., (Distinguished Scientist), Ph.D. .................. University of Michigan
D.Eng. ..................................... John Hopkins
Frazier, George C., Jr. (Emeritus), Ph.D. .................. Johns Hopkins
Holmes, John M. (Emeritus), Ph.D. .................. Tennessee
Moore, Charles F. (Alumni Prof.), Ph.D. .................. Louisiana State
Perona, Joseph J. (Emeritus), PE, Ph.D. .................. Northwestern
Prado, John W. (University Prof.), Ph.D. .................. Northwestern
Sheth, Atul C. (UTSI), Ph.D. .................. Northwestern

Associate Professors:
Bruns, Duane D., Ph.D. .................... Houston
Peterson, Simion (Research), Ph.D.During the Review Paper and Related Areas.
Stoner, Tse-Wei, Ph.D. ...................... MIT
Weber, Frederick E., Ph.D. .................. Minnesota

Assistant Professors:
Borole, Abhijet P. (Research), Ph.D. During the Review Paper and Related Areas.
Edwards, Brian J., Ph.D. .................... Delaware
Frymier, Paul D. (Liaison), Ph.D. ........... Virginia
Keffer, David J., Ph.D. ..................... Minnesota

Graduate students must register for CHE 501 every semester offered.

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 required or such evidence may be accepted by the department. The PhD program requires the satisfactory completion of:

1. Graduate courses in chemical engineering, amounting to approximately 24 semester hours, at least 9 of which must be in 600 series courses.
2. Supporting courses in related scientific and engineering fields amounting to approximately 21 semester hours.
3. A comprehensive examination, consisting of a written part and an oral part. The written part covers thermodynamics, reactor analysis, and transport phenomena and separations.
4. Active participation in graduate seminars conducted by the department. Resident students must register for CHE 501 every semester offered.

GRADUATE COURSES

403 Introduction to Optimization (3) Principles and applications of optimization techniques to chemical process design; unconstrained and equality constrained optimizations, linear programming, dynamic programming, and geometric programming. Prereq: Mathemat- 
ics 241.
415 Computer Applications in Chemical Engineering (4) Computer solution of chemical engineering problems. Application of existing personal computer programs. Flow sheet simulators, statistics, spreadsheets, graphics and process modeling. Prereq: Mathemat- 
ics 241.
467 Honors: Engineering Internship in Process Control (4) Selected students work in small groups on industrial problems in process dynamics and control. Directed by faculty and engineers from host company. Prereq: Process Dynamics and Control and consent of instructor.
500 Thesis (1-15) P/NP only. E

501 Graduate Seminar (1) Prereq: Admission to graduate program or consent of instructor. 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 for faculty time before degree is completed. May not be used to satisfy degree requirements. May be repeated. S/NC only. E

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

561 Process Modeling and Simulation (3) Theories and principles of modeling and simulation, model development from basic principles, chemical process models, steady-state and dynamic systems, geometric and physical interpretations of material balances, LRU, Q, and SVD decompositions of system matrices, eigenvalue problems and similarity transformations in solving different types of problems, numerical stability and computational methods, applications of linear algebra concepts in control and optimization studies; introduction to linear programming, computer projects. Prereq: Graduate standing or consent of instructor. (Same as Electrical Engineering 507 and Mechanical Engineering 507.)

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


541 Fluid Mechanics and Polymer Processing (3) (Same as Materials Science and Engineering 541.)

542 Diffusive and Stagewise Mass Transfer Operations (3) Analysis of mass transfer phenomena, coupled mass transfer and reaction, mass transfer in packed beds and agitated vessels, membrane separations. Equilibrium stage concepts applied to mass transfer operation, emphasizing nonstoichiometric and multicomponent systems.

547 Introduction to Transport Phenomena (3) Unified treatment of transport processes, momentum, and heat transfer. Differential and macroscopic balances in deriving governing equations. Analogies between processes. Use of dimensionless approach in scaling systems up or down. Applications involving transfer and simultaneous chemical reactions. F

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

561 Process Modeling and Simulation (3) Theories and structures of models and art of simulation. Model development from basic principles. Model development from process design data. Use of models in operations optimization and control. Prereq: Consent of instructor.

575 Applied Microbiology and Bioengineering (3) Cross-disciplinary course combining basic concepts in microbiology, biochemistry, reaction kinetics, and biochemical and environmental engineering. Commercial processes, biodegradations/wastewater treatment, analysis of basic bioreactor systems, biosensors, and immobilization techniques. Fundamental laboratory techniques during 6-week laboratory period. (Same as Environmental Engineering 575, Biosystems Engineering 575 and Microbiology 576.)


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 Environmental Science 585.)

585 Process System Reliability and Safety (3) (Same as Nuclear Engineering 585.)

590 Special Topics in Chemical Engineering (3) May be repeated. Maximum 8 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 dynamics calculations, applications to supercritical fluids, macromolecules and biological systems. Prereq: 532.


642 Advanced Topics in Polymer Processing (3) (Same as Materials Science and Engineering 642.)

647 Advanced Transport Phenomena (3) Theory of mass, momentum, and energy transport in reactive and nonreactive systems. Formulation of transport models useful for application to analysis and design of separation processes, and chemical and biochemical reactors. Prereq: 505, 547.


661 Advanced Topics in Process Dynamics and Control (3) May be repeated. Maximum 6 hrs.

675 Microbial Systems Analysis (3) Identification and analysis of complex microbial systems using perturbation-response methods. Structuring of important mechanistic processes, interactions, and regulation at several systems levels (reactor or macro, ecological, cellular/physiological and molecular). Experimental methods for data gathering, signal resolution and processing, mathematical analysis, model development (deterministic, stochastic, phenomenological), and utility and limitations of approach. Prereq: 575 or consent of instructor.

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

Chemistry (College of Arts and Sciences)

MAJOR

DEGREES

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

Michael Sepaniak, Head

Professors:

Adcock, J. L., Ph.D. .................................. Texas


Assistant Professors:

Barnes, C. E., Ph.D. ......................... Stanford Dadmun, M. D., Ph.D. ................... Massachusetts Hinde, Robert J., Ph.D. .............. Chicago Schell, P. M., Ph.D. ....................... Indiana 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 recommended. Students lacking any of these prerequisites may be admitted with appropriate deficiencies that must be removed without graduate credit. Applicants are required to take the general Graduate Record Examination.

Students 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 graduate 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 in chemistry (at the 400 level or above) and/or a related field to make an overall total of 30 hours, including one of the following sequences: 530-54-55, 543-544-545, 553-554-555 from 510-11-20. At least 14 hours of this graduate coursework must be at the 500 level or above.

5. A final oral examination.

THE DOCTORAL PROGRAM

The department offers concentrations in eight areas for the Ph.D.: analytical chemistry, chemical physics (in cooperation with the Department of Physics), environmental chemistry, inorganic chemistry, organic chemistry, physical chemistry, polymer chemistry, and theoretical chemistry.

The requirements for the Ph.D. in Chemistry (except for the chemical physics concentration) 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 601) 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 601 and one of the following courses: 510-11-12, 530-31-32, 550-51-52, 570-72-73, 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. The following general requirements include passing the above degree requirements in chemistry with concentration in physical chemistry plus 6 additional hours in physics at the 500 level or above. Three of the additional physics hours can be used to satisfy the 18 hours requirement in item 5.

GRADUATE COURSES

430 Advanced Inorganic Chemistry (3) Atomic and molecular structure, bonding theories, descriptive chemistry of elements, kinetics and mechanism of inorganic reactions, applications of modern techniques for characterization of inorganic compounds. Required background: Two semesters of inorganic chemistry. Prereq: 230 Inorganic Chemistry.


471-81 Biophysical Chemistry (3,3) (Same as Biochemistry and Cellular and Molecular Biology 471-61.)

473-83 Physical Chemistry (3, 3) Students may not receive credit for both 473 and 473N or both 481 and 483. 473 - Properties of gases; first and second and third laws of thermodynamics; chemical equilibria; simple phase equilibrium; solutions. 481 - Introduction to statistical thermodynamics; kinetics of chemical reactions; introduction to quantum mechanics and applications to electronic structure of atoms and molecules; molecular spectroscopy. Prereq: General Chemistry, Elements of Physics or Fundamentals of Physics: Electricity and Magnetism, and Calculus III.

479-89 Physical Chemistry Laboratory (2,2) Experiments on topics discussed in 471-81 or 473-83. Prereq: coreq: 471-81 or 473-89. F

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

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

502 Registration for Use of Facilities (3-15) Required for students who desire to register as graduate students in 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.

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

510 Analytical Spectroscopy (3) Principles and practice of optical and mass spectrometric techniques in quantitative chemical analysis. Required background: Two semesters of physical chemistry.

511 Analytical Separations (3) Principles and practice of chemical separations based on extraction, chromatography, and electrophoresis. Prereq: Consent of instructor. Required background: Two semesters of physical chemistry.

512 Electroanalytical Chemistry (3) Fundamentals of electrochemical processes; principles and practice of electroanalytical techniques in quantitative chemical analysis and applied study of chemical systems. Required background: Two semesters of physical chemistry.

530 Chemical Bonding (3) Wave mechanical atom, group theory, quantum approach to molecular orbital theory, covalent, ionic, and metallic bonding, ligand field theories, solid state. Required background: One semester of inorganic chemistry.

531 Characteristics of Inorganic Compounds (3) Descriptive chemistry of elements, structure, reactions, kinetics, mechanisms, equilibria, and spectra of coordination, organometallic, bioinorganic compounds. Required background: One semester of inorganic chemistry.

532 Experimental Methods of Inorganic Chemistry (3) Electronic, infrared, Raman, microwave, NMR, ESR, nuclear quadrupole, Mossbauer, mass, and photoelectron spectroscopies for characterization of inorganic compounds. Required background: One semester of inorganic chemistry.

540 Nuclear and Radiochemistry (3) Nuclear properties, radioactivity, radioactive decay processes, nuclear structure and models, nuclear reactions, radioactivity and matter, radiation detection. Required background: Two semesters of physical chemistry.

550 Structure and Reactivity in Organic Chemistry (3) Structure and bonding in organic compounds; molecular orbital theory, stereoisomerism, conformational analysis, and molecular mechanics; substituent effects on acidity and reactivity; introduction to reaction mechanisms. Required background: Two semesters of organic chemistry.

551 Organic Reactions (3) Organic transformations of functional groups; synthetic and mechanistic principles. Prereq: Consent of instructor. Required background: Two semesters of organic chemistry.

552 Organic Reaction Mechanisms (3) Techniques and principles in study of organic reaction mechanisms; applications and interpretations in polar, radical, and pericyclic reactions; reactivity of functional groups. Prereq: 550. Sp


554 Organic Spectroscopy Laboratory (1) Use of IR, UV, MS and multinuclear NMR spectrometers. Development of problem-solving ability in area of spectroscopic characterization of organic molecules. Prereq: 550 or equivalent. Coreq: 553. F

570 Quantum Chemistry and Spectroscopy (3) Basic principles of quantum mechanics and their applications to molecular orbital theory, molecular structure, and spectroscopy. Introduction to group theory. Required background: Two semesters of physical chemistry.

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

572 Thermodynamics and Statistical Mechanics (3) Macroscopic and microscopic description of equilibrium systems. Basic principles of thermodynamics and statistical mechanics, and application to selected physical systems. Required background: Two semesters of physical chemistry.

573 Chemical Kinetics and Transport (3) Time-dependent phenomena in chemistry; chemical kinetics, chemical dynamics, transport theory. Required background: Two semesters of physical chemistry.

580 Polymer Chemistry (3) Fundamentals of polymer synthesis and characterization through application of organic and physical chemical principles. Required background: Two semesters each of organic and physical chemistry.

584 Organic Chemistry of Polymers (3) Synthesis of monomers; mechanism, stereochemistry, sequence distribution, and kinetics of polymerizations. Formation of block, graft, and network polymers. Reactions on polymers. Prereq: 590 or equivalent. Sp

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/NC 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.

610 Selected Topics in Analytical Chemistry (3) Topics of current significance. Prereq: Two of 550-61-71 or consent of instructor. May be repeated. Maximum 12 hrs.

630 Selected Topics in Inorganic Chemistry (3) Topics of current significance. Prereq: 530-31-52 or consent of instructor. May be repeated. Maximum 12 hrs.

650 Selected Topics in Organic Chemistry (3) Topics of current significance. Prereq: Two of 550-61-71 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.

Child and Family Studies

(College of Human Ecology)

MAJORS

DEGREES

Child and Family Studies M.S. Human Ecology Ph.D.

James D. Moran, III, Interim Head

Professors: Blanton, Priscilla, Ed.D. Tennessee Buellner, Cheryl, Ph.D. Minnesota Cunningham, Jo Lynn, Ph.D. Michigan State
The Department of Child and Family Studies provides coursework in human development and family studies. Integration of these areas creates a unique perspective for the study of individuals and families. Each graduate student's program of study is carefully planned in conjunction with a faculty committee to establish a program consistent with program requirements and a student's individual goals. All programs are characterized by a broad array of coursework, varied research experiences, and opportunities for experiences in applied settings.

**ADMISSION REQUIREMENTS**

A completed file for review includes a departmental application, Graduate Record Examination (GRE) scores for the general section, and listing of three of Graduate School Rating Forms by individuals who can attest to the applicant's potential for graduate education. Forms may be obtained from the department.

Admission to the program is contingent upon faculty evaluation of GRE scores, undergraduate/graduate GPA, rating forms, work experience, and the match between student's goals and department's focus. Prerequisites for admission to the master's program are 9 semester hours of upper division undergraduate social science.

Prerequisites for the doctoral program are a master's degree from a nationally accredited institution or equivalent, completion of the 18-hour core in the CFS master's program (or appropriate substitutions), 3 hours of computational-based, graduate-level statistics, 3 hours of graduate-level research methods, and completion of a thesis as part of the master's degree. The department provides a remedial mechanism for doctoral students who have earned a master's degree but have not met the other prerequisite requirements.

**THE MASTER'S PROGRAM**

The Master of Science degree with a major in Child and Family Studies provides a broad foundation in the understanding of how children develop and how families function in today's society. Two concentrations are available in child and family studies or in early childhood education. Ten graduate credits are required.

Students who plan to pursue a doctoral degree are best served by selecting the thesis option. The following are required in the thesis option: 570, Statistics 531 or 537, and 6 credits of Thesis 500. Students who plan to work with children and families in the community are best served by selecting the non-thesis option. The non-thesis option requires 30 hours of coursework. In addition to the core and specialization courses, CFS 570 is required.

Specializations within the practice option include: child and family life practice, family mediation, gerontology, child and family policy, families of children with disabilities, and child and family program administration. Each of these specializations includes 6 credits of specified relevant coursework and a supervised internship (564 and 565).

Master's students who have completed the child and family life practice specialization by taking an approved set of courses are eligible to make application for full or provisional designation as a Certified Family Life Educator (CFLE) through the National Council on Family Relations. Specific coursework within each specialization is on file in the Department of Child and Family Studies. Interested students should contact the Graduate Coordinator in Child and Family Studies.

Students seeking the M.S. with a major in Child and Family Studies must file a plan of study with the department head after 12 hours of graduate credit.

The early childhood education concentration is designed for students seeking teacher licensure in early childhood education (Pre-K through Grade 4). This program is based on an undergraduate degree in child development or equivalent coursework. A non-thesis option is also available. All students in the early childhood education licensure program must enroll in Human Ecology 574, 575, 591, and Child and Family Studies 569. Students select one course from 510, 511 or 512; three courses from 511, 520, 521, 522, 525, 530, 640, 590; 3 hours of 500-level statistical methods or interpretation of statistical methods (requirement may be met with 569); and written comprehensive examination (36 credits).

**THE PH.D. CONCENTRATION**

The department participates in the doctoral program with a major in Human Ecology, concentration in child and family studies. Two themes are highlighted: the integration of theory and practice, and child and family studies and concentration in a selected area of study. A doctoral program that is concurrently specialized and integrative in nature reflects the complexity of the disciplinary subject matter, provides a broader context to formulate theoretical and practical conclusions, and broadens the empirical literature for addressing those questions.

Requirements include:

2. Completion of the doctoral core: 640, 634, 691 or 650.
5. Three credits of advanced statistics.
6. Minimum 3 credits in specialized research methods.
7. Selection of one of the following specializations: teaching in higher education (requires UT GTA seminar, 3 credits of college teaching methods, and one semester of supervised teaching experience); administration in community services (requires 566 or 563, 521 or HRS 512 or SW 541, and one semester of an administrative apprenticeship); research emphasis (requires 6 additional credits in research methods or statistics).
8. Minimum of 6 credits in a cognate area.
10. Minimum of 96 credits beyond the bachelor's degree.

**GRADUATE COURSES**

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

502 Registration for Use of Facilities (3-15) Requires 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

505 Development of Interpersonal and Supervision Skills (3) Refinement of interpersonal skills needed to work with families and other professionals. Supervisory training in others' skill development, active listening, self-disclosure, relationship building, and negotiation. Skills adapted for use among family members.

510 Theory in Human Development (3) Theoretical models of human development: cognitive, social, emotional, and ecological. Learning, analysis, synthesis, and discussion of historical and contemporary relevance of models; application of theory to research, prevention, intervention, and education; critical reading and evaluation of theory-based research on human developmental processes.

511 Survey of Research in Child Development (3) Survey of human development research from conception through adolescence. Classic and contemporary empirical literature in domains of physical, cognitive, language, social, emotional, and moral development; biological basis of development of cross-cultural perspectives.

512 Survey of Research in Early Childhood Education (3) Current literature and issues in early childhood education. Prereq: 510 or equivalent or consent of instructor.

515 Children in Contemporary Society (3) Theory and research on environmental and developmental issues in contemporary family situations and educational environments for children from infancy through middle childhood. Implications for programs and policy.


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; budgeting and supervision of staff. Required background: 6 hrs graduate-level coursework in early childhood education or child development.

522 Naturalistic Interventions for Parents and Teachers of Young Children (3) Common problems faced by parents and teachers; methods available to modify problem behavior.

564 Practicum in Human Development or Family Education. Prereq: 550. May be repeated with different topics. Maximum 6 hrs.

565 Advanced Qualitative Research Methods (3) Various theoretical approaches for family research. Prereq: 570. May be repeated with different topics. Maximum 6 hrs.

566 Family Violence (3) Theory and research on initiation, maintenance and cessation of violent behaviors in intimate partner relationships. Prereq: 550. (Same as Counseling Education and Psychology 566.)


571 Research Seminar (1) Presentation and critique of research projects. Prereq: Departmental major or consent of instructor. May be repeated. S/N only.

572 Special Topics in Human Development or Family Studies (1-3) Individualized learning experiences in specific topics in child development and early childhood education or family studies. Prereq: 6 graduate hrs in major or consent of instructor. May be repeated with different topics. Maximum 9 hrs.

573 Directed Study in Human Development or Family Studies (1-3) Individual learning experiences in specific topics in child development and early childhood education or family studies. Prereq: 6 graduate hrs or consent of instructor. May be repeated with different topics. Maximum 6 hrs.

574 Doctoral Research and Dissertation (3-15) Ph.D. only.

575 Special Topics in Human Development or Family Studies (1-3) Research and application of theoretical models to understanding research. Prereq: 550.

576 Advanced Special Topics in Human Development or Family Studies (1-3) Study of research and theory related to current issues. Prereq: 12 graduate hrs in major or consent of instructor. May be repeated with different topics. Maximum 6 hrs.

577 Advanced Directed Study in Human Development or Family Studies (1-3) Advanced, in-depth individualized learning experiences in specific topics in child development and early childhood education or family studies. May be repeated with different topics. Maximum 6 hrs.


580 Survey Design and Analysis (3) Same as Sociology 633.

581 Advanced Survey of Family Theory and Research (3) Conceptualization, analysis, and critical assessment of pertinent conceptual and empirical literatures at advanced level for variety of contemporary family issues. Prereq: 570, master's core. Required background: 6 hrs graduate-level statistics.

582 Family Studies II (3) School and community programs concerned with education for human development and family living. Committee approved and supervised written project. S/N only.

583 Family Violence (3) Theory and research on initiation, maintenance and cessation of violent behaviors in intimate partner relationships. Prereq: 550. (Same as Counseling Education and Psychology 566.)

584 Practicum in Human Development or Family Education for children living with disabilities. Prereq: Consent of instructor. S/N only.

585 Family Violence (3) Theory and research on initiation, maintenance and cessation of violent behaviors in intimate partner relationships. Prereq: 550. (Same as Counseling Education and Psychology 566.)

586 Approaches to Family Intervention and Counseling (3) Various theoretical approaches for family intervention and counseling. Structural, strategic, experiential and social learning schools of practice. Effects of intervention from perspective of their impact on family functioning and communication. Prereq: 562. (Same as Counseling Education and Counseling Psychology 566.)

587 Family Violence (3) Theory and research on initiation, maintenance and cessation of violent behaviors in intimate partner relationships. Prereq: 550. (Same as Counseling Education and Psychology 566.)


589 Research Seminar (1) Presentation and critique of research projects. Prereq: Departmental major or consent of instructor. May be repeated. S/N only.

590 Special Topics in Human Development or Family Studies (1-3) Individualized learning experiences in specific topics in child development and early childhood education or family studies. Prereq: 6 graduate hrs in major or consent of instructor. May be repeated with different topics. Maximum 9 hrs.

591 Directed Study in Human Development or Family Studies (1-3) Individual learning experiences in specific topics in child development and early childhood education or family studies. Prereq: 6 graduate hrs or consent of instructor. May be repeated with different topics. Maximum 6 hrs.

592 Doctoral Research and Dissertation (3-15) Ph.D. only.

593 Special Topics in Human Development or Family Studies (1-3) Research and application of theoretical models to understanding research. Prereq: 550.


595 Children, Divorce and Remarriage (3) Children's and adolescents' adjustments to transitions involved in parental divorce, single-parenthood, and remarriage.


597 Families and Children Coping with Stress (3) Processes used by children and families during times of stress. Theoretical contributions to study of impact of development stressors and catastrophes on children and families.

598 Family Life Education Programs (3) Planning, implementing and evaluating programs in marital, parent-child, and family relationships, and parenting education. Prereq: 550.

599 Practicum in Human Development or Family Studies (3) Community programs concerned with education for human development and family living. Committee approved and supervised written project. S/N only.

600 Practicum in Human Development or Family Studies (3) Community programs concerned with education for human development and family living. Committee approved and supervised written project. S/N only.

601 Advanced Special Topics in Human Development or Family Studies (1-3) Study of research and theory related to current issues. Prereq: 12 graduate hrs in major or consent of instructor. May be repeated with different topics. Maximum 6 hrs.

602 Advanced Directed Study in Human Development or Family Studies (1-3) Advanced, in-depth individualized learning experiences in specific topics in child development and early childhood education or family studies. May be repeated with different topics. Maximum 6 hrs.


605 Survey Design and Analysis (3) Same as Sociology 633.

606 Advanced Survey of Family Theory and Research (3) Conceptualization, analysis, and critical assessment of pertinent conceptual and empirical literatures at advanced level for variety of contemporary family issues. Prereq: 570, master's core. Required background: 6 hrs graduate-level statistics.

607 Advanced Theory in Human Development (3) Original conceptualizations and current theoretical perspectives influencing field of human development and empirical evaluations of these perspectives. Prereq: 550, 510, 511, or consent of instructor.

608 Advanced Qualitative Research Methods (3) Techniques and analysis used in qualitative research in human development and family studies. Use of methods: in-depth interviewing, participant observation, and case studies. Prereq: Communications 642 or Psychology 513.


611 Secondary Analysis of Survey Data (3) Applied seminar in secondary analysis of survey data. Identification of data sources, accessing data, evaluation, and analysis of social and political survey data. Nationally representative data sets relevant to study of families, youth, or children. Prereq: 570 or equivalent. Statistics 532 or 537 or equivalent.

612 Analytic Reasoning (3) Analysis of quantitative methods and measures used in human development and family research: validity, reliability, causality, and generalizability. Prereq: 570. Required background: 9 hrs graduate coursework in child and family studies, and 6 hrs graduate-level statistics.
THE MASTER'S PROGRAM

The Master of Science programs in Civil Engineering and Environmental Engineering are offered to graduates of recognized undergraduate curricula.

Departmental requirements provide that for a major in Civil Engineering, the Bachelor's degree must be taken before admission to candidacy for the Master of Science in Civil Engineering.

Civil Engineering

The Department of Civil and Environmental Engineering offers two options for the Master of Science with a major in Civil Engineering.

Thesis Option: A minimum of 30 semester hours, including 6 hours of thesis, is required.

Non-Thesis Option: A minimum of 33 semester hours, including a 3-hour special problems is required. The special problem will culminate in a written report which must be approved by the student's major professor.

Environmental Engineering

For a Master of Science with a major in Environmental Engineering, normally a Bachelor's degree in a field of engineering is required. For a student who does not have an engineering background, the following minimum prerequisite courses will be required: Engineering Fundamentals 101, 102; Nuclear Engineering 203 or Mechanical Engineering 331; Basic Engineering 121, 131; Environmental Science and Mechanics 231; Statistics 251; Civil Engineering 390, 395, 350; Mathematics 141, 142, 231, 241; Chemistry 120, 120. 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 should include 6 semester hours of thesis and a minimum of 12 semester hours of approved environmental engineering coursework. A minor may be selected but is not necessarily required.

Non-Thesis Option: The student must present a minimum of 33 semester hours of approved graduate courses. The major shall include a minimum of 16 semester hours of approved environmental engineering coursework. A minor may be selected but is not necessarily required. Either option must be approved by the student's major professor. A student's program must include a minimum of 9 semester hours of advanced 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 800 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 800-level courses.

3. Supporting courses in related scientific and engineering fields, amounting to approximately 24 semester hours, subject to approval by the student's faculty committee. These related fields will normally include such disciplines as mechanics, chemistry, mathematics, microbiology, physics, and other engineering fields. A minimum of 9 semester hours of mathematics will be required beyond the civil engineering undergraduate requirements.

4. One foreign language if the student's faculty committee feels that a reading knowledge of a foreign language is crucial to the student's research efforts.

5. Upon completion of at least one-half of all coursework, each student must pass a comprehensive examination administered by a faculty committee.

MINOR IN ENVIRONMENTAL POLICY

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

Civil Engineering

GRADUATE COURSES

421 Portland Cement Concrete Mix Design and Analysis (3) Aggregate properties and tests, tests of portland cement and concrete, mix design methods, admixtures, and nondestructive testing. Prereq: 321; 2 hrs and 1 lab.

451 Highway Engineering (3) Design, construction, operation, and maintenance of highway facilities; application of various engineering principles and techniques to process of planning, locating and design of highway facilities; both geometric and pavement design. Prereq: 210, 251, 352.

452 Traffic Engineering (3) Characteristics of driver, vehicle, and roadway and their 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, geometrics and terminal layout and design. Railroad capacity, geometrics and system layout and design. Prereq: 210, 251, 352.

461 Analysis of Framed Structures (3) Determination of dead, live, wind and earthquake loads for buildings; vertical and lateral load resisting systems; analysis of building frames. 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 buildings. Prereq: 471.

474 Reinforced Concrete Design (3) Design of continuous beams, floor slabs, and columns with combined axial loads and bending, footings; and design for torsion. Prereq: Introduction to Structural Design.

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

490 Water Resources Project Design (3) Coherent development of multipurpose reservoir and dam project, data acquisition, analysis, and presentation; reservoir and outlet works design; earthwork, and gravity dam; dam analysis and filters; maintenance and operation principles; and dam safety concepts, dam break analyses. Prereq: 390, 395.

495 Water Resources Development and Management (3) Principles of water resources project development and management. Institutional framework, water rights, evaluation procedures for comparing and selecting among water resources development alternatives, multi-objective planning, 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 completion of course. May not be used toward degree requirements. May be repeated. S/NC only. E

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


522 Asphalt Concrete Mix Design and Analysis (3) Aggregate properties and tests, tests of asphalt and concrete mixes, mix design methods for asphalt concrete, production and placement of hot mix asphalt. Prereq: Materials of Construction. 2 hrs and 1 lab.


531 Soil Stabilization (3) Mechanical stabilization of soils by compaction, drainage, and blending; chemical stabilization of soils with admixtures, waterproofing and mechanical soil and slope stabilization. Site investigation and stabilization with geosynthetics. Prereq: Introduction to Soil Behavior.

532 Rock Mechanics and Rock Engineering (3) Engineering properties and characterization of rock and rock masses. Discontinuity analysis, stress and strain, keyblock theory. Applications to rock slopes, underground excavations, foundations and groundwater flow. Prereq: Introduction to Soil Behavior or consent of instructor.

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


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

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

560 Seminar (1-5) Reports on current research in environmental engineering at UT. Prereq: Graduate standing.

510 Environmental Protection (3) Managing of water resources, wastewaters, air quality, solid wastes, and hazardous materials to promote efficiency and comfort and safeguard balance in natural ecosystems. Prereq: Consent of instructor.

520 Open Channel Hydraulics (3) Open channel flow principles, properties, and classifications; uniform and geostrophic flow theory and applications; open channel design; unsteady flow theory and analysis; dynamic routing; spatially varied flow; non-linear alignment; microcomputer applications, featuring HEC-2 model. Prereq: Hydraulics.

522 Floodplain and Urban Flood Management (3) Review of national, regional, and local flood problems; state of the art flood damage reduction alternatives: structural and non-structural, institutional responses; policies, programs, organizations, regulations, and legal aspects; floodplain hydrology and hydraulics, HEC-1, HEC-2: floodway encroachment, flood hazard zone and flood damage potential; floodplain management. Prereq: Hydraulics or consent of instructor for non-majors.

524 Sediment Transport (3) Sediment properties and measurements; principles of dynamics of suspended and bed sediment transport in erodible channels; erosion, transportation, and deposition of sediment by flowing water; erodible channel design; channel regime theory; common computer models. Prereq: Hydraulics.

525 Soil Erosion and Sediment Yield (3) Theory of soil erosion and sediment yield processes from disturbed land; methods and computer models for estimating sediment yield. Prereq: Calculus II or consent of instructor.

530 Urban Hydrology and Stormwater Engineering (3) Planning, design, modeling, management, and maintenance of urban stormwater systems. Theory and application of hydraulic and hydrologic principles to design of stormwater management systems; design of inlet structures, conveyance systems, detention/drainage basins and appurtenances, and selected best management practices (BMPs); evaluation of land use changes of runoff quantity and quality; review, selection and application of contemporary computer models. Prereq: Hydraulics, Hydrology.

535 Ground Water Hydrology (3) Dynamics of flow and contaminant transport in porous media; hydrodynamic dispersion; analytical solutions to transport equations. Prereq: Hydraulics and Hydrology or Civil Engineering 485 for geology majors. (Same as Geological Sciences 535.)

540 Remote Sensing for Transportation and Facilities Sitting (3) Principles of remote sensing; sources of data and data acquisition systems; photo interpretation, analog and digital techniques for analysis of aerial and terrestrial photos, radar and thermal imagery with application to transportation facilities and planning, construction, and operations. Prereq: Consent of instructor.
554 Environmental Engineering Chemistry (3) Application of chemical principles in analyzing physical, chemical, or biological interactions of chemical contaminants in various environmental compartments: atmosphere, hydrosphere, and lithosphere. Prereq: One year chemistry and consent of instructor.

555 Solid Waste Management (3) Magnitude and characteristics of solid waste problems; collection systems; design of disposal systems; landfill, incineration, and composting; design of resource recovery systems; current and future regulations. Prereq: Senior standing.

556 Hazardous Waste Management (3) Analysis and design of processes and instruments for hazardous waste disposal and processing; regulations analysis; industrial applications. Prereq: Graduate standing or consent of instructor.

557 Hazardous Waste Site Remediation (3) Advanced study of processes for hazardous waste site remediation: soil vapor extraction, soil washing, chemical destruction, thermal destruction, bioremediation. Prereq: 556 or consent of instructor.

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

570 Air Quality Management/Pollution Control (3) Introductory course on concepts of air pollution, analysis of relationships among sources, meteorology, effects, modeling, and control systems. Prereq: Consent of instructor.

571 Design of Air Pollution Control Systems (3) Design and evaluation of systems used to control emission of gaseous and particulate air pollutants. Comprehensive design of specific devices and systems. Prereq: 570.

572 Air Quality Dispersion Modeling (3) Diffusion in atmosphere; application of atmospheric dispersion models and evaluation of meteorological and air quality data. Prereq: 570.

573 Sampling of Air Pollutants (3) Standard sampling methods for particulate and gaseous air pollutants; emission control systems. Prereq: Consent of instructor.

575 Applied Microbiology and Bioengineering (3) (Same as Chemical Engineering 576, Microbiology 575, and Biosystems Engineering 575.)

581 Industrial Pollution Prevention (3) (Same as Chemical Engineering 581 and Engineering Science 585.)

590 Special Problems in Environmental Engineering (1-6) Enrollment limited to environmental engineering students in non-thesis program. Prereq: Graduate standing. May be repeated. Maximum 6 hrs. S/N only.

595 Special Topics (1-4) Problems and topics related to current developments in field. May be repeated. Maximum 4 hrs. S/N only.

620 Advanced Surface Water Hydraulics (3) Advanced topics in surface water hydraulics; solutions to St. Venant equations of unsteady flow for complex channel situations; dam breach modeling. Prereq: 520.

651 Industrial Waste Unit Operations and Processes (3) Theoretical design and laboratory modeling of industrial waste treatment processes and operations. Prereq: 551, 553. Prereq or coreq: 552, 2 hrs and 1 lab.

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 and solids in environment. Methods of assessing risk posed by presence of those chemicals. Prereq: 551.

691 Special Topics in Environmental Engineering (3) Selected advanced problems of current interest. Prereq: Consent of instructor. May be repeated.

Classics

(College of Arts and Sciences)

David W. Tandy, Interim Head

Professors:


Associate Professors:


Assistant Professor:

Sutherland, E. H. Ph.D. Berkeley

The graduate courses in the Classics include the wider reading of Greek and Latin authors in a selected field, a more detailed study of one of the great genres of classical literature, and the development of background for the appreciation of Greek or Roman 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: 401-02 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 the model. Prereq: 351-52 or consent of instructor.

431-32 Selected Readings from Latin Literature (3,3) For advanced students in Latin, oratory, historical writings, poetry of ancient Rome in original Latin. Prereq: 351-352 or consent of instructor. May be repeated. Maximum 9 hrs.

435 Medieval Latin (3) Selected readings from Latin prose and poetry of medieval Europe. Prereq: Consent of instructor.

441 Special Topics in Classical Civilization (1-3) Art, literature, religion, and society of Greece and Rome. May be repeated with consent of department. Maximum 9 hrs.

461 Studies in Classical Archaeology (3) Variable content course offering subject matter not taught in an existing course, or concentrating on one aspect of existing survey. Prereq: According to topic. May be repeated. Maximum 9 hrs.

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/N.

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

Communications

(College of Communications)

MAJOR DEGREES

Communications M.S., Ph.D.

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

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 Exam., 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 at or above the fifteenth percentile in verbal, quantitative and analytical aptitude on the Graduate Record Examination. All application materials are screened by an admissions committee authorized by the faculty of the College of 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 full 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 18 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 Graduate Studies Committee of the College of Communications.

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

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 and communications industry, with an emphasis on communications management and a deeper understanding of the communication process and social role of media. The program follows a broad-based multi-media approach while allowing the student to concentrate in one of five fields: advertising, broadcasting, journalism, public relations or
speech communication. Both thesis and non-thesis options are available. The prospect 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.

Students planning to pursue a doctoral degree with a major in Communications may be accommodated in the M.S. program through special academic advising.

Degree Requirements

The M.S. program emphasizes communications management and industry in the areas of advertising, broadcasting, journalism (publications), public relations, and speech communication. For the thesis option, a minimum of 30 hours of approved graduate work is required. The non-thesis option requires 33 hours. Orientation attendance is required.

1. Six hours of core courses—Communications 512 and 540 to 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. Fifteen hours within one department of the college, at least 6 hours at the 500 level or above. An internship, if needed, is included.

3. Three hours for the thesis option and 9 hours for the non-thesis option of electives from a list provided by the department in area of concentration.

4. Six hours of thesis work (Communications 500) or a 3-hour project (Communications 590).

Additional hours may be required for those who do not have academic prerequisites, and an internship may be required for those who do not have professional experience in the field they wish to study. A course in communications law is a prerequisite.

A student's internship experience requires approval by his/her advisor. Credit will be given through Advertising 598, Broadcasting 598, Journalism 598, or Public Relations 598 on the basis of 3 hours of credit for the equivalent of 15 weeks of full-time professional experience. This credit is to be included in the hour requirements for the M.S. program. Previous professional experience will be evaluated by the student's committee.

Students interested in subsequent entry into a doctoral program are advised to pursue the thesis option and to take additional courses in communications theory and research, subject to advisor's approval.

Each student's progress will be reviewed annually by the Doctoral Committee of the College of Communications. Results will be reported to the student by his/her program advisor, who will convey the committee's recommendation concerning the student's remaining in the program (non-binding) and suggestions for improvement in performance.

Candidates without prior teaching experience must register for Communications 521, Tutorial in Communications Teaching.

Planned course offerings in the College of Communications for a full calendar year are available the preceding November. This information is available from the Graduate Studies Office, 426 Communications Building, 974-6651. See also courses listed under Advertising, Broadcasting, Information Sciences, Journalism, and Speech Communication.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some state to enroll in certain programs at UT on an in-state tuition basis. The M.S. program in Communications is available to residents of Arkansas or Kentucky. The Ph.D. program is available to residents of the states of Alabama, Arkansas, Louisiana, Virginia, or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Student Services.

ACADEMIC STANDARDS

A student in the College of Communications whose graduate grade-point average, not including incomplete grades, is below 3.0 at any time after the end of 12 hours of graduate credit will be placed on probation. A student on probation will be dropped from the program unless his or her cumulative grade-point average is 3.0 or higher at the end of the probationary period. The probationary period is defined as the next 12 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.

GRADUATE COURSES

400 Mass Communications Law and Ethics (3) Legal issues directly affecting the mass media: libel, privacy, free press-prior trial, judicial controls, government regulation. Ethical standards and practices of mass media in America. PreReq: News Writing or Advertising Creative Strategy or Radio-TV News. 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

512 Mass Media Research Methods (3) Applications of communications research techniques for management. Gathering and analysis of data for assessing media audiences and media impact. PreReq: Consent of Instructor. S

521 Tutorial in Communications Teaching (1) Experience as teacher under guidance of faculty member. PreReq: Consent of Instructor. S/NC only. E

540 Communications Theory (3) Selected research hypotheses and theories in literature of mass communications. PreReq: Consent of instructor or admission to program. S

550 Seminar in Media Economics and New Technology (3) Electronic and print media ownership, finance and corporate structure. Roles of new technologies and marketing techniques in changing media content and function in future. PreReq: Consent of Instructor or admission to program. S

551 Seminar in Science, Society, and the Mass Media (3) Investigation of interplay between scientific community and mass media: how scientific information reaches public and impact of journalism on scientific practice. PreReq: Consent of Instructor.
Comparative and Experimental Medicine
(Office of the Provost)

MAJOR

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

L. N. D. Potgieter, Director

Joint Graduate Coordinating Committee:

Karlstad, M.D., Ph.D., Anesthesiology
Lawler, J. E., Ph.D., Psychology
Loozio, 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 pathology, infectious diseases, pharmacokinetics, epidemiology, clinical medicine, 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 students with specific interests in: phylogenetics, molecular biology, and evolutionary medicine.

Doctor of Philosophy Degree Program

Applicants generally will be expected to have a professional degree in one of the medical sciences (e.g., M.D., D.D.S., DVM) or a master's degree in one of the biomedical sciences and a Graduate Record Examination score of at least 1000 for the quantitative and verbal sections.

An individual having a baccalaureate degree with a strong background in the physical and biological sciences may be admitted upon presenting evidence of exemplary performance on the Graduate Record Examination.

Exceptional veterinary students at UT 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

Core courses are required for the program. A basic science and/or applied science concentration must be selected at the first meeting of the student's master's committee. For the basic science concentration, students must take at least 8 hours in 500- or 600-level courses in basic mechanisms of disease and at least 6 credit hours of 500-level biochemistry or cell biology. The scope of this intercollegiate program, which is broadened by faculty from a multidisciplinary perspective, the student with undergraduate biological science background, is especially useful for students with specific interest in the study of disease processes common in humans and animals from a multidisciplinary perspective. The student with undergraduate biological science background, is especially useful for students with specific interest in the study of disease processes common in humans and animals from a multidisciplinary perspective.

THE DOCTORAL PROGRAM

Core courses are required for the program. A basic science and/or applied science concentration must be selected at the first meeting of the student's doctoral committee. For the basic science concentration,
503 Graduate Research Participation (3) Advanced research techniques while conducting individual biomedical research projects under supervision of faculty. Open to all graduate students. Prereq: Consent of instructor. May be repeated with consent of instructor. Maximum 9 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.

541 Molecular Basis for Human Diseases (4) Disease at molecular level. Changes in molecular events in cells that lead to disease and occur as result of disease. Correlation with clinical and pathological states. Prereq: Biochemistry and Cellular and Molecular Biology 410-419 or equivalent. F, A

545 Clinical Genetics (3) Human genetic disorders: new developments in cytotgenetics, molecular genetics, clinical diagnoses and prevention. Prereq: Biology and genetics background or consent of instructor.

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

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

611 Advanced Topics in Medical Science (1-3) New developments in medical sciences applicable to clinical medicine. Primarily for doctoral candidates in Comparative and Experimental Medicine. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. 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

603 Correlative Post-Mortem Pathology (1-3) Gross and microscopic post-mortem examination of animals. Correlative interpretation of clinical diseases and lesions. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

604 Veterinary Pathology Seminar (1) Microscopic slides and transparencies of lesions from cases examined by pathologists, residents, and graduate students. Interpretation of observations. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. E

605 Pathobiology Seminar (1) Subjects of current interest in biosciences. Students present one seminar per term enrolled. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. Class meets once monthly. E

606 Clinical Epidemiology (3) Theory and principles of design implementation and analysis of clinical research. Lab: appraisal of biomedical literature and design of proposal for clinical research project. Prereq: Consent of instructor. Sp

607 Diagnosis and Pathogenesis of Virus Diseases of Domestic Animals (3) Advanced study of virus diseases important to domestic animals: virus biology, pathogenesis, pathology and diagnostic techniques in animal diseases diagnosis. Prereq: Consent of Instructor. 2 hrs and 1 lab. Sp

608 Descriptive and Applied Epidemiology (3) Principles of epidemiology and historic and modern application to diseases of animals. Host-agent relationships, measurement of disease frequency, animal production and disease monitoring and control, field investigations, animal health economics. Prereq: Consent of instructor. F

609 Mechanisms of Disease (4) Advanced topics in pathobiology and mechanisms of disease: pathophysiology, cellular degeneration, inflammation, immunopathology, hemostasis. Principal biochemical and morphologic responses of various cells, tissues, and organs to injury and other metabolic derangements. Selected contemporary topics from current literature and textbooks. Prereq: Consent of instructor. Sp, A

610 Advanced Topics in Comparative and Experimental Medicine (1-3) Specialized in-depth experience in various disciplines. Current and future research methodology and modern instrumentation in analytical techniques for comparative medicine. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs. E

651 Advanced Topics in Animal Anatomy (1-4) (Same as Animal Science 651), E

652 Disorders of the Endocrine System (2) (Same as Animal Science 652), Sp, A

Comparative and Experimental Medicine

See College of Veterinary Medicine and Comparative and Experimental Medicine.
Computer Science

(College of Arts and Sciences)

MAJOR

DEGREES

Computer Science ......................... M.S., Ph.D.

Robert C. Ward, Head

Professors:

Dongarra, Jack, Ph.D. ............... New Mexico
Langston, Michael A., Ph.D. .......... Texas A&M
Poore, J. H., Ph.D. ................... Georgia Tech
Sherman, Gordon R. (Emeritus), Ph.D. Purdue
Thompson, Michael G., Ph.D. ........ Duke
Ward, Robert C., Ph.D. ................ Virginia

Associate Professors:

Berry, Michael W., Ph.D. .......... Illinois
Gregor, Jens, Ph.D. ................. Aalborg (Denmark)
MacLennan, Bruce J., Ph.D. ........ Purdue
Plank, James S., Ph.D. ............... Princeton
Raghavan, Padma, Ph.D. ............ Penn State
Vander Zanden, Bradley, Ph.D. .......... Cornell
Vose, Michael D., Ph.D. ............ Texas

Assistant Professors:

Straight, David W., Ph.D. .......... Texas
Wolek, Richard, Ph.D. ............... UC Davis

THE MASTER'S PROGRAM

Two semesters of calculus plus two additional semesters of college mathematics (e.g. linear algebra, differential equations, probability) and a course in discrete structures and in systems programming are required for admission. For the master's degree, 30 semester hours of graduate credit are required, 24 of which must be 500 level or above. Computer Science 530, 560 and 580 are required for the degree. Graduate courses taken outside the department are sometimes allowed but must be approved by the Graduate Committee before enrollment.

Thesis Option

The student must reach agreement on a thesis topic with a faculty advisor and must take 6 hours of 500 Thesis. Six hours of 500 Thesis may count in the 24-hour requirement at the 500 level or above.

Non-Thesis Option

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

Problems in Lieu of Thesis Option

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

Master's Minor in Computer Science

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

THE DOCTORAL PROGRAM

A student seeking admission to the Ph.D. program is expected to meet the following requirements:

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

2. The student is expected to have taken the GRE verbal and quantitative test within the past three years and to have these scores sent to The Graduate School.

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

Original research reported in a dissertation of high quality is emphasized. The minimum hour requirements are 42 hours of course 600 Doctoral Research and Dissertation and 24 hours of graduate courses beyond the equivalent of a master's degree (i.e., beyond 30 graduate credit hours) graded A-F. Computer Science 530, 560 and 580 are required for the degree. At least six hours of 600-level graded courses must be taken in computer science at UT. The student's advisor and committee will establish the specific course requirements. The comprehensive examination consists of a departmental written examination and a subsequent oral examination conducted by the student's committee.

GRADUATE COURSES

420 Advanced Topics in Machine Intelligence (3) Search, learning, expert systems, neural networks, pattern recognition and natural language processing.

430 Advanced Topics in Hardware Systems (3) Architecture, parallel processors, microprogramming, networks and communications. Faculty research. Prereq: Completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hrs.

440 Advanced Topics in Software Systems (3) Operating systems, compilers, parallel computation, software engineering, database systems and programming languages. Faculty research. Prereq: Completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hrs.

470 Advanced Topics in Scientific Computation (3) Numerical methods, supercomputers and computer modeling and simulation of physical systems. Faculty research. Prereq: Completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hrs.

471 Numerical Analysis (3) (Same as Mathematics 471.)

472 Numerical Algebra (3) (Same as Mathematics 472.)

480 Advanced Topics in Theoretical Computer Science (3) Theory of computation, complexity theory, formal languages and graph theory and its applications. Faculty research. Prereq: Completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hrs.

490 Special Topics in Computer Science (1-3) May be repeated. Maximum 9 hrs.

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

522 Cybernetics (3) Various functions in living systems and their actual or potential realization in computers. Prereq: Discrete Structures.

525 Software Engineering (3) Survey of key ideas in software engineering: formal methods, tools, testing, reliability, structured design and development, metrics, management and history of the field.

530 Computer Systems Organization (3) Architectures and systems organization for serial and parallel machines. Required background: Architecture or machine organization.


541 Database Management Systems (3) Data model theory, optimization, and normalization; intelligent database systems; companion of implementations; analysis of distributed and networked databases. Techniques for evaluation of performances, integrity, security and reliability. Prereq: Discrete Structures.

551 Pattern Analysis (3) Decision-theoretic and structural pattern analysis. Deterministic and statistical decision rules, feature extraction and representation; syntactic and semantic methods, relational models. Prereq: Discrete Structures and probability or statistics.

552 Image Analysis (3) Enhancement and restoration of digital images. 2D transforms. Segmentation and description. Computational procedures for image reconstruction. Prereq: One year calculus and discrete structures.

560 Software Systems (3) Design and implementation of compilers, software systems; design and implementation of software system design issues; description, structure, design and implementation of contemporary software systems. Prereq: Systems 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 factorizations, data structures, numerical algorithms, complexity analyses, parallel algorithms. Prereq: Numerical linear algebra.

580 Foundations (3) Foundations of computer science, including computability, computational complexity, fundamental algorithms and algorithm analysis. Required background: Automata theory.

581 Advanced 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, dy-
degree with majors in Textiles, Retailing and Consumer Sciences, concentrations in textile science and in retail and consumer sciences; and in Recreation, Tourism and Hospitality Management, concentrations in therapeutic recreation, recreation administration, tourism, and hospitality management. An interdepartmental/interdisciplinary minor in gerontology gives the graduate student an opportunity for combining the knowledge and experience about aging in American society with his/her own major concentration.

The programs in Consumer and Industry Services Management prepare students for careers in industry, business, public and private agencies, and educational institutions. Master’s level work enables students to conduct research in retail management and merchandising and in the consumer areas related to retail decision making. Students in textile science are expected to have a solid foundation in mathematics, as well as a formal background in a physical science or engineering.

Interested students should contact the department head for more information.

ADMISSION REQUIREMENTS

A complete file for review includes the Graduate School application file, Department of Consumer and Industry Services Management application, Graduate Record Examination (GRE) scores for the general section, and three Graduate School Rating Forms completed by individuals who can attest to the potential for graduate education. Forms may be obtained from the Dean’s Office, College of Human Ecology.

In addition to specified entrance requirements stipulated by The Graduate School, admission to the master’s degree program with a major in Textiles, Retailing and Consumer Sciences is dependent on completion of undergraduate courses that give the necessary background for success in the graduate program. For the concentration in retail and consumer science, students should have an adequate background in retailing and/or consumer science supported by coursework in economics, marketing, mathematics, and statistics. For the concentration in textile science, students should have a basic technical background in textile science or materials science supported by mathematics through differential equations, organic chemistry, and general physics. Superior students deficient in one or more of the above requirements, may be admitted at the discretion of the department’s graduate faculty.

THE MASTER’S PROGRAM

The requirements for the major in Textiles, Retailing and Consumer Sciences are listed below.

Retail and Consumer Sciences (Thesis)

Major (Required RCS courses): 510, 511, 541, 550, 562
Cognate Area 6
Statistics 3
Thesis 6
Total 34

Textile Science (Thesis Option)

RCS 552 3
Research Methods* 3
Textile Science courses 12
Cognate Area 6
Statistics 3
Thesis 6
Total 34

*Must include RCS 562 or equivalent; or 3 hours of laboratory techniques in materials analysis and characterization.

Textile Science (Non-Thesis Option)

Nonwovens Core (Required TS courses): 510, 521, 526, 528, 595 15
Related Courses 9
Statistics 3
Professional Project, TS 501 3-6
Total 30-33

The major in Recreation, Tourism and Hospitality Management requires 33-36 hours for the thesis option and 36-39 hours for the non-thesis option depending upon the specific concentration. For all thesis concentrations, individuals not possessing an undergraduate degree in the discipline or having appropriate full-time work experience will be required to take 390 (graduate internship).

Requirements for each concentration are:

Hospitability Management

All students (28 hours): Hotel and Restaurant Administration 532, 537, 542; Nutrition 541; Hotel and Restaurant Administration/Nutrition electives (12 hours); related area (6 hours); statistics (3 hours);
Thesis Option (6 hours): 500;
Non-Thesis Option (9 hours): 535;
Hotel and Restaurant Administration/Nutrition elective (3 hours); elective (3 hours).

For a description of courses in the hospitality management concentration, see Nutrition.

Recreation Administration

All students (27 hours): 415 or 440, 510, 515, 540, 541; Safety Education 443; Sport Management 512; statistics (3 hours); research methods (3 hours);
Thesis Option (6 hours): 500;
Non-Thesis Option (9 hours): 590 (6 hours); elective (3 hours).

Therapeutic Recreation

All students (24 hours): 420 or 425, 510, 515, 520, 521, 522; statistics (3 hours); research methods (3 hours);
Thesis Option (9 hours): 500; elective (3 hours);
Non-Thesis Option (12 hours); electives (6 hours); 590 (3-6 hours).
the second semester of full-time enrollment in master's degree from another institution are exclusive of dissertation. Transfer students with a 600-level in the College of Human Ecology, materials analysis and characterization; must include 6 hours of laboratory techniques in Cognate Area Textile Science Courses textiles and apparel in the context of the near research being conducted in all areas of research seminar exposes students to area. minimum of 15 hours of prescribed statistics choosing to take a minor in statistics will take a least 3 hours at the 600 level. (3) Students choosing to take a minor in statistics will take a minimum of 15 hours of prescribed statistics courses and are not required to take a cognate area.

Textile Science Students enrolled in the Ph.D. program in Human Ecology with a concentration in textile science take one common course which provides 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. Requirements include:

Textile Science Courses 18
TS 552 3
TS 590 2
Cognate Area 9
Statistics (500-600 level) 6
Research Methods* 6
Electives 14
Dissertation 24
Total 82

*Must include 6 hours of laboratory techniques in materials analysis and characterization;

Note: Students must take a minimum of 9 hours at the 600-level in the College of Human Ecology, exclusive of dissertation. Transfer students with a master's degree from another institution are required to complete at least 42 hours (including dissertation hours) from UT.

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 on an in-state tuition basis. The M.S. program in Recreation, Tourism, and Hospitality Management is available to residents of the state of Kentucky. Additional information and sales planning and analysis; admissions. Admissions Specialist in the Office of Graduate Student Services. For the Ph.D., see Human Ecology.

Hotel and Restaurant Administration

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
530 Computer-Assisted Foodservice and Lodging Management (3) Application of computer technology to foodservice and lodging industry; inventory, cost accounting, production, nutrient analysis, rooms management, and sales planning and analysis. Prereq: Food and Lodging Cost Control or consent of instructor. F.A
531 Advanced Financial Management (3) Financial planning, operations and evaluation techniques used in foodservice and lodging management: developing budgets, accounting systems and financial reports. Prereq: Food and Lodging Cost Control or consent of instructor. F.A
532 Advanced Human Resource Management (3) Identifying labor needs; development and maintenance of work force. Prereq: Food and Lodging Personnel Development or consent of instructor. F.A
533 Advanced Food Production and Delivery System Management (3) Analysis of food production and delivery systems; application of quantitative methods and models to optimize decisions. Prereq: Quantity Food Procurement, Production and Service, Microcomputer Applications or consent of instructor. F.A
534 Special Topics in Foodservice and Lodging Administration (1-3) Lecture/discussion format. Contemporary developments and trends in industry. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E
535 Directed Study In Foodservice and Lodging Administration (1-3) Problems selected for study by student with guidance of faculty member. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E
537 Seminar in Foodservice and Lodging Administration (1) May be repeated. S/NC only. F
542 Advanced Hotel Administration (3) Strategic management of hotel organizations. Theoretical and applied literature on formulation and implementation of strategy; internal and external factors relevant for business and corporate level decisions. Consideration of role of marketing in hotel firms. Analysis of industry and case studies. Prereq: 531, 532. Sp.A

544 Experimental Study of Quantity Food Production (3) Design and preparation of food products applicable to foodservice industry. Market research, sensory evaluation, production techniques, and microbiological evaluation of food. Prereq: Quantity Food Procurement, Production and Service with lab, or Observation. Hospitality Sales and Marketing, 542 and Nutrition 413, or equivalents. F.A

547 Field Experience (3-9) Experience in food- or lodging-related industry or agency under supervision of faculty member. Prereq: Consent of instructor. S/NC only. E

555 Foodservice and Lodging Law (3) Management organization and policy as imposed or granted by law. Legal research to determine the legal principles at state and federal levels which impact industry. Prereq: Hospitality Law or equivalent, or consent of instructor. Sp.A

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

Recreation and Tourism Management

GRADUATE COURSES

415 Development and Maintenance of Recreation, Tourism and Athletic Facilities (3) Principles of designing, planning, equipping, operating and maintaining various facilities. Elements of risk management and safety in design process. Prereq: 310 Development and Evaluation of Recreation and Tourism Programs or consent of instructor. (Same as Sport Management 415). F
430 Organization and Administration of Leisure and Tourism Services (3) Principles of administration applied to provision of leisure services offered by public, private and/or commercial enterprises. Organizational structures, personnel management, evaluation, legal authority, introduction to budgeting and fiscal procedures. Prereq: 310 or consent of instructor. F

440 Dimensions of Commercial Recreation and Tourism Enterprises (3) Organizational structures, delivery systems, financing private enterprises and operating selected profit centers in various settings. Market performance and economic impact. Prereq: 110 Recreation Foundations of Leadership, junior standing or consent of instructor. Sp

450 Special Topics in Leisure Education and Tourism (1-6) Development of special topics in recreation, therapeutic recreation and tourism. May be repeated. Maximum 6 hrs. E

470 Tourism and Leisure Industries (3) Symbolic relationship between tourism and various sectors of leisure industry. Use of resources, both natural and developed, and economic impacts of ventures. Socio-cultural impact on venue as well as venues impact on local population. 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 Perspectives and Trends in Leisure Services (3) Basic role of leisure delivery systems in today's society; scope of leisure services, determinants of leisure behavior, developmental features of leisure and recreation. Current trends, problems, laws, and issues affected by and/or affecting delivery of leisure services. Sp

515 Philosophical and Conceptual Foundations of Leisure (3) Philosophy of leisure and recreation; nature of philosophy, concepts of leisure, recreation, play, work and other factors. History of field, and relationship of ideas to contemporary society and to professional practice. F
520 Program Design and Evaluation in Therapeutic Recreation (3) History, philosophy, nature, purpose, special populations served, programming process, professional aspects of therapeutic recreation. Basic overview of aspects of leisure delivery systems. Prereq: Consent of instructor. F

521 Facilitation Techniques in Therapeutic Recreation (3) Role of therapeutic recreation in clinical and non-clinical application of life-style planning, self-awareness, values clarification and assertiveness training in therapeutic recreation, relationship of leisure education to therapeutic recreation. Prereq: 520 or consent of instructor. Sp

522 Clinical Aspects in Therapeutic Recreation (3) Concepts and techniques utilized by experienced and advanced therapeutic recreation specialist: clinical issues, comprehensive program concerns, administration, advanced therapeutic recreation specialist: clinical issues, comprehensive program concerns, administrative funding and trends in practice of therapeutic recreation services. Prereq: 520. Sp

540 Fiscal Policies for Recreation and Sports Related Organizations and Facilities (3) Application of fiscal policies and procedures to operation of recreation and sports related organizations and facilities. Finance, revenue generating strategies, cash and inventory control, commercial/public cooperative ventures and microcomputer applications. Prereq: 430 or consent of instructor. Sp

541 Management and Operation of Recreation and Sport Related Facilities (3) Research for management and program decision, process of cost analysis, billing, and basic principles of maintenance of recreation and sport related facilities. Prereq: Consent of instructor. Su

590 Graduate Internship (1-6) Required of all graduate students. Minimum 50 clock hrs. for each hour credit. Work experience, evaluation by agency and university and written report required. E

591 Directed Study In Leisure & Recreation (1-6) Detailed study of theme, issue, or concern. Designed to meet needs of individual students. May be repeated. Maximum 8 hrs. E

592 Special Topics In Leisure & Recreation Studies (1-6) May be repeated. Maximum 6 hrs. E

Retail and Consumer Sciences

GRADUATE COURSES

411 Entrepreneurship and Small Business Management (3) Concepts of entrepreneurship within single ownership and other business organizations; risk taking and risk management; management of small business; current issues and problems. Prereq: Marketing 301 Principles of Marketing; Accounting 202 Principles of Managerial Accounting.

412 Direct Retail Methods (3) Use of direct selling methods to sell goods and services. Analysis of consumers and product/service types for integrated direct retail methods. Direct mail, catalogs, telemarketing, informercials, and electronic commerce (internet). Prereq: 375 Strategies for Growth.

415 Retail Promotion (3) In-store promotional activities; development of retail promotion strategies; evaluation of retail promotions; supplementary focus on advertising and other methods to communicate in-store promotions. Prereq: 376 Strategies for Growth.

450 Economics of Consumer Choice (3) Micro and macro economic approaches to consumer choice across life span; demographics; economic status of consumers; demand analysis; market structure and its impact on consumers; economics of information, implications on private and public sectors. Required background: Introductory economics.


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

501 Professional Project (3-6) Application-oriented, capstone project to show competence in major academic area. Enrollment limited to retail and consumer sciences students in non-thesis program. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. S/NCo only.


510 Retail Strategy and Decision Making (3) Strategic, management, and economic processes of retail sector. Analytical decision-making skills in retailing, retail industry structure, international differences in retail systems. Prereq: Retail Management or equivalent. Sp


541 Retail Consumer Analysis (3) How consumers make decisions and how retailers attempt to influence decisions by offering environment, image and selection coinciding with customers' needs.


562 Research Methods (3) Fundamentals of science method, advancement of science, methodology and method of research. Issues and concepts of basic and applied research. Prereq: Statistics 531 or equivalent. Sp

590 Research Seminar (1) Research topics in retail and consumer sciences. May be repeated. S/NCo only. F, Sp

593 Directed Study (1-3) Individual problems in retailing and consumer sciences. Prereq: 9 hrs retailing and consumer sciences graduate coursework. May be repeated. Maximum 9 hrs.

595 Special Topics in Retail and Consumer Sciences (1-3) Lecture, group discussion on specialized topics: retail industry structure, international trade, international retail trade, retailing, small business management, issues in retail management, issues in retail strategy, quality perception by consumers, product and service value, retailing to children, retailing and special populations, special research methods. Prereq: 9 hrs graduate coursework. May be repeated. Maximum 9 hrs.

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

614 Theory in Retail Environment (3) Analysis and evaluation of theory in retail environment and its application to research in retailing. Prereq: 562. 3 hrs and 2 labs.

615 Retail and Consumer Sciences Literature and Thought (3) Evaluation of retail and consumer sciences literature with emphasis upon research literature, development of scholarly thought, and identification of potential areas of further study. Prereq: 562, Marketing 501, Economics 501, F, A


625 Strategic Managerial Retailing (3) Decision-making orientation that integrates strategic framework components with preparation and analysis of specific retail case situations. Prereq: 510.

641 Retail Consumer Behavior (3) Theories and concepts from social science in relation to ultimate consumer's behavior. Prereq: 6 hrs of sociology and/or psychology or consent of instructor.

651 The Consumer and Public Policy (3) Public policy issues within consumer environments. Analysis of past and present policies within economic, social, legal and business framework. Implications of consumer issues and policy alternatives. Literature and research focus. Prereq: 550 or consent of instructor.

695 Advanced Topics in Retail and Consumer Sciences (3) Lecture, group discussion, individual research and/or application to advanced topics and research areas of current significance to retail and consumer sciences. Prereq: 9 graduate hours in consumer sciences. May be repeated. Maximum 9 hrs.
Programs leading to degrees, majors, and concentrations in:

Master of Science
Counseling
Mental health counseling
Rehabilitation counseling
School counseling

Education
Track 1-education of the deaf and hard of hearing
Track 2-education of the deaf and hard of hearing

Educational Specialist
Education
School counseling
Doctor of Philosophy

Education
Counseling psychology
Counselor education

*Program is not currently accepting new students.

See Education under Fields of Instruction for full description of all degree requirements.

The M.S. in Counseling and Ed.S. degree program with their respective concentrations are accredited by the Council for Accreditation of Counseling and Related Educational Programs. In addition, the counseling psychology concentration under the college-wide Ph.D. program is accredited by the American Psychological Association, and the concentration in counselor education is accredited by the Council for Accreditation of Counseling and Related Educational Programs.

The department includes several educational programs sponsored by the U.S. Department of Education, Office of Special Education and Rehabilitative Services, Rehabilitation Services Administration, including: Regional Rehabilitation Continuing Education Program, Orientation to Deafness, Southeastern Regional Interpreters Training Consortium, National Interpreter Training Center, and the Educational Interpreting program.

The department emphasizes research-based practices that address the growth and development of the whole person throughout the lifespan. In its counseling programs, it concentrates on maximizing development and adjustment of individuals through prevention and treatment models in schools, colleges, community agencies, businesses, and private-practice settings. In its rehabilitation programs, it pursues improvement in the quality of life for persons with disabilities and focuses 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 department is the preparation of graduates for future leadership and professional roles in business and industry, education, and community and government service.

The application deadline for admission to the doctoral and Ed.S. programs is February 1 and November 1 and February 1 for the master's program.

ADMISSION REQUIREMENTS

Admission requirements include up-to-date scores from the GRE for the major in Counseling, a departmental admissions application form and letters of reccommendation. For the doctoral program, a writing sample is also required.

Counselor Education and Counseling Psychology

GRADUATE COURSES

410 Gender Roles Development: Implications for Education and Counseling (3) Theories and research: development of gender roles and their relevance to identity and behavior in socio-psychological, educational, and counseling settings. (Same as Women's Studies 410). F, Su

431 Personality and Mental Health (3) Various perspectives of mental health with application to education and other social institutions. E

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

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


504 Special Topics (1-3) Instructor-initiated course offered at convenience of academic unit on topics of current interest. May be repeated. Maximum 15 hrs. S/NC or letter grade. E

518 Educational Specialist Research and Thesis (3) May be repeated. P/NP only. E

520 Statistics and Research Design: Conceptual (3) Consumer-oriented, conceptual treatment of statistics, research design, and quantitative basis of testing. E

525 Formal Measurement in Education and Counseling (3) Principles of test construction and item analysis. Survey of standardized tests of intelligence, achievement, aptitude, vocational interest, attitudes and personality. Prereq: 520 or equivalent. F,Su

535 Ethical, Legal, and Professional Issues in Counseling (3) Professional practice issues in school and community counseling and related fields: education, research, standards of practice, credentialing, and policy. Prereq: Admission to counseling program or consent of instructor. Su,A

550 Introduction to Pupil Personnel Programs (3) History, philosophy, professional standards, counselor role in relation to school staff and mental health professionals, and ethics of profession. F

551 Theory and Practice of Counseling (3) Philosophical bases of helping relationships; development of counselor and client self awareness; counseling theory/techniques. F,Su

552 Career Development: Vocational Theory, Research and Practice (3) Relationship of vocational theory, career development research and societal factors to life career roles. F

553 Career and Educational Information Systems and Resources (3) Use of print and non-print materials: computer-based systems, for career and educational planning. Prereq: 551 or consent of instructor and Internet access account. Sp

554 Group Dynamics and Methods (3) Theory and types of groups, descriptions of group practices, methods, dynamics, and facilitative skills, supervision of leadership skills. F

555 Practicum in Counseling (3) Supervised practice and application of counseling skills with individual clients. Prereq: Admission to program, 431, 525, 551 and consent of instructor. May be repeated. Maximum 9 hrs. E

556 Orientation to Mental Health Counseling (3) Mental health counseling as profession; professional...
organizations, work settings, code of ethics, certification requirements, and role identity, F, Sp

558 Internship in School Counseling (1-6) Supervised postgraduation employment at academic unit approved site. Prereq: 550 and consent of instructor. May be repeated. Maximum 12 hrs. S/NC only. E

559 Internship in Community Agency Counseling (1-6) Supervised postgraduation employment at academic unit approved human services agency. Prereq: Admission to community agency program, 555 and consent of instructor. May be repeated. Maximum 12 hrs. S/NC only. E

561 Development and Operation of School Counseling Programs (3) Management of comprehensive school counseling programs to include needs assessment, program planning, identification, evaluation, and use of computer-based program management software. Prereq: 550. Sp, Su

565 Facilitation of Technical Task Groups (3) Technical and social aspects of group dynamics in context of technical task groups. Application of counseling techniques to facilitation of workplace teams. Prereq: 551, 554, or consent of instructor. E

566 Approaches to Family Intervention and Counseling (3) (Same as Child and Family Studies 566.)

570 Cross-Cultural Counseling: Theory and Research (3) Theory and research on issues and problems in counseling of clients from different cultural backgrounds in U.S. and abroad. Sp

571 Individual Cognitive Assessment in Counseling (3) Basic concepts and applications in individual assessment. Emphasis on proficiency in administrative scoring, interpretation for Wechsler, adults and children, Stanford-Binet. Prereq: 525 and 520 and admission to counseling program or consent of instructor. S/NC only. Sp, A

575 Seminar in Gerontology (1) (Same as Human Ecology 585, Educational Psychology 585, Exercise Science 585, Nursing 585, Public Health 585, Social Work 585, and Sociology 585.)

593 Independent Study (1-3) May be repeated. S/NC or letter grade. E

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

602 Directed Research (1-3) Instructor- or student-initiated group investigation of empirical and theoretical problems in educational and counseling psychology. May be repeated. Maximum 12 hrs. S/NC only. E

604 Special Topics (1-3) Instructor-initiated courses offered at convenience of academic unit on topics of interest. May be repeated. Maximum 15 hrs. S/NC or letter grade. E

625 Advanced Study in Personality (3) Theory, research and conceptual analysis of studies with application to education and counseling. Prereq: 431 or equivalent. F

635 Ethical, Legal, and Professional Issues in Psychology (3) (Same as Psychology 635 and Educational Psychology 635.)

650 Seminar in Counselor Education (1) Professional issues related to role and function of counselor educator. Prereq: Admission to doctoral program in counselor education. May be repeated. Maximum 2 hrs. S/NC only. E

655 Practicum in Counselor Education (3) Supervised practice and application of counseling skills with clients. Prereq: Admission to counselor education program and consent of instructor. May be repeated. Maximum 8 hrs. Sp

659 Internship in Counselor Education (1-4) Supervised employment in academic unit approved internship site in counselor education. May be repeated. Maximum 12 hrs. S/NC only. E

661 Education Implications of Neuropsychology (3) Theory of assessment. Common syndromes and their behavioral and cognitive manifestations. Prereq: 516; and 541 or equivalent individual assessment course; or consent of instructor. Sp, A


671 Personality and Vocational Assessment (3) Use and interpretation of personality and vocational measures in assessment of clients. Prereq: 525, 552 or consent of instructor. A

672 Psychological Dysfunction (3) Classification methods, dynamics and treatment of dysfunctional individuals in counseling. Prereq: 625 and course in abnormal psychology, or consent of instructor. A

673 Advanced Theory and Practice in Group Counseling (3) Theories and supervised practice. Prereq: 554, 555, and consent of instructor. F

674 Practicum in Counseling Psychology (3) Supervised practice of individual counseling. Minimum 135 clock hrs required each semester. Prereq: Admission to counseling psychology doctoral program, 555, and consent of instructor. May be repeated. Maximum 6 hrs. E

678 Theory and Practice of Counseling Supervision (3) Theory and practice of supervision in counseling. Prereq: 655, or 674, or consent of instructor. S/NC only. Sp

679 Internship in Counseling Psychology (1-6) Supervised employment in departmentally approved counseling psychology internship sites. Prereq: Admission to counseling psychology doctoral program and consent of instructor. May be repeated. Maximum 12 hrs. S/NC only. E

693 Independent Study (1-3) May be repeated. S/NC or letter grade. E

Rehabilitation and Deafness

GRADUATE COURSES

415 Language Development of Deaf/Hard of Hearing I (3) Language problems of hearing impaired contrasted with those of normal language development. Formal linguistic systems used to describe language development problems.

416 Language Development of Deaf/Hard of Hearing II (3) Developmental and remedial methods of teaching language to hearing impaired children. Comprehension and production differences, idiomatic and figurative structures. Prereq: 415 or consent of instructor.

419 Speech Development of Deaf/Hard of Hearing (4) Theories of speech development, approaches in training perception and production of speech, and oral habilitation. Practicum experiences.

424 Nature of Hearing Impairments (3) Basic principles of audiology; anatomy and physiology of hearing; hearing loss; methods and instrumentation for assessment of hearing level; interpretation of audiologic services to medical and other rehabilitative disciplines.

425 Introduction to the Psychology and Education of the Deaf/Hard of Hearing (3) Primarily for those planning to teach hearing impaired. Overview of research related to psychology, social adjustment, communication methodology, language development and education of hearing impaired and oral methods. No credit for BLH 425. Prereq: admission to graduate program in Deaf Education.

431-32 American Sign Language III, IV (3.3) Fluency of expressive and receptive sign communication skills. Use of language in context. Grammatical structures of ASL and cultural implications of deaf community. Must be taken in sequence. Prereq: 428; 431 for 432 or consent of instructor.

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

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


504 Clinical Experience in Teaching an Supervision of Exceptional Children (3-9) (Same as Special Education 503.)

509 Vocational Guidance and Career Planning

516; and 541 or equivalent individual assessment procedures for rehabilitation counselors/case managers in private sector rehabilitation.
Ecology and Evolutionary Biology
(College of Arts and Sciences)

MAJOR DEGREES
Ecology and Evolutionary Biology, M.S., Ph.D.
T. G. Hallam, Head
C. R. Boake, Associate Head

Professors:
Boake, C. R. B., Ph.D. .................................. Cornell
Bunting, D. L., Ph.D. .................................. Oklahoma State
Burghardt, G., M., Ph.D. .......................... Chicago
Delcourt, H. P., Ph.D. ................................ Minnesota
Delcourt, P. A., Ph.D. ................................ Minnesota
Echtman, A. C., Ph.D. ................................. Kansas
Etiier, D. A., Ph.D. ................................ Minnesota
Greenberg, N. B., Ph.D. .......................... Rutgers
Gross, L. J., Ph.D. ........................................ Cornell
Hallam, T. G., Ph.D. ................................ Missouri
Harris, W. F., Ph.D. ..................................... Tennessee
McCormick, J. F. (Emeritus), Ph.D. .... Emory
McCracken, G. F., Ph. D. ....................... Cornell
Pan, J. L., Ph.D. ....................................... Pennsylvania
Riechert, S. E., Ph.D. .............................. Wisconsin
Sayler, G. S., Ph.D. ..................................... Idaho
Schultz, T. W., Ph.D. .............................. Tennessee
Simberloff, D. (Dore Hunger Chair of Excellence), Ph.D. .................................. Harvard
Stacey, G., Ph.D. ...................................... Texas
Vaughan, G. L. (Emeritus), Ph.D. ........ Duke

Associate Professors:
Amundsen, C. C., Ph.D. ....................... Colorado
Drake, A. J., Ph.D. .................................. Purdue
Fox, D. J., Ph.D. ....................................... Johns Hopkins
Gavrilets, S., Ph.D. ................................ Moscow State
Piglucci, M., Ph.D. .................................... Connecticut

Assistant Professors:
Cruzan, M. B. C., Ph.D. ....................... SUNY (Stony Brook)
Weltzin, J., Ph.D. ................................. Arizona

Research Associate Professor:
Greimler, M. J., Ph.D. ......................... Alaska

Shared faculty are drawn from other University departments, the Oak Ridge National Laboratory, the National Biological Service, and the Tennessee Valley Authority.

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

REQUIREMENTS FOR ADMISSION
Applications are accepted once a year. The deadline for receipt of all application materials is 6 January for those applicants wishing to enroll in the following Fall or Spring semesters. Applications incomplete as of that date, or received after that date, will not be considered. Applicants are expected to have an academic background consistent with a Bachelor's degree in one of the life sciences. They are expected to have completed a minimum of one year of general biology, two years of chemistry including one year of general chemistry, one year of physics, and one year of college-level calculus. Occasionally, applicants who are highly qualified otherwise but lack one of these courses or course sequences will be admitted with the expectation that the deficiency will be made up within the first year of graduate study. Applicants are required to submit scores from the general Graduate Record Examination (GRE) and successful applicants will usually have a composite score on the verbal, mathematical and analytical sections of the GRE of at least 1650. Submission of scores on appropriate (e.g., biology, mathematics) advanced GRE examinations is recommended but not required. Applicants are also expected to have an overall grade-point average of at least 3.0, and 2.7 or above for all science and mathematics courses, on a 4.0 scale (successful applicants will usually have grade-point averages well above these minima).

Application must be made to both The Graduate School and the department. The departmental application requires 3 letters of reference from persons capable of assessing the applicant's suitability for graduate work in biology and a statement of professional goals and reasons for applying to this program. Applicants for the doctoral degree are expected to have made prior contact with potential research advisors in the department's graduate program and this approach is recommended for applicants for the Master's degree program as well. Inquiries should be directed to the Chair, Graduate Affairs Committee, Department of Ecology and Evolutionary Biology, The University of Tennessee, Knoxville, TN 37996-1610.

THE MASTER'S PROGRAMS

In addition to general requirements of the Graduate School, aspirants for the Master of Science degree are expected to: (1) during the first semester in residence, take a prescriptive diagnostic examination covering major concepts in ecology and evolutionary biology. The examination may be taken twice and must be passed before the student is admitted to candidacy; (2) complete course requirements as determined by the department and the student's faculty thesis research committee; and (3) satisfactorily complete and defend a research thesis.

THE DOCTORAL PROGRAMS

In addition to general requirements of The Graduate School, aspirants for the Doctor of Philosophy degree are expected to: (1) during the first semester in residence, take a prescriptive diagnostic examination covering major concepts in ecology and evolutionary biology. The examination may be taken twice and must be passed before the student is admitted to candidacy; (2) complete course requirements as determined by the department and the student's faculty dissertation research committee; (3) pass a written and
oral comprehensive examination designed to test for adequate knowledge in those areas essential to the student's research program; and (4) satisfactorily complete and defend a dissertation. The department does not require a reading knowledge of a foreign language, but this may be imposed by the student's faculty dissertation research committee. If so, the student has the option of demonstrating reading knowledge of the prescribed language by either (a) passing the official reading examination given by the language department or (b) earning a grade of at least B in the second semester of a special language reading course for graduate students.

MINOR IN ENVIRONMENTAL POLICY

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

GRADUATE COURSES

411-12 Minicourse in Ecology and Evolutionary Biology (2) Advanced topics in ecological behavior, and evolutionary biology, concentrated in time and subject matter. Consult departmental listing for topics offered. Prereq: As announced. May be repeated. Maximum 4 hrs may apply toward departmental major.

431 Plant Ecology (4) (Same as Botany 431.)

446 Introduction to Oceanography (4) Basic oceanography: physical, chemical, geological and biological processes and patterns. Oceanic subsystems: upwellings, polar oceans, hydrothermal vents, coral reefs, estuaries, and coastal regions. Field trip to coastal required. Prereq: General Biology and General Chemistry; General Ecology recommended.

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.)


470 Aquatic Ecology (3) Introduction to the physicochemical nature of inland waters with description of biotic communities and their interrelationships. Prereq: General Chemistry and General Ecology. 2 hrs and 1 lab.

474 Ichthyology (4) Evolution; classification, collection and identification, distribution and biology of fishes; freshwater fauna of Eastern North America. Prereq: General Ecology or consent of instructor. 2 hrs and 2 labs.

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.

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 Ecology and Evolutionary Biology Seminar (1) Advanced topics in ecology, behavior, and evolutionary biology. Senior departmental majors encouraged. Required of all first- and second-year graduate students. May be repeated. Maximum 4 hrs. S/NC only.

504 Special Topics (1-3) Selected directed readings or special course in topics of current interest. Consult departmental listing for offerings. May be repeated with consent of instructor. Maximum 9 hrs. S/NC only.

505 Basic Concepts in Organic Evolution (3) Processes and patterns in organic evolution. Prereq: Admission to program in Evolutionary Biology. Required of all first-year students. F

507 Basic Concepts in Ecology (3) Contemporary issues in ecology. Prereq: Admission to program in Ecology and Evolutionary Biology. Required of all first-year students. Sp

508 Introduction to Faculty Research (1) Orientation of new graduate students to current research of departmental graduate faculty. Prereq: Admission to program in Ecology and Evolutionary Biology. Required of all first-year students. Sp

509 Foundations: Readings in Ecology (1-2) Readings and discussion of classic papers in field.

510 Foundations: Readings in Evolution (1-2) Readings and discussion of classic papers in field.

511 Foundations: Readings in Evolution (1-2) Readings and discussion of classic papers in field.

512 Foundations: Readings in Evolutionary Ecology (1-2) Readings and discussion of classic papers in field.

516 Colloquium in Ethology (1) (Same as Psychology 516.)

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. Not intended for graduate students in Ecology and Evolutionary Biology.

524 Physiological Ecology of Animals (3) Adaptive physiological response of animals to natural changes in or extremes of physical and biotic environment. Prereq: Consent of instructor. 3 hrs lab.

527 Zoogeography (3) Processes determining geographic distribution of animals and distribution and composition of animal communities. Prereq: Ecology course or consent of instructor.

528 Mathematical Ecology (3) (Same as Mathematics 528.)

529 Mathematical Evolutionary Theory (3) (Same as Mathematics 529.)

530 Zoogeography (3) Processes determining geographic distribution of animals and distribution and composition of animal communities. Prereq: Ecology course or consent of instructor.

535 Ecology and Development in the Amazon (3) Natural history, ecosystem diversity and function, and opportunities for sustainable economic development in the Amazon Basin. Includes field trip of 7-10 days to Manaus, Brazil.

540 Insect Taxonomy I: Major Orders (3) Survey of classification of major orders of insects, with practical experience in identification of insects at family level. 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 2 labs.

544 Fresh Water Invertebrate Zoology (3) Ecology and taxonomy of fresh water invertebrates exclusive of insects. Prereq: Comparative Invertebrate Biology or equivalent and consent of instructor. 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: 540 or equivalent. (Same as Psychology 545.)

547 Conceptual Foundations of Evolution and Behavior (3) (Same as Psychology 547.)

552 Development Planning in the Third World (3) (Same as Planning 552.)

553 Environmental Planning (3) (Same as Planning 553.)

556 Ice-Age Environments and Global Climate Change (3) Glacial-interglacial climatic cycles and dynamic responses of landscapes within glacial, periglacial, and non-glacial environments across North America over past 2.5 million years. (Same as Geology 556.)

557 Quaternary Ecology (3) Perturbation, process, and pattern within Quaternary ecosystems; climatic change and vegetation response during last 2.5 million years. Prereq: Consent of instructor. (Same as Geology 557.)

560 Biometry (3) Statistical applications in biological research. Prereq: Statistics course or consent of instructor.

561 Environmental Toxicology (3) Basic concepts in toxicology; molecular toxicology and detoxification; reproductive toxicology; mutagenesis, teratogenesis, carcinogenesis, pathologic changes and environmental impact. Prereq: Biochemistry and Cellular and Molecular Biology 410, Organic Chemistry or consent of instructor. (Same as Biochemistry and Cellular and Molecular Biology 561.) F

575 Ecological Genetics (3) Genetics of natural populations, using both single locus and quantitative genetic approaches. Prereq: 573 or statistics course.

577 Landscape Ecology (3) Ecological structure, function, and change through time of landscape mosaicos: quantitative measures of landscape heterogeneity; responses of organisms to changes in landscape heterogeneity. Prereq: General Ecology or equivalent or consent of instructor.

581-582 Mathematical Ecology (3,3) (Same as Mathematics 581-582.)

583 Zoogeography (3) Processes determining geographic distribution of animals and distribution and composition of animal communities. Prereq: Ecology course or consent of instructor.

585 Mathematical Evolutionary Theory (3) (Same as Mathematics 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.

599 Advanced Evolutionary Ecology (3) (Same as Botany 599.)

600 Ecological 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.

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 Biochemistry and Cellular and Molecular Biology 504.) S/NC only. F-Sp.

607 Seminar in Ecology and Evolutionary Biology (1) Readings and discussion based on current literature. 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. Prereq: General Ecology or equivalent. (Same as Botany 635 and Planning 635.)

681-682 Advanced Mathematical Ecology (3,3) (Same as Mathematics 681-682.)
Economics
(College of Business Administration)

MAJORS DEGREES
Economics ...................................... M.A., Ph.D.

Matthew N. Murray, Head

Professors:
Bohm, Robert A., Ph.D. ......................... Washington (St. Louis)
Bowby, Roger L. (Emeritus), Ph.D. ....... Texas
Carroll, Sidney L., Ph.D. ...................... Harvard
Chang, Hui S., Ph.D. ............................ Vanderbilt
Clark, Don P., Ph.D. ............................ Michigan State
Cole, William E. (Emeritus), Ph.D. ....... Texas
Fox, William F., Ph.D. .......................... Ohio State
Herzog, Henry W., Ph.D. ..................... Maryland
Jensen, Hans E. (Emeritus), Ph.D. ....... Texas
Lee, Feng-Yao (Emeritus), Ph.D. ......... Texas

Associate Professors:
Hall, Robert ...................................... Illinois
Hedlund, Robert E., Ph.D. ..................... Michigan State
Holloman, John W., Ph.D. ................. California (Davis)
Howe, Howard .................................... Illinois
Johnson, Cary L., Ph.D. ..................... Georgia (Athens)
Moore, John R. (Distinguished Prof.) ....... Illinois
Murray, M. N., Ph.D. ............................ Syracuse
Neale, Walter C. (Emeritus), Ph.D. ....... London
Russell, Milton (Emeritus), Ph.D. ....... Oklahoma
Spiva, George A. (Emeritus), Ph.D. ........ Texas

Fallaschetti, Dino, Ph.D. ...................... Washington (St. Louis)
Santore, Rudy, Ph.D. ............................ Ohio State
Stango, Victor O., Ph.D. ............. California (Davis)
Stewart, Steven W., Ph.D. ................. New Mexico

Associate Professors:
Falabella, Italy, Ph.D. ............................ Michigan State
Santoro, Gianluca, Ph.D. ..................... Stanford
Stango, Victor O., Ph.D. ............. California (Davis)
Stewart, Steven W., Ph.D. ................. New Mexico

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.

ACADEMIC STANDARDS
A graduate student whose grade-point average falls below 3.0 will be placed on probation. A student on probation will be dropped from the program unless his/her cumulative grade-point average is 3.0 or higher at the end of the probationary period. The probationary period is defined as the next semester's coursework established by the degree program for full-time students and the next two 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 must be in economics) must be at the 500 level or above. Of the minimum of 18 hours in economics at the 500 level or above, 12 hours must consist of 511, 512 and 513, 514, and the remaining 6 hours must be in one field of economics. Of the 30 hours, a maximum of 9 hours in courses approved by the department may be taken in fields other than economics. Students electing the non-thesis option are required to pass a final comprehensive examination.

The thesis option requires 30 hours of coursework at the 400 level or above, including at least 24 hours at the 500 level or above. 6 hours of which may be thesis hours. Of the remaining 18 hours at the 500 level or above, at least 15 hours must be in economics and must include 511, 512, 513, and 514. A maximum of 6 hours may be in an area other than economics.

THE DOCTORAL PROGRAM
Admission to the Ph.D. program is based on promise of outstanding scholarship as demonstrated by previous academic performance, by scores achieved on the general portion of the GRE, and by recommendations. The program requires a minimum of 46 hours of coursework beyond the bachelor's degree or 24 hours beyond the master's degree, at least 24 hours of 600 level or above. Of the remaining 18 hours at the 500 level or above, 6 hours of which may be thesis hours. Of the remaining 18 hours at the 500 level or above, at least 15 hours must be in economics and must include 511, 512, 513, and 514. A maximum of 6 hours may be in an area other than economics.

ACADEMIC COMMON MARKET
Students seeking a minor in environmental policy must also complete, in addition to above, a policy-relevant dissertation approved by the coordinating committee.

ACADEMIC COMMON MARKET
An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT on an in-state tuition basis. Students seeking a minor in environmental policy must also complete, in addition to above, a policy-relevant dissertation approved by the coordinating committee.

GRADUATE COURSES
400 Special Topics (3) Topics vary. Prereq: Determined by department. May be repeated.
413 Macroeconomic Fluctuations (3) Analysis of historical data, methods of analyzing macro-economic fluctuations, theoretical explanations of cycles, and role of monetary and fiscal policies in aggregate economy. Major writing requirement. Prereq: Intermediate Macroeconomics or consent of instructor.
415 History of Economics (3) Same as History 415.
435 Industrial Organization Analysis (3) Monopoly and competition in United States economy; inter-

462 Economics of Resources and Environmental Policy (3) Prerequisite: Analysis of environmental policy and allocation of resources. Benefits and costs of development of natural resources and impacts of growth. Major writing requirement. Prereq: 201.

471 Public Finance: Optimal Government Functions and Expenditure Analysis (3) Problems of collective consumption, external effects, public investment, social decision making. Major writing requirement. Prereq: 201.

472 Public Finance: Taxation and Intergovernmental Relations (3) Analysis of individual taxes and of tax systems, non-tax sources of revenue, fiscal federalism. Major writing requirement. Prereq: 201.

482 Introduction to Mathematical Economics (3) Application of basic mathematical tools: calculus, matrix algebra, etc. to major topics of economic theory. Prereq: Intermediate Microeconomics with B or better and Calculus.

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

511-12 Microeconomics 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 production and cost, market structures, derived demand and factor pricing, introduction to welfare economics, market failure and theory of second best, pure exchange.

513-14 Macroeconomics Theory (3,3) Determination of national income, prices, and employment. Results using Keynesian, non-market-clearing, monetarist, and rational expectations paradigms.


525 Economic History of Europe (3) Nature and functioning of economic systems and policies in history of Western civilization, major issues of method and interpretation. Prereq: Graduate standing in economics or consent of instructor.

537 Managing in a Regulated Economy (3) Economic effects of antitrust and public utility, international and environmental regulation on business. Development of decision-making skills in area of governmental-business relations.

577 Environmental Economics and Policy Management (3) Interdisciplinary perspective on goals of sustainable economic development and environmental quality. Development of decision-making tools and conflict resolution.

579 Environmental Policy Research Workshop (1) Multidisciplinary analysis of advanced topics in environmental policy. Student participation. Major writing requirement. Prereq: Consent of instructor. May be repeated: Maximum 6 hrs.


583 Econometric Techniques (3) Multivariate time series, panel data and limited dependent variable analysis applied to economic problems. Prereq: 582.

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

613 Advanced Macroeconomic Theory (3) Prereq: 514 or equivalent.


621 International Economics (3) Comparative advantage, trade migration, commodity composition of trade, protectionist policies, protectionist arguments, trade liberalization, U.S. trade policy, exchange rate determination, balance of payments adjustment, multinational corporations, and international capital flows. Prereq: 512 and 514.

623 Economic Development: Theories and Policies (3) Principal theories explaining economic behavior in developing countries and policies and strategies used to promote development. Prereq: Undergraduate degree in economics or consent of instructor.

624 Economic Development: Western Impact on Asia and Africa (3) Studies of consequences of contact between developed world and developing countries of Asia and Africa. Prereq: 21 hrs of upper-division undergraduate social science or consent of instructor.


842 Labor History and Legislation (3) Development of organized labor as important economic and political force in U.S., from Colonial history to present. Evolution of legal status of labor unions and of individual workers' vis-a-vis their employers.

851 Monetary Theory (3) Study of money, credit, and liquidity as related to real output determination, interest rates, employment, and prices. Prereq: 513.

852 Topics in Monetary Theory (3) Advanced monetary models, issues in monetary policy, open economy monetary theory and policy. Student participation. Prereq: 651.

651 Regional and Urban Location and Development Theory (3) Theory of industrial and agricultural location and migration. Economics of land use patterns, central places, and urban form. Spatial inequalities and urban problems. National policies for regional and urban assistance.

652 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.


872 Public Finance: Taxation and Intergovernmental Relations (3) Theory of taxation; tax incidence, tax efficiency, and tax policy analysis; policy analysis of U.S. tax structure at federal, state, and local levels. Theory of fiscal federalism and intergovernmental relations.

877 Environmental and Natural Resource Economics (3) Theories of environmental economics and economic tools and policies for environmental resources. Exploration of issues related to market failure and differences between renewable and nonrenewable resources.

878 Economics of Environmental Policy (3) Topics in environmental economics. Conception of alternative policy instruments, defining policy objectives and roles of risk in decision-making process.

882 Econometric Methods (3) Advanced topics in econometrics. Prereq: 583 or equivalent.

890 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. Counseling**

**M.S. Education**

**M.S., Ed.S., Ed.D., Ph.D. Educational Administration and Policy Studies**

**M.S. Educational Psychology**

**M.S. Human Performance and Sport Studies**

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The College of Education offers the Master of Science, Educational Specialist, Doctor of Education, and Doctor of Philosophy degrees through six departments: Counseling, Deafness and Human Services, Educational Administration and Cultural Studies, Educational Psychology, Exercise Science and Sport Management. Instructional Technology, Curriculum and Evaluation, Theory and Practice in Teacher Education. The College also offers initial teacher licensure programs at the graduate level. The program features a professional year internship with accompanying coursework which may lead to a master's degree with a major in Education. See Track 2 under Master's Programs, Education, and Teacher Licensure.

For admission, most programs require current scores from the GRE general section, and all require a departmental application form and letters of recommendation as indicated on the chart of Majors and Degree Programs. For additional information about the various programs of study and admission, write to the Graduate Center in the College of Education, Claxton Complex A332, The University of Tennessee, Knoxville, TN, 37996-3400, tel. (865) 974-0906, www.utm.edu/advising/advising.html.

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**THE MASTER'S PROGRAMS**

College Student Personnel

Students who major in College Student Personnel are prepared to enter the field of student personnel administration in colleges, universities, and community or junior colleges. The program has both a thesis and non-thesis option. A minimum of 36 hours, which includes 6 hours of practicum experience, is required in either option. Students must complete a minimum of 12 hours in Higher Education courses.

Counseling

The master's degree with a major in Counseling offers concentrations in: Mental health counseling, School counseling.

The major includes thesis and non-thesis options. The concentration in mental health counseling is fully accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP) and requires completion of 60 hours of coursework, plus supervised practicum and internship experiences working with clients. The concentration in rehabilitation counseling...
is fully accredited by the Council on Rehabilitation Education, Inc. and requires 54 semester hours, including internship. A minimum of 12 hours of Rehabilitation and Deafness courses is required. The concentration in school counseling is fully accredited by the Council for Accreditation of Counseling and Related Educational Programs and requires 48 hours of coursework, including supervised practicum and internship experiences working with clients. A final examination is required of all students.

Education

The master's degree with a major in Education has two tracks. Track 1 is intended for students who are licensed to teach English, elementary education, foreign language, mathematics, natural science, social science, early childhood special education, or education of the deaf and hard of hearing. (Non-licensed applicants to Track 1 will be reviewed on a case-by-case basis and must have a strong disciplinary background and professional goals which can be fostered through participation in this non-licensure program.) Track 2 is designed for students seeking initial teacher licensure in one of the above fields. Thesis and non-thesis options are available for both tracks.

Track 1 - Concentrations are available in:
- Art education
- Curriculum
- Education of the deaf and hard of hearing
- Elementary education
- English education
- Foreign language/ESL education
- Instructional technology
- Mathematics education
- Modified and comprehensive special education
- Reading education
- Science education
- Social foundations
- Social science education
- Special education: early childhood
- Sport

The thesis option requires the completion of 30 hours, including 6 hours of Thesis 500 (36 hours for instructional technology concentration). The non-thesis option requires the completion of 33 hours of coursework (36 hours for special education and instructional technology concentrations). Both options require a minimum of 12 hours in the major discipline (18 hours for special education concentration).

Track 2 - Concentrations are available in:
- Art education
- Education of the deaf and hard of hearing
- Elementary teaching
- Modified and comprehensive special education
- Secondary teaching
- Special education: early childhood
- Sport

The thesis option requires completion of 36 hours, plus 6 hours of Thesis 500 for a total of 42 hours. The non-thesis option requires 36 hours, including 24 hours of prescribed licensure coursework and 12 hours in the academic discipline as approved by the student's committee.

For both tracks, a comprehensive written examination is required. An oral exam is given over the thesis.

Educational Administration and Policy Studies

The master's degree program with a major in Educational Administration and Policy Studies offers a concentration in educational administration and supervision, requiring a minimum of 36 hours, including 6 hours of Thesis 500 for the thesis option, or 36 hours for the non-thesis option.

The concentration in educational administration and supervision consists of a minimum of 18 hours of coursework in Educational Administration and Supervision. A final oral examination is required for the thesis option, with a written exam at the option of the committee. A final written comprehensive examination is required for the non-thesis option, with an oral exam at the option of the committee. Students entering either of these options must complete the introductory core consisting of Educational Administration and Supervision 513, 515, 516, and 535 or a demonstrated computer proficiency. These courses are prerequisites to other courses in the unit.

Educational Psychology

The master's degree with a major in Educational Psychology is offered with concentrations in:
- Adult education
- Individual & collaborative learning

Both programs include thesis and non-thesis options. The major in Educational Psychology requires 36 hours. The concentration in adult education requires a minimum of 12 hours in adult education courses. A final examination is required of all master's degree students.

Human Performance and Sport Studies

The master's degree with a major in Human Performance and Sport Studies offers concentrations in:
- Exercise science
- Sport management
- Sport studies

Applicants must submit an admission application and 3 letters of recommendation. Both thesis and non-thesis options are available. The non-thesis option requires 32 hours (sport management concentration requires 33 hours), including a project, and a course in research design or an approved specialized research class. The thesis option requires the completion of 33 hours, including 6 hours of Thesis 500. Both options require a minimum of 12 hours of sport studies, exercise science, or sport management courses.

THE SPECIALIST IN EDUCATION PROGRAM

The Educational Specialist degree program with a major in Education encompasses concentrations in:
- Curriculum
- Educational administration & supervision
- Elementary education
- English education
- Foreign language/ESL education
- Instructional technology
- Mathematics education
- Reading education
- School counseling
- School psychology
- Science education
- Social science education
- Special education

The instructional and curricular concentrations require completion of a minimum of 30 hours of coursework beyond the master's degree, including 6 hours in core courses, 18 hours in specialized courses, and 6 hours to be determined by the student's committee.

The educational administration and supervision concentration requires the completion of a minimum of 30 hours beyond the master's degree. Both thesis and non-thesis options are available. The school counseling concentration requires a minimum of 22 hours beyond the master's degree but not fewer than 60 hours beyond the baccalaureate, including practicum and internship experiences. The school psychology concentration requires the completion of a minimum of 66 semester hours beyond the baccalaureate. Refer to Degree Requirements under The Graduate School for complete program requirements.

THE DOCTOR OF EDUCATION PROGRAM

The Ed.D. program with a major in Education is available in the following concentrations and specializations:
- Curriculum, educational research, and evaluation (curriculum, educational research, evaluation)
- Educational administration and policy studies (educational administration and supervision, higher education)
- Educational psychology (collaborative learning)
- Instructional technology (educational applications of technology)
- Literacy, language education, and ESL education (literacy, ESL education)
- Teacher education (elementary education, social science education, mathematics education, science education)

In addition to the requirements of The Graduate School, the hour requirements in the curricular and instructional concentration areas are determined by the student's doctoral committee. A comprehensive examination and an oral examination on the dissertation are required.

The concentration in educational psychology with a specialization in collaborative learning requires the completion of a minimum of 90 hours beyond the baccalaureate degree and incorporates a cohort model through which students participate in core courses as a group. This program offers an alternative residency which includes a two-year, on-campus, continuous enrollment in six to nine hours per semester including summers. During this time period, students are enrolled in a doctoral seminar (EPS630) for four of the six semesters and participate with faculty on research teams for 12 of the required hours. Contact the program coordinator for additional information and program requirements.

The requirements for the concentration in educational administration and policy studies are determined on an individual basis by each student's doctoral committee. Course requirements include a 6-9 hour cognate within the college and a 6-9 hour minimum external to the college. Additional course requirements include completion of two consecutive semesters of Educational Administration and Policy Studies 804 during
residence. Though an internship is highly recommended, it is not required. A foreign language requirement is at the discretion of the committee. A written comprehensive examination, as well as an oral examination on the dissertation, is required. An alternative residency, which includes a two-year, on-campus, continuous enrollment in Educational Administration and Policy Studies 608, Leadership Forum, is available for qualified students.

THE DOCTOR OF PHILOSOPHY PROGRAM

Faculty from all six departments participate in the delivery of the Ph.D. degree program with a major in Education. Concentrations and specializations are available in the following areas:

- Counseling psychology (gender and cultural issues in counseling, career development, group process, counseling service, assessment)
- Counselor education (school counseling, counseling service) (Not currently accepting new students)
- Cultural studies in education (social and cultural theory)
- Curriculum, educational research, and evaluation (curriculum, educational research, evaluation, educational applications of technology)
- Early childhood education (early childhood special education)
- Educational administration and policy studies (educational administration and supervision, higher education)
- Educational psychology (adult education, applied educational psychology)
- Exercise science (biomechanics/sports medicine, exercise physiology, physical activity and population health)
- Instructional technology (educational applications of technology)
- Literacy, language education, and ESL education (literacy, ESL education)
- School psychology
- Socio-cultural foundations of sport and education (history of education, history of sport, psychology of sport, philosophy of sport, sociology of education, sport sociology)
- Teacher education (elementary education, gifted and talented education, mathematics education, science education, social science education)

The program requirements are:

**Requirements**

**Minimum Hours**

**Research Area**

**Core Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Minimum Hours</th>
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<tbody>
<tr>
<td>Concentration within primary concentration</td>
<td>3</td>
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<tr>
<td>Philosophy of science or history of philosophy of education (select one)</td>
<td>3</td>
</tr>
<tr>
<td>from Philosophy 446 or 546 or courses identified in addendum to Ph.D. guidelines or Cultural Studies in Education 607</td>
<td>3</td>
</tr>
<tr>
<td>Theoretical foundations and/or applications (select one)</td>
<td>3</td>
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<tr>
<td>Learning and curriculum theory (Educational Psychology 609, 515, or Psychology 580)</td>
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<tr>
<td>Administrative/leadership theory (Educational Administration and</td>
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**MINOR IN GERONTOLOGY**

Graduate students with minors/concentrations in counseling, exercise science, or educational psychology may pursue a specialized minor in gerontology. This interdisciplinary/minor concentration 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.

**ADDITIONAL REQUIREMENTS**

- Supervision 513, 680 or Educational Administration and Policy Studies 514
- Group dynamics (Counselor Education and Counseling Psychology 554)
- Instructional technology (Instructional Technology, Curriculum and Evaluation)
- Trans-college seminar: two consecutive semesters (Education 601)
- Concentration
  - A minimum of 15 hours selected from one concentration: 15
- Specialization
  - A minimum of 9 hours selected from a specialization: 9
- Cognate
  - A minimum of 6 hours selected from outside the college in addition to the designated research courses: 6
- Dissertation 24

The residence requirement consists of three consecutive semesters of full-time enrollment. Additional details are available through the College's Graduate Center, Claxton Complex A332, (865) 974-8070, or mlw@utk.edu.

**TEACHER LICENSURE**

In addition to the above cited degree programs, the College of Education offers graduate level teacher licensure courses. Students completing requirements for initial teacher licensure earn 24 semester hours of graduate credit which may be applied to a 36 semester hour Track 2 master's degree with a major in Education.

To earn initial teacher licensure, students must complete undergraduate prerequisites courses, gain admission to The Graduate School as a degree seeking student, and the following 24 hours of coursework:

Fall Semester

- 575 Internship
- --- Specialty Studies
- 574 Analysis of Teaching for Professional Development 2

Spring Semester

- 575 Internship 8
- 591 Clinical Studies 4 24

TOTAL 8

Further details concerning the teacher licensure program and the Track 2 master's degree program are available through the College of Education Advising Center, Claxton Complex A332, (865) 974-8194, or idmorgan@utk.edu.

**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 on an in-state tuition basis. The M.S. program in Counseling is available to residents of the state of Florida (concentration in rehabilitation counseling). The M.S. program in Education (concentration in education of the deaf and hard of hearing) is available to residents of the states of Alabama, Kentucky, Maryland, South Carolina, Virginia, or West Virginia. The M.S. program in Human Performance and Sport Studies is available to residents of Alabama, Arkansas, Maryland, South Carolina, or Virginia. The Ed.D. program in Education (concentration in educational psychology) is available to residents of Kentucky. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Student Services.

**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.

540 Topics in Improvement of Instruction (1-3) Special conferences, workshops, and inservice programs. May be repeated. Maximum 8 hrs. SNC only.

562 Direction and Supervision of Student Teaching (3) Roles and responsibilities of cooperating teachers and student teachers; objectives and policies of student teaching program elements of clinical supervision; overview of research. F, Su

586 Teacher-Parent-Community Relations (3) Techniques for effective relations between parents and teachers; examination of roles and expectations; parental involvement; volunteer programs; influence of community on educational process. Prereq: Consent of instructor. Sp, Su

574 Analysis of Teaching for Professional Development (2) Strategies to document and analyze effectiveness of teaching and of professional development. Study and application of various approaches. Coreq: 575. F

575 Professional Internship in Teaching (1-5) Intensive teaching and teaching-related experiences in professional settings in public schools. Enrollment limited to postbaccalaureate students in professional year program. Prereq: Admission to Teacher Education Program. May be repeated. Maximum 12 hrs. SNC only. F, Sp

576 Practicum in Classroom Teaching (1-8) Teaching and teaching-related experiences in elementary and secondary school settings. Specific hours and school level assignment determined by licensure or certification requirements. May not be used for probationary licensure year. May not be used toward degree requirements. May be repeated. Maximum 12 hrs. SNC only. E

589 Field Experience (1-3) Application of curricular and instructional principles, methods, and materials in schools. Prereq: Program prerequisites and consent of instructor. May be repeated. Maximum 9 hrs. SNC only. E

591 Clinical Studies (4) Group and individual seminar activities during full-time internship. Application and evaluation of professional core competencies. Completion and presentation of portfolio and analysis of teaching project. Coreq: 575.

601 Trans-College Seminar (1) Introduction to Ph.D. program in Education: research requirements, meaning of scholarship in academic and issues/problems in education. Minimum of two consecutive semesters preceded or followed by summer term required of all Ph.D. students. Prereq: Admission to Ph.D. program.
or consent of Ph.D. program coordinator. May be repeated. Maximum 3 hrs. May not be used to meet 600 requirement. S/NC only.

635 Teacher Education in America (3) For students preparing to enter teacher education. Brief historical development, program analysis and evaluation, current issues, and future directions. F

Educational Administration and Cultural Studies
(College of Education)

MAJORS DEGREES

College Student Personnel ..........M.S., Ed.S., Ed.D., Ph.D.
Education ..........M.S., Ed.S., Ed.D., Ph.D.
Educational Administration and Policy
Studies ..........M.S., Ed.D.
Human Performance and Sport Studies .......... Ed.S.

Joy T. DeSensi, Head

Professors:
Allison, C. B. (Emeritus), Ph.D. .......... Oklahoma
Bogue, Grady (Liaison), Ed.D. ............... Memphis State
DeSensi, J. T., Ed.D. .......... North Carolina (Greensboro)
Howard, Robert (Emeritus), Ph.D. .......... Ohio State
Malik, Anand (Emeritus), Ed.D. .......... Columbia
McNinis, Malcolm, Ph.D. .......... Florida State
Mead, B. J. (Emeritus), Ph.D. .......... Purdue
Mertz, Norma T., Ed.D. .......... Columbia
Morgan, W. J. (Liaison), Ph.D. .......... Minnesota Paul, Joan (Emeritus), Ed.D. .......... Alabama
Phillips, Madge M. (Emeritus), Ph.D. .......... Iowa
Ubben, Gerald C., Ph.D. .......... Wayne State

Associate Professors:
Aper, Jeffery P. (Liaison), Ph.D. .......... VPI
Norris, Cynthia, Ed.D. .......... Tennessee
Thayer-Bacon, Barbara, Ph.D. .......... Indiana
Wright, Handel K., Ph.D. .......... Toronto

Assistant Professors:
Fisher, Leslue, Ph.D. .......... California
Mangione, Terry, Ph.D. .......... Buffalo

The Department of Educational Administration and Cultural Studies participates in graduate programs leading to degrees, majors, and concentrations in:

Master of Science

College Student Personnel
Education
Social foundations
Educational Administration and
Policy Studies
Educational administration and
supervision
Human Performance and Sport Studies
Sport studies
Specialist in Education
Education
Educational administration and
counseling

Doctor of Education
Education
Educational administration and
policy studies

Doctor of Philosophy
Education
Cultural studies in education
Educational administration and
policy studies
Social-cultural foundations of sport
and education

See Education under Fields of Instruction for full description of all degree requirements. Programs in cultural studies, including those in the socio-cultural foundations of education and sport, derive their intellectual identity and orientation from disciplines such as anthropology, history, philosophy, psychology, and sociology, and from more specialized forms of inquiry such as ethnography, semiotics, literary theory, hermeneutics, linguistics, and feminist theory.

The faculty are devoted to interdisciplinary inquiry and seek to bring their disciplines to the service of students and faculty throughout the college as aids to understanding diverse cultural contexts that shape beliefs, values and practices. The faculty examine critically the social practices, institutions, "helping" agencies, and other social sites where disenfranchised and marginalized groups struggle for greater control over their futures.

Programs in educational administration and in higher education focus on the preparation and development of administrative and instructional leaders who will serve in diverse settings of schools and colleges, community and human service agencies, adult and continuing education organizations, and educational units of government and corporate organizations.

A cohort based alternative approach to residence for the Doctor of Education degree program is offered. This alternative residence involves, among other requirements, a two-year, on-campus, continuous enrollment in Educational Administration and Policy Studies 606, Leadership Forum. Students should contact the department for further information.

The annual admission deadline is March 15 for the Ed.S. and doctoral programs, and March 15 for the master's programs.

Cultural Studies in Education

GRADUATE COURSES

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

501 Special Project (3) Culminating experience for non-thesis major. Research study suitable for publication, or practicum requiring special written work. Prereq: 532. 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


505 History of Olympism: Ancient and Modern (3) Examination of various aspects of ancient and modern Olympic Games. Ancient Olympic 776 BC to 393 AD: Panhellenic

Games. Modern Olympics, 1896 to date: political, social, class, gender, and economic issues that influence Olympic Games.


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. E

526 Philosophy of Education (3) Description, interpretation, and critique of philosophical/theoretical arguments: truths, knowledge and values in relation to education. E

532 Professional Practice Issues in Sport Psychology (3) Study and critique of various aspects of professional practice in sport psychology. 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. Acquisition and performance of skills: discussion of current research and methodology. E

535 Health and Exercise Psychology (3) Study and cultural critique of various aspects of exercise psychology. E

537 Sport Psychology Seminar (1) Issues and problems in applied sport psychology. Analysis and synthesis of research literature and discussion of sport psychology consultation practices and other topics. May be repeated. Maximum 3 hrs. S/NC only.

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

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 purposes, to content of curriculum and to methods and techniques for conducting educational enterprise. F/Su

541 Special Topics (1-3) Advanced study in selected disciplinary or professional areas of physical education and sport. May be repeated. E

542 Sociological Aspects of Sport (3) Social and cultural factors influencing sport and physical education. Pertinent issues and research applications. Prereq: Consent of instructor. E

544 Survey of Contemporary Philosophies in Education (3) Current debates within various philosophical fields of study related to education. E

545 Educational Sociology (3) Sociological analysis of American education system. Controversial social issues that affect educational system and potential solutions offered by various programs. Open to juniors, seniors, and graduate students. F

546 Topics in History of Education (3) May be repeated. E

547 Topics in Philosophy of Education (3) May be repeated. F/Su

549 Topics in International Education (3) Historical, philosophical, and sociological foundations; selected nations and their cultures. May be repeated. E

560 Introduction to Qualitative Research in Education (3) Fundamentals of qualitative research methods
and development of skills needed for qualitative research proposals. Overview of qualitative research methods: ethnography, case study, historiography, biography, oral and life history. Critical reading and evaluation of qualitative research studies. F,Sp

500 Cultural Studies Seminar (1) Two semester sequence (Fall and Spring); ongoing discussion about cultural representation, popular culture, interdisciplinarity, social justice issues. Presentations, videos and readings. May be repeated. Maximum 4 hrs. S/NC only.

501 Issues in Cultural Studies (3) Combination of theoretical readings in cultural studies and service learning for social justice project. Discussion of inter-disciplinary, social justice and activism. Links between theory and practice of cultural studies.

502 Justice, Schools, and Sports (3) Social justice issues: education and sport practices. Social justice, moral commitments to others in educational and sport settings, and equal opportunity to acquire social goods and benefits. Prereq: Admission to doctoral program with concentration in cultural studies in education.

503 Independent Study (1-3) May be repeated. S/NC or letter grade. E

504 Supervised Readings (1-3) May be repeated. S/NC or letter grade. E

505 Special Topics (1-3) Advanced study in selected aspects of cultural studies. May be repeated. Maximum 9 hrs. S/NC or letter grade.

600 Doctoral Research and Dissertation (3-15) May be repeated. S/NC only. E

601 Seminar in Philosophy of Education (3) Selected philosophical issues in education. Prereq: 2 courses in history or philosophy of education. May be repeated: education, philosophy of education. May be repeated with consent of instructor. Sp

625 Seminar in History of Education (3) Selected historical issues in education. Prereq: 2 courses in history or philosophy of education. May be repeated with consent of instructor. Sp

633 Advanced Sport Psychology (3) Analysis, synthesis, and discussion of contemporary theory and topics; research development and production in sport psychology. May be repeated. Maximum 9 hrs.


681 Practicum (1-3) Intern experience in areas of major interest. May be repeated. 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) Study for doctoral students in selected aspects of cultural studies. May be repeated. Maximum 9 hrs. S/NC or letter grade.

516 Research for Educational Administration (3) Descriptive, experimental, and quasi-experimental designs to help students without quantitative background to read and understand technical professional literature. Introduction to inferential statistics, needs assessments, and evaluation procedures. Sp, Su

523 Administration of Special Services (3) Legal, programmatic, and ethical responsibilities of educational administrators in design and implementation of special service programs within school settings. Special learner characteristics, program categories, service delivery models, and philosophical frameworks. Inclusion and full service delivery.

535 Administrative Applications of Microcomputers (3) DOS, word processing, database management, spreadsheet, and computer communications. Review and development of specific administrative applications: scheduling, attendance, student record systems, and accounting. F, Su

544 School Finance and Business Management (3) For prospective building level administrators. Financial and logical management tasks and procedures in individual school setting. Prereq: M.S. Introductory core or consent of instructor. F, Su

547 Educational Facility Planning (3) Concepts and skills for development, evaluation, construction, renovation, maintenance, design and use of facilities. Prereq: Doctoral student in Education. F, Su

548 Supervision and Personnel Administration (3) Basic supervisory and personnel concepts and related topics: basic supervision, recruitment, interviewing, personnel planning, organizing, and evaluating. Prereq: Doctoral student in Education. F, Su

553 Strategies of Educational Planning (3) Processes for improving decision-making function through use of both qualitative and quantitative planning techniques. Prereq: CPM, PERT, Delphi. Prereq: M.S. Introductory core or consent of instructor. F, Su

554 Policy Issues in Educational Law, K-12 (3) Legal aspects of educational law, legislation and practices for public school administrators and teachers. Prereq: 663 or SPED 21, or consent of instructor. F, Su

560 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 663 or SPED 21. 21 hrs in educational administration and supervision 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 663 or SPED 21. 21 hrs in educational administration and supervision or consent of instructor. E

585 Educational Leadership-Principalship (3) Knowledge, skills and relationships for principal to be effective educational leader. Simulation materials and field-based activities. Prereq: Internship in Educational Administration and a summary of internship. F, Su

590 Seminar in School Leadership, K-12 (3) On-site study of quality school processes throughout region. Prerequisites: makes organizations "bermarks of quality. Prereq: Consent of instructor. May be repeated. S/NC or letter grade. F, Sp

605 Advanced Seminar in Administrative Theory (3) Interdisciplinary seminar. Readings selected by faculty for research and scholarly inquiry from current classic theoretical studies and current periodical literature in administrative and organizational theory.

Educational Administration and Policy Studies

GRADUATE COURSES

513 Administrative and Organizational Theory in Education (3) Introduction to theoretical administrative and organizational foundations of management and leadership of educational programs and institutions. F, Su

515 Human Relations and Communication in Administration (3) Development and use of effective interpersonal communication skills and channels, intergroup relations, supportive work climates, personnel management, role conflict, and role identity. Prereq: 513, 514. E

516 Research for Educational Administration (3) Descriptive, experimental, and quasi-experimental designs to help students without quantitative background to read and understand technical professional literature. Introduction to inferential statistics, needs assessments, and evaluation procedures. Sp, Su

523 Administration of Special Services (3) Legal, programmatic, and ethical responsibilities of educational administrators in design and implementation of special service programs within school settings. Special learner characteristics, program categories, service delivery models, and philosophical frameworks. Inclusion and full service delivery.

535 Administrative Applications of Microcomputers (3) DOS, word processing, database management, spreadsheet, and computer communications. Review and development of specific administrative applications: scheduling, attendance, student record systems, and accounting. F, Su

544 School Finance and Business Management (3) For prospective building level administrators. Financial and logical management tasks and procedures in individual school setting. Prereq: M.S. Introductory core or consent of instructor. F, Su

547 Educational Facility Planning (3) Concepts and skills for development, evaluation, construction, renovation, maintenance, design and use of facilities. Prereq: Doctoral student in Education. F, Su

548 Supervision and Personnel Administration (3) Basic supervisory and personnel concepts and related topics: basic supervision, recruitment, interviewing, personnel planning, organizing, and evaluating. Prereq: Doctoral student in Education. F, Su

553 Strategies of Educational Planning (3) Processes for improving decision-making function through use of both qualitative and quantitative planning techniques. Prereq: CPM, PERT, Delphi. Prereq: M.S. Introductory core or consent of instructor. F, Su

554 Policy Issues in Educational Law, K-12 (3) Legal aspects of educational law, legislation and practices for public school administrators and teachers. Prereq: 663 or SPED 21, or consent of instructor. F, Su

560 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 663 or SPED 21. 21 hrs in educational administration and supervision 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 663 or SPED 21. 21 hrs in educational administration and supervision or consent of instructor. E

585 Educational Leadership-Principalship (3) Knowledge, skills and relationships for principal to be effective educational leader. Simulation materials and field-based activities. Prereq: Internship in Educational Administration and a summary of internship. F, Su

590 Seminar in School Leadership, K-12 (3) On-site study of quality school processes throughout region. Prerequisites: makes organizations "bermarks of quality. Prereq: Consent of instructor. May be repeated. S/NC or letter grade. F, Sp

605 Advanced Seminar in Administrative Theory (3) Interdisciplinary seminar. Readings selected by faculty for research and scholarly inquiry from current classic theoretical studies and current periodical literature in administrative and organizational theory.
Higher Education

GRADUATE COURSES

530 Special Topics (1-3) May be repeated. E

534 Program Evaluation in Education (3) (Same as Instructional Technology, Curriculum and Evaluation 533.)

536 Policy Issues in Higher Education Quality Assurance (3) Examinations of practical and ethical dimensions of work in educational administrative; assistance to current and prospective administrators to deal with dimensions in knowledgeable, reflective and principled ways. (Same as Higher Education 670.)

580 Administration of Complex Organizations (3) Concepts and theoretical formulations to understand, analyze, evaluate, and change complex educational programs and organizations. Prereq: 513 or consent of instructor. Sp, Su

590 Special Topics (1-3) May be repeated. E

Educational Psychology

Degree Programs

MAJORS DEGREES

Education .................. Ed.S., Ed.D., Ph.D. Educational Psychology. M.S.

R. S. McCallum, Head

Professors:

Bellon, Jerry J. (Emeritus), Ed.D. UC Berkeley
Brockett, Ralph G., Ph.D. .......... Syracuse
Dickinson, Donald J. (Emeritus), Ed.D. ............. Oklahoma State

George, Thomas W., Ed.D. .......... Tennessee
Greenberg, Katherine H., Ph.D. .......... George Peabody
McCallum, R. S., Ph.D. .......... Georgia
Peters, John M., Ed.D. .......... NC State
Skinner, Christopher H., Ph.D. .......... Lehigh
Williams, R. L. (Liaison), Ph.D. .......... George Peabody

Associate Professors:

Bain, Sherry K., Ph.D. .........., Southern Mississippi
Kindall, Luther M., Ed.D. .......... Tennessee
Ziegler, Mary F., Ed.D. .......... Columbia

The Department of Educational Psychology offers graduate programs leading to degrees, majors, and concentrations in:

Master of Science

Educational Psychology

Adult education individual and collaborative learning

Educational Specialist

Education

School psychology

Doctor of Education

Education

Educational psychology

School psychology

See Education under Fields of Instruction for full description of all degree requirements.

The department brings together four areas of graduate study related to teaching and learning across the lifespan. The department is committed to the creation and study of environments that enhance learning potential and promote lifelong learning for people of all ages, abilities, and backgrounds within our programs and the professional practices that we address. Assistantships and fellowships are available for qualified applicants. For more detailed information about the department, see website at http://web.utk.edu/~edpsy.

The adult education area is designed for individuals who seek to provide professional leadership in the education of adults. It offers two degree programs: Master of Science with a major in Educational Psychology, concentration in adult education, and Doctor of Philosophy with a major in Education, concentration in educational psychology, specialization in adult education. For details, see website at http://web.utk.edu/~adulted.

The applied educational psychology area is designed for individuals who seek to provide professional leadership in promoting and facilitating learning and/or its measurement. It offers two degree programs: Master of Science with a major in Educational Psychology, concentration in individual and collaborative learning, and Doctor of Philosophy with a major in Education, concentration in educational psychology, specialization in applied educational psychology. For details, see website at http://web.utk.edu/~appedpsych. The collaborative learning area is designed for professional practitioners who seek to increase their understanding of the collaborative learning process and its facilitation in their interaction with learners of any age in a variety of educational situations.
It offers the Doctor of Education degree program with a major in Education, concentration in educational psychology, specialization in collaborative learning. For details, see website at http://www.utm.edu/~collab.

The school psychology area offers advanced training in psychological, educational, and professional foundations leading to licensure as a school psychologist. It offers two degree programs: Educational Specialist with a major in Education, concentration in school psychology, and Doctor of Philosophy with a major in Education, concentration in school psychology. The school psychology programs are accredited by the relevant bodies, including the National Association of School Psychologists (NASP), the American Psychological Association (APA), and the National Council for Accreditation of Teacher Education (NCATE). For details, see website at http://www.utm.edu/~sychpsych.

Admission Requirements

Admission requirements include completion of all items in the department’s admissions packet and three letters of recommendation (i.e., rating forms). Up-to-date GRE scores are required for application to all degree programs except the master’s program. For applicants to the doctoral programs, a writing sample is also required.

Application Deadlines

Applications are reviewed throughout the year for applicants to the master’s program. For applicants to the doctoral programs who wish to begin a program the next fall semester, the application deadline is January 15th. The adult education area also has a deadline of October 15th for applicants at the Ph.D. level who wish to begin the program spring semester.

GRADUATE COURSES

432 The Disadvantaged Student: Psychoeducational Perspectives (3) Theory and research regarding etiology, psychosocial behavior and appropriate interventions. F

460 Self-Management in the Helping Professions (3) Application of self-management strategies to career, social, emotional, and health domains for both helping professionals and their clientele. Prereq: Consent of instructor. F

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

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


504 Special Topics (1-3) Instructor-initiated course offered at convenience of unit on topics of current interest. May be repeated. Maximum 15 hrs. S/N or letter grade. E

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

510 Psychological Theories of Human Development Applied to Education (3) Theory and research on emotional, social, and intellectual development over life span with applications to educational and therapeutic settings. F,Su

513 Reflective Practice in Education and Psychology (3) Concepts, theories and processes of reflective practice applied to educational settings. E

514 Individual Study in Adult Education (3) Prereq: Consent of supervising instructor. Approval may be completed in office of unit head. May be repeated. Maximum 6 hrs. E

515 Educational Applications of Behavioral Theories of Learning (3) Behavioral theories and research, conditioning, observational learning, and ethological learning as systems to apply to student motivation, discipline and learning. Su

516 Educational Applications of Cognitive Learning Theories (3) Cognitive theory and research, social learning, attribution and information processing as applied to education. Su

518 Educational Specialist Research and Thesis (3) May be repeated. P/NP only. 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

521 Program Development and Operation in Adult Education (3) Theories and methods from research to practice in planning and conducting education programs. Prereq: Consent of instructor. Sp

522 Adult Development (3) Theory and research in adult development and change over lifespan and its implications for adult learning in formal and informal contexts. 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.

524 Continuing Professional Education (3) Theories and concepts supporting design and management of educational programs for adults in professions. Prereq: 520 or equivalent.

525 Characteristics of Adult Learners (3) Key characteristics of adult learners, current theory and research on adult learning and implications for teaching and learning concepts. Sp

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: Counselor Education and Counseling Psychology 525. A

527 Controversies in Adult Education (3) Controversies confronting field of adult education; development of critical analysis skills by looking at controversies from different perspectives. Sp

528 Psychology of Aging (3) Theory and research of aging and gerontology related issues: psychological and related physiological changes that occur in later life stages of human development. Implications for treatment programs and policy. Sp

529 Facilitating Adult Learning (3) Theory, research and practice related to working with adults in teaching-learning situations. Su

530 Methods of Collaborative Inquiry (3) Philosophical and theoretical frameworks for designing and conducting collaborative inquiry projects. Practice in conducting research. Sp

540 Seminar in School Psychology (3) Essentials of theory and practice of school psychology as professional specialty. Consideration of history and current issues in school psychology. F

541 Psychoeducational Assessment (3) Direct, psychoeducational, cognitive and practical methods of assessment. Prereq: Admission to school psychology program or consent of instructor, and Consent of Education and Counseling Psychology 525 or equivalent. 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/N 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 consulting skills to educational settings. Prereq: 545. Sp

549 Internship in School Psychology (1-6) Supervised employment in unit approved school psychology internship sites. Prereq: Enrollment in school psychology program and consent of instructor. May be repeated. Maximum 12 hrs. S/N only. E

560 Discipline and Conflict Resolution (3) Applications of major models of discipline and conflict resolution strategies in development of constructive atmosphere for classroom learning. Sp

572 Cognitive Education: Models and Approaches (3) Models and approaches in field of cognitive education: research and theoretical support for various program components, critical variables of organizational learning that affect success of implementation. Sp

573 Meeting Needs of Nontraditional and Underachieving Learners (3) Exploration of students’ needs at any age and level of functioning who are not progressing up to their fullest potential. Causes of academic and motivational problems, and approaches to overcome them. Learning to learn, cultural alienation, and personal world view and interaction with effective teaching and learning. Su

574 Facilitating Group Change (3) Practical issues of group change. Analyses of group and individual experiences in all types of educational settings in relation to systems theory and collaborative learning theory. Needs of individuals and groups involved in change and roles of inside and outside change agents. F,Su


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

602 Directed Research (3) Instructor- or student-initiated group investigations of theoretical and practical problems in educational and counseling psychology. May be repeated. Maximum 12 hrs. S/N only. E

604 Special Topics (1-3) Instructor-initiated courses offered at convenience of unit on topics of interest. May be repeated. Maximum 15 hrs. S/N or letter grade. E

609 Advanced Seminar in Curriculum and Learning (3) Team-taught interdisciplinary seminar: trends, themes, and issues in curriculum and learning. Reading and discussions based on significant research and scholarly publications. Sp

612 Modes of Inquiry (3) Same as Educational Administration and Policy Studies 612.

620 Seminar in Adult Education (3) Issues in adult education, theories and concepts, philosophical positions, research trends and methodologies. Prereq: 520 or equivalent. Sp

621 Advanced Seminar in Program Planning (3) Concepts, principles, and theories related to program planning in adult education. Prereq: 521 or equivalent. A

622 Advanced Seminar in Adult Development and Learning (3) Adult development and adult learning theory and research. Prereq: 522, 525, or equivalent. A

Electrical and Computer Engineering

(College of Engineering)

MAJOR DEGREES

Electrical Engineering.......................... M.S., Ph.D.

Marshall O. Pace, Acting Head

Professors:
Abidi, Mongi, Ph.D. ...................... Tennessee
Alexeff, Igor (Emeritus), Ph.D. .... Wisconsin
Bailey, J. Milton (Emeritus), Ph.D. ........ Georgia Tech
Birdwell, J. Douglas, Ph.D. ............. MIT
Bishop, Asa O., Jr. (Emeritus), Ph.D. .. Clemson
Bodenheimer, Robert E. (Emeritus), Ph.D. .......... Northwestern
Bose, Bikal K. (Condra Chair of Excellence), Ph.D. .......... Calcutta
Boudin, Donald W., Ph.D. .............. Vanderbilt
Gonzalez, R. C. (Emeritus), Ph.D. .......... Florida
Goode, Joseph M. (Emeritus), Ph.D. .... Georgia Tech
Green, Walter L. (Emeritus), Ph.D. .... Texas A & M
Hung, James C. (Emeritus), Ph.D. .... New York
Karim, Mohammad A. (Liaison), Ph.D. ...... New York
Kennedy, Eldredge J. (Emeritus), Ph.D. .... Pennsylvania
Lawler, J. S., Ph.D. ...................... Michigan State
Pace, Marshall O. (Liaison), Ph.D. ....... Georgia Tech
Pierce, John W. (Emeritus), Ph.D. ......... Pittsburgh
Pujoer, Alfonso Jr. (UTSI), Ph.D. ......... Vanderbilt
Roberts, M. J., Ph.D. ..................... Tennessee
Rochelle, Robert W. (Emeritus), Ph.D. .... Maryland
Roth, J. Reece, Ph.D. ................... Cornell
Symonds, Frederick W. (Emeritus), Ph.D. ...... New York
Tillman, James D. (Emeritus), Ph.D. ....... Auburn

Associate Professors:
Abdala, C. T., Ph.D. ....................... Georgia Tech
Bomer, Bruce W. (UTSI), Ph.D. .......... Tennessee
Brisson, Paul B., Ph.D. .................... New Mexico State
Cary, Paul B. (UTSI), Ph.D. ............... New Mexico State
Eisen, Ph.D. ............................. Connecticut
Joseph, Roy D. (UTSI), Ph.D. ............ Case Western Reserve
Koch, Daniel, Ph.D. ........................ Missouri (Rolla)
Newport, Danny, Ph.D. .................... Tennessee

Assistant Professors:
Chasson, John, Ph.D. ................. Minnesota
Howlader, Mostofa, Ph.D. ............... Virginia Tech
Montoya, Tom P., Ph.D. ................. Georgia Tech
Peterson, Gregory, Ph.D. ............... Washington (St. Louis)
Qi, Haiqiong, Ph.D. ........................ North Carolina State
Smith, L. Montgomery (UTSI).

Ph.D. ........................................... Tennessee
Smith, Phillip W. ........................ Virginia
Tolbert, Leon, Ph.D. ........................ Georgia Tech

The Department of Electrical and Computer Engineering offers graduate degrees leading to the Master of Science and a Doctor of Philosophy with a major in Electrical Engineering. Graduate students are able to conduct research in a wide variety of electrical engineering areas including communication, computer engineering, computer vision and robotics, electromagnetics, electro-optics, image processing, information, intelligent control, microelectronics, mixed-signal VLSI, monolithic sensors, plasma engineering, power electronics and systems, sensor fusion, and signal processing.

The department sustains a strong joint program in mixed-signal VLSI and monolithic sensors with the Oak Ridge National Laboratory, Instrumentation and Controls Division. This program provides students with unique opportunities to receive career-related training at ORNL while satisfying thesis or dissertation requirements of the graduate program. Departmental graduate programs are also available at the Space Institute, Tullahoma. Some of the electrical engineering courses are offered in the evening. Engineers working in industry are encouraged to participate in the department's graduate program. Further information about these various programs is available from the department.

The Departmental Graduate Committee is responsible for administering, promoting, and advancing the general well-being of the graduate program. Departmental actions regarding a graduate student may be appealed in writing, first to the departmental graduate committee and then to the department faculty.

THE 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 two to three years of part-time study.

Admission Requirements

Applicants for admission to the M.S. degree program are expected to have completed a bachelor's degree in Electrical Engineering with an average of at least 3.0 out of 4.0 both overall and in the senior year. All applicants whose native language is not English, including those who have earned degrees at U.S. institutions, must score at least 550 on the TOEFL exam to be considered for admission to the program.

Students who hold the bachelor's degree 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. The department will require that selected undergraduate courses be taken to make the background of these students comparable to that of students who hold a bachelor's degree in Electrical Engineering. These undergraduate courses may include electrical engineering courses from the sophomore and junior years and one senior electrical engineering sequence of the student's choice. The specific set of undergraduate courses required will be chosen in view of the applicant's prior education and experience. The student will be admitted under non-degree status until the required undergraduate courses are successfully completed with a 3.0 average.

Master's Degree Requirements

Students may choose between a thesis option and a project (non-thesis) option M.S. program. All students must file a Master's Program Plan with the departmental graduate committee specifying which option they have selected, a semester-by-semester schedule of the courses they intend to take, and the members of the student's master's commit-
Students may change between the thesis and project options, one time, by filing an amended Master’s Program Plan.

**Thesis Option** Specific requirements of the thesis option are a minimum of 30 semester hours including:

1. Electrical Engineering 503 and 504.
2. Six semester hours of mathematics at the 400 level or above selected from a list approved by the graduate committee, or 6 semester hours of EE courses at the 500 level or above, or 6 semester hours of non-EE courses approved by the student’s master’s committee and the graduate committee.
3. An additional 12 semester hours of 500-level work in electrical engineering including 6 semester hours in the student’s major area of electrical engineering and 6 semester hours in a second area of electrical engineering approved by the student’s master’s committee.
5. A final oral examination covering the thesis and related coursework.

**Non-Thesis Option** Specific requirements of the project (non-thesis) option are a minimum of 33 semester hours including:

1. Electrical Engineering 503 and 504.
2. Six semester hours of mathematics at the 400 level or above selected from a list approved by the graduate committee, or 6 semester hours of EE courses at the 500 level or above, or 6 semester hours of non-EE courses approved by the student’s master’s committee and the graduate committee.
3. An additional 18 semester hours of 500-level work in electrical engineering courses, with at least 6 hours of 500-level work in each of two areas of electrical engineering.
4. Electrical Engineering 501 (project in lieu of thesis) with a minimum grade of B. This course will be administered by the student’s master’s committee. A written report proposing describing what the student will do in the course must be submitted in advance for the graduate committee’s approval. A written final report and oral presentation is required and one copy of the final draft must be submitted to the graduate committee.
5. A final written and oral examination covering the project and related coursework.

**THE DOCTORAL PROGRAM**

The Ph.D. degree program with a major in Electrical Engineering may be pursued in the concentration areas of circuit theory, computers, electro-optics, communication theory, electromagnetic theory, plasma engineering, power systems, solid-state electronics, power electronics, and control systems.

Applicants are required to submit scores on the General Graduate Record Exam. A TOEFL score of 550 is required for non-native speakers of English, including those who have earned degrees at U.S. institutions. Specific departmental requirements for the Ph.D. include the following:

1. A Master of Science or Master of Engineering degree.
2. A minimum of 24 semester hours of coursework beyond the Master’s, excluding research and dissertation credit. These hours must include:
   a. A minimum of 12 semester hours in electrical engineering at the 500 and 600 levels.
   b. A minimum of 9 semester hours of 600-level coursework. At least 3 hours of this work must be in an area other than the student’s major area.
   c. A minimum of 6 semester hours of mathematics courses at the 500 level or above and approved by the electrical engineering graduate committee.
3. One foreign language if the student’s faculty committee feels that a reading knowledge of a foreign language is crucial to the student’s research efforts.
4. Satisfactory performance on a qualifying examination and on a comprehensive examination. The qualifying examination is prepared by the Electrical Engineering faculty and consists of two 4-hour written examinations covering courses required in the undergraduate electrical engineering curriculum through the junior level. The qualifying examination is offered twice each year (January and August) and is to be taken the first time it is offered after the student enrolls in the program. A student who fails the qualifying examination takes and pass the examination the next time it is offered to complete the program. A minimum of 18 hours of coursework must be completed after the student has taken the qualifying examination the first time.
5. Comprehensive examination is required by the Graduate School. In this department, the comprehensive exam is administered by the student’s committee; the exam results are reported to the graduate committee for approval; and the exam is filed in the department. The comprehensive exam is given when the student is ready to apply for admission to candidacy. The comprehensive exam consists of both written and oral parts. The written part consists of at least two sections: a complete review of the literature in the student’s dissertation topic, and a review of the major tools to be used in the dissertation work. The student’s committee may require additional written sections. The students must demonstrate a mastery of the dissertation area, ability to think analytically and creatively, skill in using academic resources, and ability to complete the dissertation satisfactorily. The oral part consists primarily of a professional presentation of a proposal for dissertation work and its defense. The committee may cover additional topics in the oral part.
6. Participation in departmental seminars.
7. A minimum of 24 hours of doctoral coursework.

**GRADUATE COURSES**

Note: Courses required in the Electrical Engineering undergraduate curriculum cannot be used in either the M.S. or Ph.D. programs. No 400-level course may be used toward a graduate degree in Electrical Engineering except when required by the program.

400 Senior Design (5) Major design project focusing student’s attention on professional practice, accumulated background of curricular components, and recent developments in field. Directed to topics within field of electrical engineering. Level 3 design projects which require laboratory work. Prerequisite: Linear System Analysis, Analog Energy System Components, Electronic Circuits, Analog Communication Amplitude and Frequency Modulation, Introduction to Logic Design of Digital Systems.

411 Digital Signal Processing and Filter Design (3) Discrete-time signals and systems, sampling, discrete Fourier transforms, analog filter characteristics, non-recursive and recursive filter design, and CAD tools for filter design. Level 1 design projects which require laboratory work. Prerequisites: Frequency-Domain Analysis of Signals and Noise, Linear System Analysis, Systems and Power Laboratory.

412 Linear Control System Design (4) Classical and modern techniques for design and compensation of linear feedback control systems. Bode design, root locus design, state variable pole placement design. Level 2 design projects which require laboratory work. Prerequisite: 411.

421 Electric Energy Systems (3) Structure and operation of electrical energy grid; load flow; economic loading; planning; control; reliability. Balanced and unbalanced fault, system protection, system stability. Level 1 design projects. Prerequisite: Linear System Analysis, Electric Energy System Components, Systems and Power Laboratory.


423 Electric Machines (3) Principles of electromechanical energy conversion. Design procedures for AC and DC machine windings; construction and performance characteristics. Effect of machine parameters on steady state and dynamic performance; the dq model; reference frames. Level 1 design projects. Prerequisite: Linear System Analysis, Electric Energy System Components.

431 Operational Amplifier Circuits (3) Linear and non-linear active circuits using commercial operational amplifiers. Operational, instrumentation, isolation, bridge, rms logarithmic converters, multipliers and function generator, rectifiers, references, active filters, modulation and demodulation, sinusoidal generation. Noise fundamentals and calculations in op-amp circuits. Design for specified pole-zero functions, Applications: transducer interfacing. Level 1 design projects which require laboratory work. Prerequisite: Linear System Analysis, Electric Energy System Components.

432 Electronic Amplifiers (4) Feedback amplifier principles; wideband linear amplifier design; low-noise preamplifier design; audio power amplifier design; linear and digital power design and switching regulator principles. Radio frequency amplifier design; oscillator principles. Laboratory experiments and design projects. Level 2 design projects which require laboratory work. Prerequisite: 431.

441 Digital Communications (3) Discrete Fourier Transforms. Binary and M-ary Signaling, digital communication in present of noise, matched filtering and equalization. Information theory. Level 1 design projects. Prerequisite: Analog Communication Amplitude and Frequency Modulation.

442 Communication System Design (4) Application of communication theory to system design. Development of communication system specifications. System simulation utilizing graphical programming language. Hardware and software design and simulation. Construction and performance evaluation of complete analog or digital transmitter and receiver or significant subsystems. Level 2 design projects. Prerequisite: 441.


451 Microprocessors and Microcontrollers in Electrical Engineering (3) Project-oriented course using microcomputer kit having monitor program and development system with cross-assemblers, file management, and emulation capability. Interfacing and hard-
signals and systems, sampling, fast Fourier transform.

505 Digital Signal Processing 1 (3) Discrete-time spectrum and spectral analysis applied to response correlation functions and temporal analysis, power theory. Statistical averages and transformations of discrete Fourier transform and fast Fourier transform. Sided z-transform and its inversion by residues. The Fourier transform and series. Sampling theory. Two-form, its inversion with residues, and its relation to the Fourier transform and series. Frequency and/or faculty time before degree is completed. May be taken any semester when student uses University facilities. Committee. May be repeated. Maximum 6 hrs.


507 Application of Linear Algebra in Engineering Systems (3) (Same as Chemical Engineering 507 and Mechanical Engineering 507)

511 Linear Systems Theory (3) State space models of linear dynamical systems, linear algebra, state transition map, matrix exponential, controllability, observability, realization theory, and stability theory. Coreq: 503.

512 Multivariable Linear Control System Design (3) Design of controllers, for multivariable systems, which satisfy constraints on robustness to plant uncertainties, disturbance rejection, command following. Prereq: 511.


519 Control Systems Design II (3) Digital control, variable structure control, state-space design of SISO systems, use of estimators and observers, comparison of classical and state-space methods of control system design, considerations for control system instrumentation. Prereq: 518.

521 Power Systems Analysis I (3) Matrix-vector representations of power networks, sequence modeling of power system components, unbalanced shunt and series faults. Formulating and solving problems in matrix-vector form with application to large scale power systems. Prereq: 421 or equivalent.

522 Power Systems Analysis II (3) Operation and control of interconnected power systems, transient and dynamic stability. Formulating and solving problems in matrix-vector form with application to large scale power systems.

523 Power Electronics and Drives (3) Forced commutated inverters, advanced PWM techniques, current-fed inverters, drive system modeling, vector and scalar control of induction machines, parameter variations, control principles of synchronous machines.


531 Advanced Analog Electronics I (3) Physical operation of modern, advanced, complex active devices, control and/or switching devices: diodes, bipolar transistors, J-FETs, and MOS-FETs. Small-signal equivalent circuits and noise models of active devices. Project laboratory. Prereq: 431; 432, or consent of Instructor.


545 Introductory Microwave Networks and Components (3) Linear and nonlinear microwave resonators, planar waveguides, millimeter wave devices. Component and system parameter measurement by modern network analyzers. Electromagnetic oscillators and amplifiers, frequency sweeping, transistors and parametric devices, mixers, switches.


552 Digital System Design II (3) State identification and structure realizations of sequential machines. Digital system architecture design: microprogramming and interrupt control. Prereq: 551.

561 Plasma Diagnostics I (3) Principles of active, passive, perturbing and nonperturbing diagnostic methods used in low temperature plasmas, and high temperature plasmas of interest in fusion research. Laboratory safety, data reduction and presentation, microprocessor based data handling and analysis, and reduction of time series data. Prereq: 461, 463, or consent of instructor.

562 Plasma Diagnostics II (3) Laboratory instruction in operation of plasma diagnostic equipment in plasma science laboratory. Experience with high voltage, vacuum, RF, and digital data handling techniques. Prereq: 561.

566 Industrial Plasma Engineering II (3) Continuation of 565 to industrial applications: Ion implantation in solids, plasma deposition and etching, space propulsion systems, plasma chemistry, plasma lighting devices, insulating dielectrics and breakdown, materials processing with plasma arcs, and related topics. Prereq: 565 or consent of instructor.

571 Pattern Recognition (3) Decision-theoretic and structural approaches to pattern recognition. Deterministic and statistical decision rules, feature extraction and representation, syntactic and semantic methods. Prereq: 471 or consent of instructor.

572 Digital Image Processing (3) Spatial and transform processing of images in the complex plane, digital signal operators, image enhancement, restoration, and coding. Segmentation techniques. Image representation and description. Prereq: 472 or consent of instructor.

573 3D Methods in Robot Sensing, Vision and Visuospatialization (3) Tools used for 3D reconstruction and analysis; 3D recovery by nonlinear estimation. Projective geometry, analytic photogrammetry, range sensing, lighting models, differential geometry, and 3D rendering.

574 Advanced Computer Vision (3) Principles and methods for analysis of time and space varying imagery. Imaging physics and color theory, shapeform, feature correspondence and tracking, stereo vision, structure from motion, optical flow, motion-based segmentation, and selected topics form current literature. Prereq: 573 or consent of instructor.


Electrical Insulation (3) Principles, testing, and control of synchronous machines, static Kramer drives, static Schubert drives, VSCF generation, modern control theory in ac drives.

Optimal Control (3) Deterministic and stochastic dynamic programming in continuous and discrete time, maximum principle and matrix minimum principle, computational methods in optimal control. Prereq: 511.

Advanced topics in Systems Theory I (3) Topics of current interest to students and faculty: large scale systems, model order reduction, algebraic and geometric system theories, and advanced design methods. Prereq: 503 and consent of instructor.

Advanced 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: 503.

Advanced Power Electronics and Drives (3) Phase-controlled cycloconverters, cycloconverter-fed ac drives, resonant converters, vector and scalar control of synchronous machines, static Kramer drives, static Schubert drives, VSCF generation, modern control theory in ac drives.

Advanced Graduate Seminar (1) Research in department may be repeated. S/NC or letter grade.

Advanced Topics in Electronic Instrumentation I (3) Based on particular interests of students. Fundamental physical processes in instrumentation transducers: thermoelectric, magnetoelastic, electromagnetic and quantum-mechanical devices. Prereq: 531-32 and consent of instructor.


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.

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: 643.

Computer-Aided Design of VLSI Systems I (3) Fabrication of microelectronic devices; computer-architecture design; algorithmic state machines; partitioning; structured design methodology. Prereq: 551-2 or consent of instructor.

Computer-Aided Design of VLSI Systems II (3) Computer-aided design tools; design and implementation of fully custom very large scale integrated (VLSI) circuits; design for testability; testing of fabricated chips. Prereq: 551.

Advanced Plasma Physics I (3) Basic concepts of high temperature plasma physics. Magnetohydrodynamics and kinetic descriptions of plasma, plasma transport, plasma waves, equilibrium, and stability. Prereq: Physics 541-2, 461-2 or 563-4, or consent of instructor.


Image Processing and Robotics I (3) Three-dimensional scene modeling and recognition, multi-sensor systems. Prereq: 572 or 573 or consent of instructor.

Image Processing and Robotics II (3) Stereo-vision, shape theory. Prereq: 571.

Image Processing and Robotics III (3) Time-varying imagery, path planning and navigation. Prereq: 572.

Advanced Graduate Seminar (1) Research in department may be repeated. S/NC or letter grade.

Special Topics (1-3) Advanced topics of current interest to Ph.D. students in Electrical Engineering. May be repeated. Maximum 9 hrs.

Electrical Insulation (3) Principles, testing, and control of synchronous machines, static Kramer drives, static Schubert drives, VSCF generation, modern control theory in ac drives.

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.

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: 643.

Computer-Aided Design of VLSI Systems I (3) Fabrication of microelectronic devices; computer-architecture design; algorithmic state machines; partitioning; structured design methodology. Prereq: 551-2 or consent of instructor.

Computer-Aided Design of VLSI Systems II (3) Computer-aided design tools; design and implementation of fully custom very large scale integrated (VLSI) circuits; design for testability; testing of fabricated chips. Prereq: 551.

Advanced Plasma Physics I (3) Basic concepts of high temperature plasma physics. Magnetohydrodynamics and kinetic descriptions of plasma, plasma transport, plasma waves, equilibrium, and stability. Prereq: Physics 541-2, 461-2 or 563-4, or consent of instructor.


Image Processing and Robotics I (3) Three-dimensional scene modeling and recognition, multi-sensor systems. Prereq: 572 or 573 or consent of instructor.

Image Processing and Robotics II (3) Stereo-vision, shape theory. Prereq: 571.

Image Processing and Robotics III (3) Time-varying imagery, path planning and navigation. Prereq: 572.

Advanced Graduate Seminar (1) Research in department may be repeated. S/NC or letter grade.

Special Topics (1-3) Advanced topics of current interest to Ph.D. students in Electrical Engineering. May be repeated. Maximum 9 hrs.

Electrical Insulation (3) Principles, testing, and control of synchronous machines, static Kramer drives, static Schubert drives, VSCF generation, modern control theory in ac drives.

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.

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: 643.

Computer-Aided Design of VLSI Systems I (3) Fabrication of microelectronic devices; computer-architecture design; algorithmic state machines; partitioning; structured design methodology. Prereq: 551-2 or consent of instructor.

Computer-Aided Design of VLSI Systems II (3) Computer-aided design tools; design and implementation of fully custom very large scale integrated (VLSI) circuits; design for testability; testing of fabricated chips. Prereq: 551.

Advanced Plasma Physics I (3) Basic concepts of high temperature plasma physics. Magnetohydrodynamics and kinetic descriptions of plasma, plasma transport, plasma waves, equilibrium, and stability. Prereq: Physics 541-2, 461-2 or 563-4, or consent of instructor.

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 with a grade of B or better.
3. Passing of the regular Ph.D. foreign language examination as currently administered at UT.

Capstone Experience Requirement: An integral part of all options in the master's degree program in English is a capstone experience which allows the student to synthesize and apply the knowledge and skills gained through the completion of the program in a substantial way. Examples of capstone experiences include, but are not limited to, the completion of a thesis or the formal public presentation of a paper at a professional meeting or colloquium. All capstone experiences normally occur after the completion of 24 hours of coursework and must be approved by the Director of Graduate Studies.

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 of whom should be from the literature faculty.

Final Examination: The reading list may be modified by the A.B. 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 54 semester hours beyond the B.A. (of which at least 24 semester hours must be beyond the M.A.) to include at least 42 semester hours at the 600 level, at least 15 semester hours at the 500 level or above (only 3 hours of 693 Independent Study may be applied toward the M.A. and 3 at the M.A.); a 3-hour course in teaching composition, and 15 additional hours at any level approved for graduate credit (including a maximum of 12 hours at the 400 level if approved by the Director of Graduate Studies).

Up to 6 of these additional hours may be taken in some cognate field or fields such as history, philosophy, 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 and for 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 must be fulfilled by (a) completion of French 302 or German 332 at UT with a grade of B or better, (b) completion at UT 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.
2. One modern language approved by the Director of Graduate Studies in English. This requirement must be fulfilled by passing grade on the language examination given by UT and completion of two courses given in the foreign language at the 300 level or above, at least one course to be at the 500 or 600 level. A minimum grade of B must be received in each course.
3. One modern language approved by the Director of Graduate Studies in English and intensive study of the English language. This requirement must be fulfilled by completion of (a), (b), or (c) in option 1. for one foreign language, and completion of 6 semester hours in English language courses with grades of B or better, at least three of which must be from English 508 or 506 History of the English Language (offered in alternate years only). For the other 3 hours, the student may either complete the history of the language sequence or choose one other course in the language taught in the Department of English at UT 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: (1) 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. (2) 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 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 teaching each semester.

GRADUATE COURSES
Note: Students enrolling in English graduate courses must first register in the office of the Director of Graduate Studies in 306 McClung Tower.

401 Medieval Literature (3) Reading and analysis of selected medieval literary masterpieces in modern English.

402 Chaucer (3) Reading and analysis of The Canterbury Tales and Troilus and Criseyde in Middle English.

404 Shakespeare I: Early Plays (3) Shakespeare's dramatic achievement before 1601, reading and discussion of selected plays from Elizabethan romantic comedies, including Twelfth Night; English histories, including Henry IV, Part 1; and early tragedy, including Hamlet.

405 Shakespeare II: Later Plays (3) Shakespeare's dramatic achievement after 1601, reading and discussion of selected plays from great tragedies, including Othello; problem plays, including Measure for Measure; and dramatic romances, including The Tempest.

406 Renaissance Drama (3) English theatre between 1560 and 1640 through reading of representative plays by Shakespeare's contemporaries: Marlowe, Webster, Jonson, and Marlowe.

409 Spenser and His Contemporaries (3) Principal achievements in prose and poetry of sixteenth-century English authors; Spenser, Wyatt, Marlowe, More, Sidney, and Bacon.

410 Milton, Donne and Their Contemporaries (3) Principal achievements in prose and poetry of first two-
literary movement, or other coherent emphasis. May be repeated. Maximum 9 hrs. each.

530-31 Readings in English Literature of the Restoration and Eighteenth Century (3,3) Topics vary. Genre, poetry, prose, fiction, drama; or period: Restoration, earlier eighteenth century, later eighteenth century. May be repeated. Maximum 9 hrs. each.

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. May be repeated. Maximum 9 hrs. each.

550-51 Readings in American Literature (3,3) Content varies: genre, theme, literary movement, or other coherent emphasis. May be repeated. Maximum 9 hrs. each.

552 Readings in Black American Literature (3) Content varies: genre, theme, literary movement, or other coherent emphasis. May be repeated. Maximum 9 hrs.

560-61 Readings in Twentieth-Century Literature (3,3) Content varies: genre, theme, literary movement, or other coherent emphasis. May be repeated. Maximum 9 hrs. each.

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 fiction. May be repeated. Maximum 9 hrs.

581 Colloquium in Poetry Writing (2) Major poetic project or continuation of project begun in 463. Individual consultation with instructor supplements class analysis; readings in contemporary poetry and theory. Prereq: 463 or consent of instructor. May be repeated. Maximum 8 hrs.

582 Special Topics in Writing (1-3) Topics vary. May be repeated. Maximum 6 hrs. Enrollment by consent of director of graduate studies only.

583 Special Topics in Literature (3) Topics vary: genres, modes, and other literary subjects not in standard period divisions. May be repeated. Maximum 6 hrs.

584 Topics in Feminist Studies (3) Topics vary. May be repeated. Maximum 9 hrs.

585 Issues in Invention, Style, and Audience (3) Theoretical perspectives on contemporary research in rhetoric and composition.

586 History of Rhetoric I (3) Survey of rhetoric from Sophists to 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. May be repeated. Maximum 6 hrs.

589 Special Topics in Language (3) Topics vary. May be repeated. Maximum 6 hrs.

590 Topics in Critical Theory (3) Topics vary. 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.

594 Film History, Form, and Analysis (3) Issues in film studies: history of narrative film; concept of film form; critical approaches to film study (genre, auteur, formalist, and others); and critical analysis of individual films.


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 culture, read in Old and Middle English. Subject matter varies from year to year. May be repeated. Maximum 9 hrs.


640-41 Readings in Restoration and Eighteenth-Century Literature (3,3) Topics vary: Swift, satiire, restoration literature, Johnson and Boswell, Addison and Steele, restoration drama, Dryden. May be repeated. Maximum 9 hrs. each.

650 Studies in English Romanticism (3) Seminar content varies: particular literary figure or figures, genres, theme, or other coherent focus. May be repeated. Maximum 9 hrs.

651-52 Studies in Victorian Literature (3,3) Seminar content varies: particular literary figure or figures, genres, theme, or other coherent focus. May be repeated. Maximum 9 hrs. each.

660-61-62 Studies in American Literature (3,3,3) Southern literature before 1830, frontier, regionalism, women's literature, Irving, Cooper, Poe, Emerson, Thoreau, Hawthorne, Melville, Whitman, Dickinson, James, and Twain. May be repeated. Maximum 9 hrs. each.

670-71-72 Studies in Twentieth-Century Literature (3,3,3) Seminar content varies: particular literary figure or figures, genres, theme, or other coherent focus. May be repeated. Maximum 9 hrs. each.

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 history of rhetoric and composition. Issues in invention, textuality, literacy, historiography, style and ethics. May be repeated. Maximum 9 hrs.

686 Studies in Creative Writing (3) Content varies. Connection between theory and practice in writing. May be repeated. Maximum 9 hrs.


690 Special Topics (3) Content varies. History of ideas, humor, biography, autobiography, extra-literary disciplines. May be repeated. Maximum 9 hrs.

694 Studies in Film (3) Content varies. Advanced work in film history and analyses. May be repeated. Maximum 6 hrs.

Entomology and Plant Pathology

(College of Agricultural Sciences and Natural Resources)

MAJOR DEGREE

Entomology and Plant Pathology M.S.

Carl J. Jones, Head

Professors:

Bernard, Ernest C., Ph.D. Georgia
Bost, Steven C., Ph.D. NC State
Burgess, Edward E., Ph.D. Tennessee
Gerhardt, Reid R. (Liaison), Ph.D. NC State
Grant, Jerome F., Ph.D. Clemson
Hilty, James W. (Emeritus), Ph.D. Ohio State

Johnson, Leander F. (Emeritus), Ph.D. Louisiana State
Jones, Carl W., Ph.D. Wyoming
Lambdin, Paris L., Ph.D. VPI
Newman, Melvin A., Ph.D. Texas A & M
Patrick, Charles R., Ph.D. Georgia
Piers, Charles D., Ph.D. Clemson
Southards, Carroll E. (Emeritus), Ph.D.

Wendham, Alan S., Ph.D. NC State
Wendham, Mark T., Ph.D. NC State

Associate Professors:

Canaday, Craig H., Ph.D. Ohio State
Gwinn, Kimberly D., Ph.D. NC State
Hale, Frank M., Ph.D. Ohio State
Lentz, Gary L., Ph.D. Iowa State
Owney, Bonnie H., Ph.D. NC State
Ridderick, Bradford B., Ph.D. Clemson
Skinner, John A., Ph.D. California (Davis)
Veil, Karen M., Ph.D. Florida

Assistant Professor:

Pereira, Roberto M., Ph.D. Florida

The Department of Entomology and Plant Pathology offers a graduate program leading to the Master of Science with a concentration in entomology or plant pathology.

Students in entomology may specialize in crop entomology, medical and veterinary entomology, insect biology, insect pest management, or biological control. Students in plant pathology may specialize in fungal and soil diseases, scab, zebra mites, plant nematology, or virology. For specific information, contact the department head.

THE MASTER'S PROGRAM

Admission Requirements

For admission to the M.S. degree program, a student must meet all requirements of The University of Tennessee Graduate School and must have completed (1) general botany or biology, 8 hours; (2) advanced biological sciences, 8 hours; (3) general inorganic chemistry, 6-8 hours; (4) organic chemistry, 3 hours. In addition, three completed ratings forms and a written statement of career goals and interest in entomology or plant pathology are required.

Degree Requirements

The program requires a written thesis based on original research and the completion of a minimum of 24 hours of coursework for graduate credit, approved by the student's advisory committee. Included in the course requirements are two acceptable seminar presentations for 1 hour each. An oral final exam must be passed to the satisfaction of the advisory committee after the thesis has been completed. A minor is not required but may be selected at the option of the student. The minor will include at least 6 hours and not more than 10 hours of graduate-level credit in the minor department. The student's committee shall include a member of the faculty from the minor department to assist in designating courses required for the minor.
Environmental Engineering
See Civil Engineering

Exercise Science and Sport Management
(College of Education)

MAJORS

Exercise science and Sport Management

DEGREES

Education ........................................... Ph.D.
Human Performance and Sport Studies . M.S.

Edward T. Howley, Head

Professors:

Beitel, Patricia A. (Emeritus), Ed.D. ............ North Carolina (Greensboro)
Howley, Edward T., Ph.D. .................... Wisconsin
Kozar, Andrew J. (University Prof.), Ph.D. ............... Michigan
Lay, Nancy E. (Emeritus), Ph.D. ....... Florida State
Liemohn, W. P., Ph.D. ....................... Iowa
Namey, T. C., M.D. .............. Washington (St. Louis)
Rickett, Ian R. H., Ph.D. ............... Brown
Watson, Helen B. (Emeritus), Ph.D. ....... Michigan
Welch, Hugh (Emeritus), Ph.D. ............. Florida

Associate Professors:

Bassett, David R., Jr., Ph.D. ............ Wisconsin
Jones, Ralph E., Ph.D. .................... Toledo
Kelley, Dennis R., Ph.D. ................... Georgia State
Thompson, Dixie L., Ph.D. ................. Virginia

Assistant Professors:

Lewison, Martin, ....................... Pittsburgh
McCutchin, M. G., Ed.D. ............... North Carolina (Greensboro)
Stratta, Terese, Ph.D. ...................... Southern Illinois
Zhang, Songning, Ph.D. ................. Oregon

The Department of Exercise Science and Sport Management offers graduate programs leading to degrees, majors, and concentrations in:

Master of Science

Human Performance and Sport Studies

Exercise science (exercise physiology; biomechanics/sports medicine)

Sport management

Doctor of Philosophy

Education

Exercise science

See Education under Fields of Instruction for full description of all degree requirements. The exercise science concentration promotes and integrates scientific research, education, and practical applications of exercise science to maintain and enhance health, fitness, performance, and quality of life. The department offers an undergraduate major in Exercise Science that will prepare students for careers in fitness and provide the science-based background needed for application to graduate programs in biomechanics, physical therapy, cardiac rehabilitation, public health, exercise physiology, athletic training, or public school teaching. Graduate students and faculty focus on research dealing with theoretical and applied aspects of exercise and sport.

The sport management concentration provides the opportunity for students to attain knowledge and to develop the essential skills to become successful sport managers. In addition, the department coordinates and provides instruction in many physical activities designed to improve physical fitness and encourage future participation in lifetime sports.

Effective courses are offered in dance. These courses are appropriate for students interested in management of dance studios, teaching dance, or dance performance.

ADMISSION REQUIREMENTS

Applicants are required to complete the departmental application which will be sent to all persons upon their initial inquiry about the program. This is in addition to The Graduate School application. Applications from persons who have less than a 3.0 GPA will not be considered.

The following retention policy applies to all graduate students seeking a degree in the department:

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 ASSISTANTSHIPS

A limited number of graduate assistantships are available for qualified women and men who are graduates of accredited colleges or universities. These assistantships are open to students in the master’s and doctoral programs. Students interested in these opportunities should file their applications before February. Letters should be addressed to Graduate Assistantships Coordinator, Exercise Science and Sport Management Department, The University of Tennessee, Knoxville, TN 37996-2700.

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.

480 Dance Through the 19th Century (3) Dance of various societies and culture from pre-history through 19th century.

490 Dance in the 20th Century (3) History and philosophy of dance.

495 Dance Pedagogy (3) Principles and methods of teaching dance with practical application in mini-teaching experience. Requires upperclass or graduate standing and consent of instructor.
Exercise Science

GRADUATE COURSES

480 Physiology of Exercise (3) Functions of body in muscular work: physiological aspects of fatigue, training and adaptation to environment. Prereq: Biochemistry and Cellular and Molecular Biology 230 Human Physiology or 440 General Physiology. (Same as Biochemistry and Cellular and Molecular Biology 480.)

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

501 Special Project (3) Culminating experience for non-thesis major. Prerequisite study suitable for publication, or practicum requiring special written work. 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.


508 Research in Exercise Science (3) Research for writing of thesis and institutional review board proposals; presentation of research through free communications and poster presentations; calculation and interpretation of statistics related to common research designs used in research; and use of computer software.

509 Graduate Seminar in Public Health (1) Same as Public Health 509, Nutrition 509, Nursing 509 and Social Work 509.


513 Biomechanics of Orthopedic Rehabilitation (3) Effect of physical activity on musculoskeletal tissue: flexibility development and measurement, surgical implications, and rehabilitation related research.

516 Therapeutic Exercise (3) Current research in therapeutic exercise: role of nervous system, soft tissue healing, proprioception, muscle activation patterns, and strength.

521 Analytic Epidemiology (3) Epidemiologic strategies for evaluating research questions concerning causes, prevention and treatment of morbidity and disability. Presentations by experts working with large population-based studies. Research processes: grant writing and protocol preparation. Prerequisite: Course in statistics or consent of instructor.

525 Epidemiology of Injury and Violence (3) Epidemiologic methods to describe magnitude and examine etiology of unintentional injuries. Alternative approaches for preventing or controlling occurrence of injury and violence in both general population and high risk sub-populations.

531 Biomechanics (3) Biomechanical principles and applications to analyses of human movements. Quantitative analysis of human movements. Prerequisite: General physics.

533 Exercise Physiology (3) Physiology of human performance: acute and chronic effects of exercise on metabolic, cardiac, pulmonary, and skeletal systems. Prerequisite: Human physiology or general physiology, general chemistry, 240 or 569.

541 Special Topics (1-3) Advanced study in selected areas of exercise science. May be repeated.

563 Laboratory Techniques in Exercise Physiology (3) Laboratory course in experimental methodology and instrumentation: respiratory and metabolic measurements, blood chemistry, and gas analysis. Prerequisites: 480 or 533.

565 Advanced Physiology of Exercise (3) Systematic study of skeletal muscle and metabolism related to acute exercise and physical training: lectures, discussions of major scientific reviews, and appropriate laboratory experiments. Prerequisites: 480 or 533.


569 Clinical Exercise Physiology (3) Cardiac structure and function, interpretation of 12-lead electrocardiograms, exercise electrocardiograms for cardiac and pulmonary patient. Prerequisites: 480 or 533, and 567. (Same as Public Health 569.)

570 Cardiac Rehabilitation Practice (1-3) Supervised experience in hospital-based exercise programs for patients with cardiac and/or pulmonary disorders. Use of telemetry monitoring, leading safe exercise regimens counseling participants on safe exercise guidelines. Presenting educational class on topic applicable to participants. Prerequisites: 533 and 567, or consent of instructor. Coreq: 569. May be repeated. Maximum 6 hrs.

581 Biomechanics Instrumentation (1) Kinematic, kinetic and muscle activity measurements of human movements using computerized videography, force platform, electromyography and other relevant instruments. May be repeated. Maximum 3 hrs. S/NC only.


593 Independent Study (1-3) May be repeated. S/NC or letter grade. E

600 Doctoral Research and Dissertation (3-15) Prerequisites: 532. May be repeated. S/NC or letter grade. 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) Prerequisite: Doctoral student or consent of instructor. May be repeated. S/NC or letter grade.

625 Mortality and Survival (3) Life table and other population-based approaches to studying interations and sociodemographic patterns and differentials in mortality, morbidity, and disability. Prerequisite: 2 graduate statistics courses or consent of instructor.

635 Physical Activity and Positive Health (3) Review of clinical, epidemiological, and experimental evidence concerning relationship and effects of exercise on health-related components of fitness. Prerequisite: Elementary statistics, 480 or 533, and 567 consent of instructor. (Same as Public Health 635.)

651 Seminar in Exercise and Applied Physiology (1-3) Selected topics in exercise and environmental physiology. Prerequisites: 480 or 533. May be repeated with consent of instructor.

664 Research Participation in Exercise Science (1-5) Participation in research with faculty member whose interests coincide with those of student. S/NC only.

693 Independent Study (1-3) May be repeated. S/NC or letter grade. E

Sport Management

GRADUATE COURSES

415 Development and Management of Recreation, Tourism and Athletic Facilities (3) (Same as Recreation and Tourism Management 415.)

440 Sport Marketing (3) Application of fundamental marketing concepts to sport industry. Marketing research, promotions, fund raising, advertising, and assessment of marketing programs specific to sport. Historical development of sport marketing. Prerequisite: Marketing or consent of instructor.

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

501 Special Project (3) Culminating experience for non-thesis major. Research study suitable for publication, or practicum requiring special written work. Prerequisite: 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.


511 Administration/Supervision in Sport (3) Development of knowledge and skills needed for effective management of sport industry including organizational, administrative, and supervisory strategies related to sport in profit and non-profit settings.

512 Application of Legal Concepts to Sport Settings (3) Application of contract law, breach of contract, and monetary damages within sport settings: risk assessment and development of effective risk management strategies, development of contracts in sports; and analysis of cases involving discrimination based upon gender, race, and age as well as protection of rights at amateur and professional levels of sport.

530 Sport and Media Issues (3) Gender and race issues within context of media and sport. Development of sport media and media influence on sport.

532 Research Techniques in Sport (3) Evaluate, criticize, and apply research techniques in sport with consideration for and experiences in appropriate review, design, analysis procedures, and proposal development.

535 Ethics in Sport Administration (3) Development of analytical skills and knowledge necessary for managers/administrators in sport business/organizations, and upper level managers in sport business/organizations. Social issues and ethics in sport administration.

540 Sport Economics and Finance (3) Principles of economics and finance as applied to sport organizations. Market structures of sport finance and political economics that form those structures.

544 Theories of Leadership and Leader Behavior in Sport (3) Integration of various theoretical approaches to leadership styles in sport administration within cultural contexts, research, and field experiences.

553 Case Studies in Sport Administration (3) Current issues and problems in sport administration at all levels of amateur and professional sport. May be repeated under different topic. Maximum 9 hrs.

554 Readings in Sport Administration (3) Survey of pertinent literature in refereed and applied journals and texts.

555 Evaluation Techniques for Sport Managers (3) Review and application of evaluation techniques appropriate for sport programs, facilities, and personal needs.

570 Event Management (3) Review of current research related to theory and practice in event management and involvement in management capacity with one or more special events.
Finance

(College of Business Administration)

MAJOR

Business Administration ........... MBA, Ph.D.

James W. Wansley, Head

Professors:

Black, Harold A. (James F. Smith, Jr., Prof.), Ph.D. ... Ohio State
Boehm, T. P., Ph.D. .... Washington (St. Louis)
DeGennaro, R. P., Ph.D. .......... Ohio State
Dottwerich, William W. (Emeritus), Ph.D. .......... Pennsylvania
Ehrhardt, M. C. (Castagna Prof.), Ph.D. .......... Georgia Tech
Philippatos, G. C. (Distinguished Prof.), Ph.D. .......... New York
Shrieves, Ronald E. (AmSouth Bank Prof.), Ph.D. ....... UCLA
Wachowicz, J. M., Jr., CPA, Ph.D. .......... Illinois
Wansley, James W. (Clayton Chair of Excellence) (Liaison), CFA, Ph.D. .......... South Carolina

Associate Professors:

Auxier, A. L., Ph.D. ................ Iowa
Collins, M. Cary, Ph.D. ........... Georgia
Deves, Phillip R., Ph.D. .......... North Carolina
Murphy, Deborah L., Ph.D. .......... Florida

BUSINESS ADMINISTRATION CONCENTRATIONS

For complete listing of MBA and Ph.D. program requirements, see Business Administration.

MBA Concentration: Finance.

The curriculum offers courses for those interested in careers in corporate financial management, security analysis and investments, banking and financial institutions, and real estate.

Minimum course requirements are three courses: 511 plus two from the following: 512, 522, 532, 581, and 599 (Torch Fund only).

Ph.D. Concentration: Finance.

Minimum course requirements are finance seminars 641, 642, 651, 652.

GRADUATE COURSES

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

510 Contemporary Concepts and Methods in Finance (6) Emphasis on current issues and academic research. Topics vary. Prereq: Business Administration 504 and 505 or consent of instructor.

511 Issues in Finance (3) Strategic issues: corporate finance, investments, and capital markets. How decision-making in finance affects corporate value. Prereq: Business Administration 501, 511, 512, and 513 or consent of instructor.

512 Problems in Financial Management (3) Readings and cases that apply finance theory to real-world investment, financial, and asset management problems. Prereq: Business Administration 504 and 505 or consent of instructor.

522 Portfolio Analysis and Management (3) Portfolio theory and evidence of behavior of security returns view with to determining rational investment policy. Structure of risky assets and of real asset. Capital structure and portfolio formation. Prereq: Business Administration 504 and 505 or consent of instructor.

523 Commercial and Investment Banking (3) Analysis of management policies of financial institutions and investment banking firms. Legal, economic and regulatory environment and implications for management. Financial institution structure and competition. 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 various financing options on rates of return on income-producing properties. Effect of various financing options on equity returns. Prereq: Business Administration 504 and 505 or consent of instructor.

591 Financial Analysis of Decision Problems (3) Financial analysis and valuation of investment and financing decisions. 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. S/N/C or letter grade.

600 Doctoral Research and Dissertation (3-15) Ph.D. only: E

641 Seminar in Finance (1-3) Capital markets, utility theory, capital, pricing, theory of the firm, capital structure, dividend policy. Prereq: Consent of Instructor. S/N/C or letter grade.

651 Seminar in Corporate Finance (1-3) Recent theoretical and empirical developments in microfinance. Topics vary. Prereq: 641 and consent of instructor. May be repeated. Maximum 6 hrs. S/N/C or letter grade.


653 Seminar in Financial Institutions (1-3) Theoretical and empirical studies of financial institutions. Topics include: money market and capital market analysis, bank lending arrangements, and asymmetric information, international competitiveness, and deposit insurance. Prereq: 641 and consent of instructor. May be repeated. Maximum 6 hrs. S/N/C or letter grade.

654 Special Topics (1-3) Recent developments in finance. Topics vary. Prereq: 641 and consent of instructor. May be repeated. Maximum 6 hrs. S/N/C or letter grade.

Food Science and Technology

(College of Agricultural Sciences and Natural Resources)

MAJOR

Food Science and Technology .... M.S., Ph.D.

Clark J. Brekke, Head

Professors:

Brekke, Clark J., Ph.D. .......... Wisconsin
Collins, Jim L. (Emeritus), Ph.D. .......... Maryland
Davidson, P. Michael, Ph.D. .......... Washington State
Draughon, F. Ann, Ph.D. .......... Georgia
Jaynes, Hugh O. (Emeritus), Ph.D. .......... Illinois
Meth, William C., Ph.D. .......... Tennessee
Miles, James T. (Emeritus), Ph.D. .......... Iowa State
Overstreet, William W. (Emeritus), Ph.D. .......... Iowa State
Penfield, Marjorie P., Ph.D. .......... Tennessee

Associate Professors:

Golden, David A. (Lisbon), Ph.D. .......... Georgia
Loveday, H. Dwight, Ph.D. .......... Kansas State
Mount, John R., Ph.D. .......... Ohio State

Assistant Professors:

van Laack, Riette L. J. M., Ph.D. .......... Utrecht Weiss, Jochen, Ph.D. .......... Massachusetts

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 areas of food processing, food chemistry, food microbiology, sensory evaluation of foods. Anthesis of interests (meals, dairy, fruits, vegetables, bread, bakery products) can be emphasized in any of the areas by careful selection of courses and the research topic. Minors are available in cognate fields. For detailed information, contact the department head.

Admission requirements of The Graduate School of UT apply. In addition, applicants must submit scores from the general section of the Graduate Record Exam (GRE), a written statement of educational and career goals, and Graduate School rating forms or letters of recommendation from at least three people familiar with the applicant's scholastic ability and professional potential. Admission to the program is contingent upon faculty evaluation of the applicant's undergraduate/graduate GPA, GRE scores, rating forms, relevant work experience, and scores from the Test of English as a Foreign Language (TOEFL), if applicable.

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 505 Thesis. In addition, an oral, final examination covering the problem and coursework is required. The oral examination will be held on the Knoxville campus.

THE DOCTORAL PROGRAM

1. Completion of a master's degree in the field, or a closely related field, or passing a special qualifying examination is required for admission.

2. A dissertation is required for the Ph.D. degree. Each candidate must develop a detailed written plan for the dissertation research. A minimum of 72 hours beyond the Bachelor's degree, excluding credit for the master's thesis, is required. Of this, 24 semester hours must be 600 Doctoral Research and Dissertation.

3. At least 24 hours of coursework numbered above 500 are required exclusive of doctoral research and dissertation. At least 6 of the 24 hours must be courses numbered above 600.

4. A minimum of 6 hours of courses for graduate credit must be taken outside the Department of Food Science and Technology.

5. All candidates must complete 601 (2 hrs.) and are expected to attend 601 during their Ph.D. program.

6. 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 (4) Reactions of water, proteins, lipids, carbohydrates, minerals, enzymes, vitamins, and additives in foods. Prereq: Chemistry 110 Introduction to Organic and Biochemistry, Biochemistry and Cellular and Molecular Biology 310 Physiological Chemistry. 3 hrs and 1 lab.

420 Food Microbiology (2) Physical, chemical and environmental factors affecting growth and survival of foodborne microorganisms: pathogenic and spoilage microorganisms affecting quality of foods and their control. Prereq: Microbiology 210 General Microbiology. Coreq: 429. F

429 Food Microbiology Lab (3) Methods for examination, enumeration, cultivation and identification of foodborne microorganisms. Prereq: Microbiology 210 General Microbiology. Coreq: 429. F

430 Sensory Evaluation of Food (3) Principles and methods of sensory evaluation of foods. Prereq: Basic statistics. 2 hrs and 1 lab. F

452 Science of Dairy Foods (3) Science and technology of processing of milk and its products. Prereq: Food Laws and Regulations, Food Chemistry, Food Microbiology and Lab, and Food Preservation or consent of instructor. 2 hrs and 1 lab. Sp

460 Meat Science (3) Carcass characteristics of meat animals, muscle structure and composition, cut identification, curing, freezing and cooking. Prereq: Food Industry or consent of instructor. Sp

469 Meat Science Lab (1) Slaughter and processing methods for beef, pork, lamb and poultry. Coreq: 460. Sp

470 Food Crop Products (3) Food products from plants; types, manufacturing systems, quality attributes and utility. Prereq: Food Preservation and 3 hrs biological science or consent of instructor. Sp

480 Cereal Science and Bakery Products (3) Chemistry and technology of processing cereal grains, interactions of ingredients during production and storage of baked products. Prereq: Food Laws and Regulations, Food Chemistry, Food Microbiology and Food Preservation or consent of instructor. 2 hrs and 1 lab. Sp

490 Food Laws and Regulations (3) Laws and regulations designed to preserve safety, wholesomeness, and nutritional quality of United States food supply; precedent case studies and their impacts on laws and regulations. Prereq: The Food Industry; consent of instructor for non-majors. Recommended prerequisite: Core courses in Food Science and Technology.

495 Food Processing System Analysis and Evaluation (3) Design and evaluation of food processing operation to produce safe and acceptable quality food product. Prereq: Food Chemistry, Food Microbiology, Food Preservation or consent of instructor. Sp

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

501 Seminar (1) Individual reports and discussion on topics from current literature. May be repeated. Maximum 3 hrs. F,Sp

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

503 Problems in Lieu of Thesis (2-3) May be repeated. SNC only. E

507 Professional Development Seminar (1) Same as Agriculture and Natural Resources 507, Animal Science 507, Biosystems Engineering 507, Biosystems Engineering Technology 507, Ornamental Horticulture and Landscape Design 507, and Plant and Soil Sciences 507. SNC only. F

508 Thesis Proposal Preparation (1) Same as Agriculture and Natural Resources 508, Animal Science 508, Ornamental Horticulture and Landscape Design 509, and Plant and Soil Sciences 509. SNC or letter grade. Sp

510 Instrumental Analysis of Foods (3) Modern instrumental methods for control of food manufacturing processes. Prereq: Food Chemistry. 2 hrs and 1 lab. F

511 Color of Foods (2) Chemical basis, measurements, and reactions involved in color changes in foods. Manufacture and application of food colors in foods. Prereq: Food Chemistry or equivalent. 1 hr and 1 lab. F, A

512 Flavor of Foods (2) Chemical basis, measurements, and reactions involved in flavor changes in foods. Manufacture and application of flavorings in foods. Prereq: Food Chemistry or equivalent. 1 hr and 1 lab. F, A

515 Food Carbohydrates, Proteins and Lipids (4) Advanced study of chemical and physical attributes of carbohydrate, protein, and lipid components of foods; effects of components on production of safe and consistent quality food products; and changes during processing and/or distribution of food products. Prereq: Food Chemistry or equivalent. 3 hrs and 1 lab. Sp

521 Advanced Food Microbiology (3) Extrinsic and intrinsic factors associated with foods and food processing that relate to growth, survival, inhibition, detection, and recovery of foodborne pathogens and spoilage microorganisms; traditional and current approaches to microbiological food safety and quality. Prereq: Food Microbiology and Lab or equivalent. 2 hrs and 1 lab. Sp, A

540 Food Product Development (3) Art, science and technology of developing and marketing new food products. Prereq: Food Preservation. 2 hrs and 1 lab. Sp, A

550 Advanced Meat Science (3) Physical and chemical changes that occur in conversion of muscle to meat; effect of postmortem treatments on meat quality, composition and palatability; packaging, preservation and quality control. Prereq: 460. 2 hrs and 1 lab. Sp, A

590 Special Topics in Food Technology and Science (1-3) Critical reviews of current research and production concerns of food industry. May be repeated. Maximum 9 hrs. F, Sp

593 Directed Studies (1-3) Research on non-thesis topics chosen by student and major professor. Supervised experience in food industry or governmental laboratory. May be repeated. Maximum 6 hrs. E

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

601 Seminar (1) Reports and directed discussion on research topics from current literature. May be repeated. Maximum 3 hrs. F, Sp

620 Food Toxicology (3) Basic and applied concepts in food toxicology; toxicological aspects of processed foods, Mode of action, prevention and control of food toxins; in food supply. Prereq: Food Chemistry, 521 or consent of instructor. Sp, A

640 Advanced Food Processing (3) Role of processing treatments in modification of food properties; texture, flavor and color characteristics. Prereq: Food Preservation, 510, 511, 512 or consent of instructor. Sp, A

Forestry, Wildlife and Fisheries

(College of Agricultural Sciences and Natural Resources)

MAJORS

FORESTRY (College of Natural Resources)...

NATURAL RESOURCES (College of Natural Resources)...

WILDLIFE AND FISHERIES (College of Natural Resources)...

DEGREES

Forestry (College of Agricultural Sciences and Natural Resources) M.S.

Natural Resources (College of Agricultural Sciences and Natural Resources) Ph.D.

Wildlife and Fisheries Science (College of Agricultural Sciences and Natural Resources) M.S.
Professors:

Associate Professors:
Assistant Professors:


Graduate study leading to the Master of Science with majors in Forestry and in Wildlife and Fisheries Science and the Doctor of Philosophy with a major in Natural Resources is offered by the Department of Forestry, Wildlife and Fisheries. The doctoral program is pending approval of the Tennessee Higher Education Commission.

The mission of the Department of Forestry, Wildlife and Fisheries is to advance the management, utilization, and appreciation of natural resources in Tennessee, the region and beyond through programs in teaching, research and extension.

THE MASTER'S PROGRAMS

Both thesis and non-thesis options are available for the major in Forestry; a thesis is required in Wildlife and Fisheries Science.

For admission, the student must have a Bachelor's degree from an accredited institution in forestry, wildlife, fisheries, or other natural resource area. Applicants must take the general Graduate Record Examination (GRE) with minimum scores required. Graduate School rating forms or letters of recommendation from three individuals familiar with the applicant's academic ability are required. The department also has an application that must be submitted at the time of application to The Graduate School.

THESS Option

1. Prior to research for the thesis, the student is required to develop a detailed written research proposal. Registration for 6 hours of Thesis (Forestry 500 or Wildlife and Fisheries Science 500) is required.
2. A graduate committee of no fewer than 3 faculty members must be selected by the second semester of residence. At least one member must be from outside the department. In addition to the thesis requirement, a minimum of 24 hours of graduate coursework in the student's major must be completed. This work must be approved by the student's committee and no more than 10 hours of the minimum 30 can be below the 500 level. The committee may require additional coursework if the student's progress or background indicates such need.
3. All students are required to include Forestry 512 or Wildlife and Fisheries Science 512, Seminar, in their programs. This is required of each graduate student in residence for the fall semester.
4. An oral examination covering the thesis and coursework is required.

Non-Thesis Option (Forestry only)

1. Thirty-five hours of graduate coursework of which 28 must be at the 500 level or above is required.
2. A graduate committee of no fewer than 3 faculty members will be selected. At least one member shall be from outside the department. The committee will meet and schedule the student's program during the first semester in residence.
3. Three hours of Forestry 511 are required.
4. Nine hours of coursework in the department must be at the 500 level or above, exclusive of Forestry 511.
5. Final comprehensive written and oral examinations shall be taken upon completion of no fewer than 28 hours of approved study.

THE DOCTORAL PROGRAM

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

Admission Requirements

Applicants to the Ph.D. program normally should have completed a master's degree in a related field. Specific admission requirements include:

1. A minimum grade-point average of 3.0 on a 4.0 scale.
2. A minimum composite score on the general Graduate Record Examination (GRE) on the verbal, quantitative, and analytical sections of 1650, with a minimum of 1100 on the verbal and quantitative sections.
3. A statement of professional goals, natural resource management philosophy, and reasons for applying to the program.
4. Three letters of reference from individuals capable of evaluating the applicant's potential for graduate work in interdisciplinary natural resource management.

Degree Requirements

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

1. Research Methods and Analysis (9 credits in at least two of the subject areas) Research/Experimental Design Statistics/Econometrics/Biometrics GIS/Remote Sensing
2. Core Subject areas (33 credits to be determined by Doctoral Committee)
3. Professional Development (6 credits) Teaching - all students will be expected to complete FWF 601 and assist in teaching a course during their tenure in the program.

Problem Solving - FWF 610 will be required of all doctoral students that will include participation in an interdisciplinary team to address a significant national or regional natural resource issue.

Professional Communications - all students will be required to complete FWF 612 as part of their program of study. Part of the seminar requirement will consist of assisting in the development and conduct of FWF 512.

4. FWF 600 Doctoral Research and Dissertation (24 credits)

A doctoral committee consisting of at least four faculty members must be identified by the student and major professor. At least two of the committee members must be from the Department of Forestry, Wildlife and Fisheries. Three of the committee members, including the major professor, must be approved by the Graduate School to direct doctoral research. The committee should be formed during the first year of the student's program.

All students are required to successfully complete an oral and written examination on all coursework completed as part of the Ph.D. requirements. The exam is scheduled when the student has completed all or nearly all of the coursework. At least one faculty member must be appointed by the Graduate School to direct doctoral research. The committee will determine the content, nature, and schedule of the comprehensive exam and certify the results.

During the first year, the student should develop a research prospectus that outlines the research project and problem to be addressed as part of his/her doctoral research. The prospectus is presented to the student's committee and the committee will approve the research topic and approach.

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

MINOR IN ENVIRONMENTAL POLICY

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

Forestry

GRADUATE COURSES

421 Forest and Wildland Resource Economics (3) Production functions, supply-demand and market analysis; non-market programs and projects; economic analysis and decision models; Investment and financial analysis; managerial economics: taxes; forest products marketing. Prereq: Forest Resource Analysis or consent of instructor. F

422 Forest and Wildland Resource Policy (3) Policy formulation; criteria for evaluation; forest and wildland law and regulation; forest land management policies, methods of visitor and recreation site management; case studies. Weekend field trips. Prereq: Wildland Recreation or consent of instructor. 2 hrs and 1 lab. Sp

423 Wildland Recreation Planning and Management (3) Planning processes, master and site planning, site design projects; management strategies, methods of visitor and recreation site management; case studies. Weekend field trips. Prereq: Wildland Recreation or consent of instructor. 2 hrs and 1 lab. Sp

433 Wood Adhesives and Glued Wood Products (2) Theory and practice of adhesive bonding of wood; wood substrate-adhesive interface for bonding; principles of adhesion; wood adhesives; gluing of solid wood and composite wood manufacturing practices; laboratory manufacture and testing of adhesives, adhesive bond strength and glued wood product performance; day field trips. Prereq: Wood Properties and Uses and Wood Identification, or consent of instructor. 1 hr and 2 labs. F

434 Wood Processing and Machining (2) Primary log breakdown and secondary processing into major products. Fundamental and 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. Sp

435 Wood Drying and Preserving (2) Discussion of wood-moisture relationships. Introduction to commercial wood drying equipment and practices: Proper use, specification, and disposal of preservative treated wood. Day field trips. Prereq: Wood Properties and Uses and Wood Identification, or consent of instructor. F

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

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered for 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/N only. E

511 Problem Analysis in Forest Resources (3) Problem identification, analysis and solution in forest resources management, identify, analyze and prepare written report. First course must have approval of graduate committee. Available only to students in nonthesis option for M.S. in Forestry. E

512 Seminar (1) Current developments in forestry. Required of all graduate students in residence in fall. May be repeated. Maximum 2 hrs. S/N only. F

515 Forest Conservation Workshop (1-3) Relation of forest biology, ecology and management to conservation issues; integration of current conservation issues into classroom and student projects; environmental education and services to students in forestry or wildlife and fisheries science. May be repeated. Maximum 3 hrs. S

520 Advanced Forest Ecology (3) Physiological ecology and adaptations of trees; relationships between organismal traits, genetic and chemical differences; competition and natural selection; population dynamics, and forest management. Prereq: Graduate standing in forestry or biological science, or consent of instructor. Sp, A

525 Woodlot Management (3) Current technologies and management strategies concerning wise use of forest resources from small woodlots, non-industrial forest landowners necessary for decision-making and implementation. Prereq: 6 hrs of biological sciences or consent of instructor. Not available to students in forestry or wildlife and fisheries science. 6.5 hrs and 1 lab weekly for 6 weeks. Sp, A

530 Advanced Forest Resource Management (3) Analysis of forest management problems in public and institutional organizations: ecological forest classification; resource and goal programming; applied to real and management problems; advanced forest investment analysis; decision making methods for forest management; composition and structure, processes, and policies of forest ecosystems. Prereq: Senior-level forest management or consent of instructor. Sp, A

540 Genetics in Forestry (3) Genetic improvement of forest trees, selection, genetic analysis, field testing for genetic variability; tree breeding; development of seed orchards; hybridization; tree cytology and tissue culture, use of biochemical variations in forest species planning and conducting forest genetics research. Prereq: Silvicultural methods and Biology 220 or consent of instructor. Sp

545 Recreation Planning for Forests and Associated Lands (3) Review of planning development on forests and associated lands; analysis and critique of specific contemporary alternatives. Over-night field trips. Prereq: Senior-level in forest recreation or consent of instructor. Sp

570 Management & Policy of Forest Resource Organization (3) Theory and application of management as applied to natural resource organizations; institutional direction and culture, and strategic management. Development of policy as planning tool and as results from conflict resolution. Linkage between policy development and execution, and structure and management of organizations. Prereq: Senior-level in forest recreation or consent of instructor. F, A

580 Advanced Silviculture (3) Silvicultural characteristics, silvicultural systems and practiced applied to commercially important hardwoods and softwoods. In-depth analyses of silvicultural principles involved and tools used, prescribed fire, pesticides, in regeneration and management; computer modeling of stand dynamics, structure, growth/yield. Prereq: Undergraduate silviculture course or consent of instructor. 2 hrs and 1 lab. Sp

585 Advanced Forest Biometry (3) Application of sampling techniques to forest inventory; fixed and variable plots sampling; list sampling; Poisson sampling; regression estimators; multistage and multi-phase sampling. Growth and yield predictors for uneven-aged and uneven-aged and even-aged stands. Land Measurement Techniques and Forest Resource Inventory or consent of instructor. F, A

590 Advanced Topics in Forestry (1-3) Recent advances and concepts, research techniques, and analysis of current problems. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. F

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

601 Teaching Methods in Natural Resources (3) Review of teaching and learning methods in natural resources education at collegiate level. Methods for conducting lectures and laboratory sessions. Prereq: Consent of instructor. E

610 Seminar in Natural Resources (2) Selected issues in natural resource management at regional, national, or international levels. Development of interdisciplinary approach to addressing problems: evaluating current state of knowledge, developing alternative action plans, and identifying criteria for evaluation of alternatives. F

612 Seminar in Forestry, Wildlife and Fisheries (1) Current issues and developments in forestry, wildlife and fisheries. Required of all doctoral students in residence during fall. May be repeated. Maximum 3 hrs. F

Forestry, Wildlife & Fisheries

GRADUATE COURSES

410 Wildlife Habitat Evaluation and Management (3) Ecological relationships between wildlife and habitat. Evaluation, modeling, and management of wildlife habitat. Effects of land-use practices on wildlife habitat. Weekend field trips. Prereq: Principles of Wildlife and Fisheries Management or consent of instructor. Sp, A

416 Planning and Management of Forest, Wildlife and Fisheries Resources (3) Integrated forest and wildlife resource management through developing long-range management plans and analyzing case studies including conflict resolution. Applicable to majors in Forestry and in Wildlife and Fisheries Science. Prereq: Graduate standing in 1 hr and 2 labs. Sp

520 Natural Resource Issues at International Level (1) Identification and analyses of issues regarding forestry, wildlife, and fisheries linkages within other U.S. and international agencies. Analysis of international elements affecting natural resources in different parts of the world. Prereq: Senior-level in forest recreation or consent of instructor. 6 hrs of biological sciences or consent of instructor. Not available to students in forestry or wildlife and fisheries science. 4 hrs and 1 lab for 6 weeks. Sp, A

525 Management of Forest, Wildlife and Fisheries Resources (2) Current technologies and management strategies concerning wise use of forest, wildlife, fish, and fisheries resources. Prereq: Consent of instructor for decision-making and implementation. Prereq: 6 hrs of biological sciences or consent of instructor. Not available to students in forestry or wildlife and fisheries science. Sp, A

535 Environmental Impacts to Natural Ecosystems (3) Current environmental problems impacting natural ecosystems: climate change, acid deposition, air pollution, species declines, and introductions of exotic species. Analysis of environmental impact of natural resources. Prereq: Consent of instructor. Sp

540 Seminar on Integrated Resources Management in Biosphere Reserves (2) MAB program, UNESCO-sanctioned global conservation initiative. Analysis of integrated resources management program, including goals. Prereq: Senior-level in forest recreation or consent of instructor. 6 hrs of biological sciences or consent of instructor. Not available to students in forestry or wildlife and fisheries science. 4 hrs and 1 lab for 6 weeks. Sp, A

550 Recreation Planning for Forests and Associated Lands (3) Planning development on forests and associated lands; analysis and critique of specific contemporary alternatives. Overnight field trips. Prereq: Consent of instructor or equivalent or consent of instructor. Applicable to majors in Forestry in and in Wildlife and Fisheries Science. Sp, A

560 Seminar on Integrated Resources Management in Biosphere Reserves (2) MAB program, UNESCO-sanctioned global conservation initiative. Analysis of integrated resources management program, including goals. Prereq: Senior-level in forest recreation or consent of instructor. 6 hrs of biological sciences or consent of instructor. Not available to students in forestry or wildlife and fisheries science. 4 hrs and 1 lab for 6 weeks. Sp, A

570 Management & Policy of Forest Resource Organization (3) Theory and application of management as applied to natural resource organizations; institutional direction and culture, and strategic management. Development of policy as planning tool and as results from conflict resolution. Linkage between policy development and execution, and structure and management of organizations. Prereq: Senior-level in forest recreation or consent of instructor. F, A

590 Advanced Topics in Forestry, Wildlife and Fisheries (1-3) Recent advances and concepts, research techniques, and analysis of current problems. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. F

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

601 Teaching Methods in Natural Resources (3) Review of teaching and learning methods in natural resources education at collegiate level. Methods for conducting lectures and laboratory sessions. Prereq: Consent of instructor. E

610 Seminar in Natural Resources (2) Selected issues in natural resource management at regional, national, or international levels. Development of interdisciplinary approach to addressing problems: evaluating current state of knowledge, developing alternative action plans, and identifying criteria for evaluation of alternatives. F

612 Seminar in Forestry, Wildlife and Fisheries (1) Current issues and developments in forestry, wildlife and fisheries. Required of all doctoral students in residence during fall. May be repeated. Maximum 3 hrs. F
Wildlife and Fisheries Science

GRADUATE COURSES

440 Wildlife Techniques (3) Methods of wildlife damage control, management of wildlife habitat, management identification of wildlife field sign, 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. F

442 Fisheries Techniques (3) Active and passive sampling techniques for fish and aquatic organisms: population estimation methods, fish handling and transport; cold habitats analyses; marking and tagging techniques; age determination and incremental growth analysis; stream assessment; equipment and instrument 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. F

443 Fisheries Science (3) Quantification and management of freshwater fish populations, estimation, age and growth, biological assessment, and stocking. Prereq: Principles of Wildlife and Fisheries Management or consent of instructor. 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 wild mammal management. Prereq: Principles of Wildlife and Fisheries Management or consent of instructor. 2 hrs and 1 lab. 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 wild bird management. Prereq: Principles of Wildlife and Fisheries Management 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 use of facilities. Not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

512 Seminar in Wildlife and Fisheries Science (1) Current developments in wildlife and fisheries science. Required of all graduate students in residence in fall. May be repeated. Maximum 2 hrs. S/NC only. F

515 Seminar in Avian Ecology and Management (1-2) Readings and discussion based on current literature on contemporary topics in avian ecology and management. Additional credit awarded for writing review paper on contemporary topics of interest to student. Prereq: Consent of instructor. F, A

520 Planning and Administration of Fisheries and Wildlife Programs (2) Factors influencing policy and program planning activities of fisheries and wildlife agencies. Decision-making policies, case histories. S, A

525 Endangered Species Management and Conservation of Biodiversity (2) Status, ecology and management of endangered wildlife and plant species. Historic aspects, policy implications and philosophical issues surrounding recovery efforts. Approaches to monitor and manage for biodiversity. Prereq: Graduate standing or consent of instructor. S, A

530 Wildlife Diseases (2) Necropsy of birds and mammals for diagnosis of various diseases and methods of preparing pathological materials in field or lab. Investigative procedures concerning wildlife diseases. Prereq: 1 yr biology, 444 or 445, or consent of instructor (same as Comparative and Experimental Medicine - Veterinary Science 530). F, A

535 Floodplain Ecosystems (3) Ecology, restoration and management of floodplain ecosystems: biotic and abiotic processes, social considerations and, wildlife and forest management; Lower Mississippi River Alluvial Valley. Prereq: Consent of instructor. 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, assessment of current technologies for fish and wildlife population analysis. Techniques, methodology and goals for wildlife habitat analysis. Prereq: Animal Science 571 or Statistics 538 or consent of instructor. F, A

550 Fish Physiology (3) Mechanisms of gas transfer, circulation, excretion, osmoregulation, locomotion, and neural/hormonal control of these systems in fishes. Comparisons and contrasts with physiology of terrestrial animals. Practical applications of fish physiology to aquaculture, pollution assessment, and fishery management. Prereq: Senior or graduate standing in life sciences. F, 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. S, A

560 Recirculating Aquaculture (3) Growing fish in intensive, indoor systems with reconditioned water. Techniques of solids removal, nitrification, and gas balance. Practical experience with operating systems. Prereq: 443 or consent of instructor. S, A

563 Advanced Topics in Wildlife and Fisheries Science (1-3) Recent advances and concepts, research techniques and analysis of current problems. Prereq: 443, 444, 445, or consent of instructor. May be repeated. Maximum 6 hrs. F

593 Independent Study in Wildlife and Fisheries Science (1-4) May be repeated. Maximum 6 hrs. E

French

See Modern Foreign Languages and Literatures

Geography

(College of Arts and Sciences)

MAJOR

Geography ....................................................... M.S., Ph.D.

BruceRalston, Head

Professors:

Aiken, Charles S., Ph.D. ......................... Georgia
Bell, Thomas L., Ph.D. ....................... Iowa
Foresta, Ronald, Ph.D. ....................... Rutgers
Hammond, E. H., Emeritus, Ph.D. ........ California
Harden, Carol P., Ph.D. ...................... Colorado
Horn, Sally P., Ph.D. ......................... California
Jumper, Sidney R. (Liaison), Ph.D. ....... Tennessee
Long, Robert G., Emeritus, Ph.D. ........... Utah
Minkel, C. W., Ph.D. ......................... Northwestern
Mischke, Robert F. (Emeritus), Ph.D. .......... Utah
Nunis, Kenneth, Ph.D. ....................... Louisiana
Schieferstein, Jerome, Ph.D. ................. Indiana
Sneed, John D., Ph.D. ....................... Washington
T. S. , Ph.D. ............... Illinois

Associate Professors:

Brinkman, Leonard W., Jr., Ph.D. ................. Wisconsin
Orvis, Kenneth H., Ph.D. ..................... California
Shaw, Shih-Lung, Ph.D. ..................... Ohio State

Assistant Professor:

Grissino-Mayer, Henri, Ph.D. ..................... Arizona

THE DOCTORAL PROGRAM

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 minor. An emphasis in geographic information systems is available for students who have appropriate backgrounds in mathematics and computer science. The doctoral program is for those who have demonstrated proficiency in conducting independent research. The department is particularly well-equipped 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 in 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 options for the Master of Science. 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. In the thesis option, 6 hours must be Thesis 500. A final examination is required in both programs.

THE DOCTORAL PROGRAM

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 major. An emphasis in geographic information systems is available for students who have appropriate backgrounds in mathematics and computer science. The doctoral program is for those who have demonstrated proficiency in conducting independent research. The department is particularly well-equipped 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 in 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 options for the Master of Science. 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. In the thesis option, 6 hours must be Thesis 500. A final examination is required in both programs.
comprehensive examination should be taken within the same semester.

MINOR IN ENVIRONMENTAL POLICY

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

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT 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. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Student Services.

GRADUATE COURSES

410 Global Positioning Systems and Geographic Data (3) Theory, field and laboratory use of Global Positioning Systems for capturing digital geographic data; manipulation of data, coordinate datasets, datum issues, scanning and digitizing, map standards, and uncertainty in Geographic Information Systems. 2 hrs and 1 2-hr lab.

411 Computer Mapping and Geographic Information Systems (3) Concepts, management, and presentation of digital data for spatial analysis: cartographic data structures. Prereq: Introduction to Cartography and knowledge of computer language or consent of instructor. Writing intensive. (Same as Urban Studies 441.)

412 Advanced Cartography Techniques (3) Cartographic design and display techniques for reference and thematic maps. Basic principles and methods of map reproduction. Prereq: Introduction to Cartography or consent of instructor. 2 hrs and 2 labs.

413 Remote Sensing: Types and Applications (3) Principles and uses of remote sensing imagery, data, and spectral data: geographic interpretation and mapping techniques. Prereq: Introduction to Cartography or consent of instructor. 2 hrs and 1 2-hr lab.

415 Quantitative Methods in Geography (3) Geographical application of statistical techniques; point pattern analysis, and analysis of areal units. Prereq: Statistical Reasoning 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: World Geography or Core Concepts or consent of instructor.

423 Geography of American Popular Culture (3) Geographical study of regional variation in popular cultures, youth cultures in United States. Prereq: Cultural Geography: Core Concepts or consent of instructor. (Same as American Studies 423.)

433 The Land-Surface System (3) Characteristics of surface form, pattern, and process. Prereq: Core Concepts or consent of instructor. (Same as American Studies 423.)

434 Climatology (3) Geographical study of surface form, process, and interaction. Prereq: Geography of the Natural Environment or consent of instructor.

435 Biogeography (3) Changing distribution patterns of plants and animals on a variety of spatial and temporal scales. Effects of continental drift, Pleistocene climatic 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, 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 in Canada, the U.S., Mexico, and Central America. Relationships between climate, soil, fire, and human disturbance. Long-term monitoring of biological processes. Prereq: Coursework in geography or botany or consent of instructor.

441 Urban Geography of the United States (3) Concepts and theories concerning development and implications of urban systems in the United States. Prereq: World Geography or Economic Geography: Core Concepts or consent of instructor. Writing intensive. (Same as Urban Studies 441.)

442 Rural Geography of the United States (3) Geographical appraisal of rural areas of United States: small towns and urban fringes. Problems and potentials of rural America. Prereq: World Geography or Economic Geography: Core Concepts or consent of instructor. Writing intensive.

449 Geography of Transportation (3) Examination of transportation systems, their effects on trade patterns, land use, location problems, and their development. Prereq: Economic Geography: Core Concepts or consent of instructor.

450 Process Geomorphology (3) (Same as Geology 450.)

466 Teaching and Learning Geography (3) Preparation of prospective teachers in content, skills, techniques, and understandings needed for effective teaching and assessment of geography in K-12 schools. Course organization and content based largely on that of National Geography Standards.

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

501 Colloquium in Geography (1) Discussion of departmental 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 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 Introduction to Geographical Research (1) Research interests and methods of departmental faculty and program. Prereq: Consent of instructor. (Same as Information Management 431.)

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 Geographic Software Design (3) Algorithms for spatial analysis, software design, and program implementation in stand alone and distributed computing environments. Prereq: Consent of instructor. (Same as Information Management 531.)

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 using appropriate computer programs; usefulness to geographic research of techniques developed by other disciplines. Prereq: 415 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.

517 Geographic Information Management and Processing: Concepts and current management of geographic information. Database design, manipulation, sampling and analysis. Prereq: Consent of instructor. (Same as Information Management 532.)

518 GIS Project Management (3) Interactions between management, technical, and application aspects of Geographic Information Systems project through simulated environment of real-world GIS sites. Prereq: Computer Mapping and Geographic Information Systems or 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.

532 Topics in Global Change (3) Emerging trends, anticipated problems, and methods in global change and response. Prereq: 434 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.

534 Topics in Physical Geography (3) Trends, problems, and methods in area of climatology. Prereq: 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: 434 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.

536 Topics in Physical Geography (3) Examination of trends, problems, and methods in area of climatology. Prereq: 434 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.

590 Independent Study (1-15) See College of Arts and Sciences. Prereq: Written consent of department prior to registration. S/NC or letter grade.

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, scope, problems, and methods of geography. Prereq: Consent of instructor.

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

609 Seminar in Geography (2-3) Topics vary. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

631 Seminar in Natural Hazards (3) 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.

634 Seminar in Climatology (3) Prereq: 534, 532 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.
663 Seminar in Geography of the American South (3) Prereq: Consent of Instructor. May be repeated. Maximum 4 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.

William M. Dunne, Head

Professors:
Broadhead, Thomas W., Ph.D. ............... Iowa
Byerly, Don W. (Emeritus), Ph.D. ........... Tennessee
Driese, Steven G. (Liaison), Ph.D. ........... Wisconsin
Dunne, William M., Ph.D. ...................... Bristol
Hatcher, Robert D., Jr. (Distinguished Scientist), Ph.D. .......... Tennessee
Kopp, Otto C. (Emeritus), Ph.D. ............. Columbia
Labotka, Theodore C., Ph.D. ............... Caltech
McSween, Harry Y., Ph.D. ................. Harvard
Mira, Kula C., Ph.D. ......................... Western Ontario
Taylor, Lawrence A., Ph.D. ................. Lehigh
Walkr, Kenneth R. (Carden Prof.), Ph.D. .... Yale

Associate Professors:
Clark, G. Michael, Ph.D. ...................... Penn State
McKay, Larry D. (Jones Prof.), Ph.D. ........ Waterloo
Mckinney, Michael L., Ph.D. .............. Yale
Mora, Claudia I., Ph.D. ..................... Wisconsin
Williams, Richard T. II, Ph.D. ............. Virginia Tech

Assistant Professors:
Kah, Linda C., Ph.D. .......................... Harvard
Uhle, Maria (Jones Prof.), Ph.D. ........... Virginia Tech

The Department of Geological Sciences offers both the M.S. and Ph.D. degrees in Geology. Persons interested in these programs should contact the Director of Graduate Admissions in the department.

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

Prerequisite for both degrees is a Bachelor's degree, including coursework in mineralogy, optical petrology, geology, stratigraphy, paleontology, structural geology, and field geology. One year each of coursework in calculus and chemistry and one year of coursework in biology, physics, or statistics are also required. Applicants lacking any of these may be admitted, but the deficiencies must be removed within the first year without graduate credit. Substitutions may also be allowed.

THE MASTER'S PROGRAM

The department offers the thesis option in the master's program. Graduation requires the successful oral defense of a written thesis and a minimum 3.0 GPA in all graduate coursework.

Course requirements are a minimum of 30 semester hours, including:
1. Six hours of Thesis 500.
2. Registration in 595 during the first two years in residence. Two hours may be credited toward the 30-hour minimum. This requirement may be waived in unusual circumstances.
3. Sixteen hours of geology courses, with at least 14 hours at the 500 or 600 level, including at least one course from any three of the following five groups:
   - Group 1: 410, 460, 490, 530, 563, 565
   - Group 2: 420, 540, 541, 550, 556
   - Group 3: 470, 570, 575, 576
   - Group 4: 401, 485, 510, 521, 535, 550
   - Group 5: Any 400- or 500-level courses with graduate credit from related departments (allied sciences, mathematics, and engineering), selected with approval of advisor.
4. Eight hours of additional graduate coursework.

THE DOCTORAL PROGRAM

The prerequisite for the Ph.D. program, in addition to that for the M.S. program, is either a master's degree in Geology, or a Bachelor's degree plus completion of 9 hours of coursework from the list in #3 above, including one course from each group. These courses may be taken while completing other course requirements.

Graduation requires passing a comprehensive examination, taken no later than the end of the second year in residence, in addition to all core requirements with a minimum 3.0 GPA, completion of the language requirement, and successful oral defense of the dissertation.

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

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

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

GRADUATE COURSES

401 Quantitative Methods in Geology (3) Applications of calculus and differential equations to problems in earth sciences. Examination of methods in hydrogeology, wave equation in geophysics, mechanical modeling and boundary conditions in structural geology and tectonics. Prereq: The Dynamic Earth or Earth, Life, and Time, 2 semesters of Calculus.
411 Optical Mineralogy (2) Laboratory course on principles of optical microscopy. Use of petrographic microscope to identify rock-forming minerals with applications to petrology and environmental mineralogy. Prereq: Mineralogy.
412 Elements of X-ray Diffraction (2) Laboratory course on principles and applications of x-ray diffraction. Phase identification, quantitative determination of mineral abundances in mixtures, and crystal structure determination. Prereq: 312.
420 Paleocology (4) Principles of ecological analysis as applied to fossils and fossil assemblages: data collection and interpretation. Laboratory designed around preparation of scientific reports based on field and laboratory analysis. Writing emphasis course. 3 hrs and 1 lab.
421 Invertebrate Paleontology (4) Survey of invertebrate animal phyla: skeletal structure and preservation, functional morphology, paleoecology, and stratigraphic distribution. Prereq: Paleobiology or consent of instructor. 2 hrs and 2 2-hr labs.
440 Field Geology (5) Summer field course for advanced undergraduate geology majors and first-year graduate students in geology. Taught off-campus and requires full-time of student. Syllabus of major aspects of geological sciences in societal context. Field techniques demonstrated, practiced, and applied to solution of geologic problems. Prereq: 312. Completion of major core courses and consent of instructor.
450 Process Geomorphology (3) Integrative approach to development of surface of earth based upon case histories, maps, remote sensing imagery. Prereq: 101-02 (Same as Geography 450). 2 hrs and 2 2-hr labs.
455 Basic Environmental Geology (3) Applications of geological sciences toward comprehension of effects of geological processes on humans and effects of human activities on earth's environment. Prereq: The Dynamic Earth. 2 hrs and 1 2-hr lab or field period.
460 Principles of Geochemistry (4) Applications of chemical principles to geologic systems: problemsolving techniques. Phase diagrams, partitioning of trace elements, thermodynamic principles for evaluating stabilities of mineral assemblages, aqueous solutions, and applications of radiogenic and stable isotopes to geologic systems. Prereq: Chemistry 120-130 General Chemistry, Mathematics 141-142 Calculus I, II. Recommended prereq: Geology 330 Igneous and Metamorphic Petrology or consent of instructor. 3 hrs and 1 lab tutorial.
471 Fieldwork in Geophysics (2) Geophysical investigations applied to solution of problems in tectonics, hydrogeology, or environment. Summer field course off-campus. Requires full-time for 2 or more weeks. Prereq: 470 or consent of instructor.
475 Physical and Chemical Systems of the Earth (3) Development of physical earth from solar nebula to present. Formation, composition and evolution of hydrosphere, crust, mantle, and core. Interdisciplinary approach to study of behavior of terrestrial systems, with special emphasis on interrelationships of geologic processes. Prereq: 470 or consent of instructor.
and biomedical sciences and children and families. The faculty are committed to the educational value of community-based service learning, applied research, and community outreach. For more information, http://hss.he.utk.edu.

Health
A graduate program is available leading to the Master of Science with a major in Health Promotion and Health Education (thesis or non-thesis option), requiring completion of 30 semester hours. The program emphasizes research skills development by those already employed in the health professions with each student completing a realistic health-related research proposal as a major developmental activity.

The Doctor of Philosophy with a major in Human Ecology offers a concentration in community health. Perspectives of social, behavioral and biomedical sciences are incorporated with educational models appropriate for addressing community health needs.

THE PH.D. CONCENTRATION
The community health concentration integrates the behavioral and natural sciences with public health, community health education, health promotion and the safety sciences to prepare scholars with an interest in improving the health of the nation.

Requirements include:
1. Minimum 21 hours of foundation courses: 610, 620, 6 hours of statistics, 3 hours of specialized research methods, and 6 hours of natural or behavioral sciences.
2. Minimum 21 hours in primary specialization: 530, 540, 650, 655, 660 and 6 hours of electives
3. Minimum 12 hours in supporting specialization in a focused area: public health, safety, gerontology or a program approved by doctoral committee.
4. Minimum 6 hours in a cognate area.

GRADUATE COURSES
400 Consumer Health (3) Survey of major consumer health care providers and health care services; selecting, purchasing, evaluating and financing medical and health care services/products. (Same as Public Health 400.) Sp

405 Alcoholism and Alcohol Education (3) Problems of alcoholism. Factors which make alcoholism serious health and safety problem. Various types of instructional/educational and intervention programs.

406 Death, Dying and Bereavement (3) Aspects of death, dying, and handling trauma of less. Medical, financial, physical, legal and social implications of death. F,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

423 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 423.) F,Sp

430 Suicide and Crisis Intervention (3) Factors which make suicide a health problem. Assessment, intervention, and prevention techniques.

435 Substance Use and Abuse (3) Drug and alcohol abuse problems and suspected causes; pharmacology of drugs and effects on society; strategies for intervention and education. Sp,Su

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 faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

520 Sex Education and Human Sexuality (3) Advanced in-depth discussion of educational and health counseling theory, techniques, materials used in school, community, or health care facility. Sp

530 Health Promotion and Health Education Program Development (3) Theories and principles of health promotion program development, methodology, marketing, public relations, health education as vehicle for health promotion. F

540 Evaluation in Health Promotion and Health Education (3) Evaluation principles and methodologies as related to health promotion products, processes and programs. Construction of instruments for use in assessing health education outcomes. Sp

570 Special Topics (1-3) For graduate students, instructors, teachers and other health professionals. Health/ wellness or health promotion issues. May be repeated. Maximum 12 hrs. E

590 Research Methods in Health (3) Basic research techniques in variety of health settings. Development of research skills and problem identification for research topic. (Same as Public Health 590.) F

593 Directed Independent Studies (1-3) Individual identification and study of health/wellness or health promotion problem/issue. Specific proposal to instructor before registration. May be repeated. Maximum 12 hrs. E

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

601 Internship/Research in Safety and Health (3-6) (Same as Safety 601.)

610 Critical Analysis of Writing and Research (3) Analysis of writing and research in related areas. F

620 Advanced Research Techniques in Health (3) Advanced theory and techniques of research design and methodologies in health discipline. Prereq: 590, 610. Sp

650 Health Aspects of Gerontology (3) Knowledge and understanding of biological, psychological and sociological aspects of aging as related to health and wellness of individual. (Same as Public Health 650.) Su

655 Seminar in Nation's Health (3) Comprehensive study of definition, determinants, resources and health status of nation. (Same as Public Health 655.) F

660 International Health (3) Study of quality of health, health promotion and health services in countries throughout world. (Same as Public Health 660.) Sp


Public Health
Graduate study with a major in Public Health leads to the Master of Public Health (M.P.H.). Three professional preparation concentrations are available: community health education, gerontology, and health planning/administration. Preparation for professional practice in improving community health emphasizes a population perspective, service-learning and application opportunities through rigorous internships. The M.P.H. program is accredited by the Council on Education for Public Health. A minor in statistics is available to interested M.P.H. students due to public health affiliation with the Intercollegiate Graduate Statistics Programs.

ADMISSION REQUIREMENTS
A statement of the applicant's educational and career goals and three rating forms are required. Request application packet from the department. Preference for admission to degree status shall be given to those with a minimum undergraduate grade-point average of 2.8 and with at least one year of professional experience in a health-related occupation. As a restricted program, non-degree admission requires department recommendation. Deadlines for completed applications are 1 February for Summer term and 1 April for Fall semester.

THE MASTER'S PROGRAM
The M.P.H. is a non-thesis program requiring completion of 36 semester hours of coursework including 9 weeks of field practice. The field internship provides a full-time experience with an affiliated health agency or organization offering one or more health programs. Of importance, field practice allows the student to apply academic theories, concepts, and skills in an actual work setting. Students must complete all assigned prerequisite courses and 21 semester hours of the curriculum with a minimum overall GPA of 3.0 prior to placement in the field.

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

Requirements include:
1. Public Health Foundation courses (16 hours): 509, 510, 520, 530, 540, 555.
2. Internship (6 hours): 587, 588.
3. Concentration of Study (16 hours). Required and recommended electives will be selected by the student in consultation with the major advisor. A list of courses is available for each concentration: community health education, gerontology, and health planning/administration.

For more information, refer to the website: http://hss.he.utk.edu/pubhealth.

DUAL M.S.-M.P.H. PROGRAM
The College of Human Ecology offers a coordinated dual program leading to the conferral of both the Master of Science with a major in Nutrition (public health nutrition concentration) and the Master of Public Health. The dual program allows students to complete both degrees in less time than would be required to earn both degrees independently.
MINOR IN GERONTOLOGY
Graduate students in Public Health may pursue a specialized minor in gerontology. This interunit/interdisciplinary minor gives the student an opportunity for combining the knowledge about aging in American society with his/her major concentration. 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 on an in-state tuition basis. The M.P.H. program in Public Health is available to residents of the state of Arkansas. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Student Services.

COURSE REGISTRATION
Non-degree students must obtain permission from the M.P.H. program director to register for 500-level public health courses. Prerequisite 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 Worksite Health Promotion (3) Foundations of health promotion programs delivered in worksite that reaches around issues relative to employees and management: theory, program design, implementation and evaluation from perspective of health promotion specialist. Prereq: Health Education, Promotion, and Behavior Sp
493 Directed Independent Study (1-3) 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) Re
demand of intramural and competitive sports. May be repeated. Maximum 30 hrs. E
509 Graduate Seminar in Public Health (1) In-depth discussion of timely topics reflecting scope of public health as discipline and its interrelation with many other academic and professional disciplines. Speakers both internal and external. May be repeated. Maximum 4 hrs. Prereq: (Same as Nutrition 509, Nursing 509, Exercise Science 509 and Social Work 509.) S/NC only. F,Sp
520 Public Health Policy and Administration (3) Administrative considerations of community-based health care programs and public health practice. Health policy formulation, political environment and governmental involvement, legal responsibilities, and managerial concepts/techniques. F,Sp
521 Organization Theory and Health Care Delivery (3) Administrative and Organization theory related to health facilities; operation and management of community health care programs; 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 services programs. Management and operation of health services programs for patients and clients in settings which provide activities of daily living and special psychosocial environmental needs. Programs for home health services, comprehensive medical rehabilitation, nursing homes, congregate living centers and similar type health programs. Prereq: S/NC only. Consent of instructor. Sp
525 Financial Management of Health Programs (3) Financial management concepts and practices applied to health service programs. Fundamentals of budgeting, costing, financial reporting and control. Opportunities to apply techniques. Prereq: S/NC only. Consent of instructor. Sp
530 Biostatistics (3) Application of descriptive and inferential statistical methods to health-related problems. Analysis of data. Use and interpretation of vital statistics and introductory research methodology preparatory for first course in epidemiology. Prereq: Introductory statistics or consent of instructor. F,Sp
540 Principles of Epidemiology (3) Distribution and determinants of health-related outcomes in specified populations, with application to control of health problems. Historical origins of discipline, hypotheses formulation, research design, data and error sources, measures of frequency and association, etiologic reasoning, disease screening, and injury control. Prereq: Consent of instructor. Sp
550 Principles and Practices of Community Health Education (3) Theoretical foundations for community health education; opportunities for skill development in variety of educational processes; and introduction to community health analysis. F
552 Community Health Problem Solving (4) Dynamics of community organization, community needs assessment, educational interventions, and application of program planning and evaluation techniques. Opportunity to practice skills in realistic setting. Prereq: Consent of instructor. Sp
560 Theories and Techniques in Health Planning (4) Overview of health planning concepts and methodologies; systems-oriented planning process. Major elements of planning: formulation and conceptualization of problem, plan design, evaluation and implementation. Health problems of institutions, communities and selected population groups, appropriate diagnoses and programs for addressing needs. Sp
568 Physical Activity and Positive Health (3) (Same as Exercise Science 568.)
569 Clinical Exercise Physiology (3) (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, Counseling Education and Counseling Psychology 585, Exercise Science 585, Nursing 585, Psychological and Social Studies 585, Social Work 585, and Sociology 585.)
587-88-89 Internship (3,3,3) Internship (community health education, gerontology, or health planning/administration) in either approved organization or research setting under supervision of designated preceptor. Prereq: M.P.H. major; one semester advance notice and consent of major advisor. 587: available only for approved extended placements. S/NC only. Consent of instructor. Sp
590 Research Methods in Health (3) (Same as Health 590.)

The program is designed to meet the needs of students who are interested in the benefits of majors in both nutrition and public health. Therefore, it accommodates the interests of students who: 1) plan a career in public health nutrition and want to acquire the knowledge and skills of the nutritionist and public health professional; 2) plan a career in nutrition and want to acquire the knowledge and skills and the perspective of the public health professional; or 3) plan a career in public health and want to acquire the knowledge, skills and perspective of the nutritionist.

Admission Requirements
Applicants for the M.S.-M.P.H. program must make separate application to, and be competitively and independently accepted by, the Department of Nutrition for the M.S., Department of Health and Safety Sciences for the M.P.H., and the Public Health Academic Program Committee.

Students who have been accepted by both departments may apply for approval to pursue the dual program anytime prior to, or after, matriculation in either or both departments. Such approval will be granted, provided that studies be started prior to entry into the fourth semester of the M.S. and M.P.H. programs.

Curriculum
A dual degree candidate must satisfy the requirements for both the M.S. (public health nutrition concentration) and the M.P.H. degrees, as well as the requirements for the dual program. All candidates for the dual degree must successfully complete Health and Safety Sciences (Ph 555), two credits of Seminar in Public Health (Ph 509), and a minimum of 60 credits. The Department of Nutrition will award a maximum of 9 semester hours of credit toward the M.S. degree for successful completion of approved graduate level courses offered in the Department of Health and Safety Sciences. The Department of Health and Safety Sciences will award a maximum of 11 semester hours of credit toward the M.P.H. degree for successful completion of approved courses offered in the Department of Nutrition. All courses for which such cross-credit is awarded must be approved by the Public Health Academic Program Committee and the student's graduate committee. A single block field experience (or public health internship) is required of all students and the analytical field paper incorporates public health nutrition and the student's public health concentration. The dual degree will award credit from the program before completion of the requirements for both degrees will not receive credit towards the M.S. or M.P.H. degrees for courses taken in the other program, except as such courses qualify for credit without regard to the dual program.

Approved Dual Credit
M.S. courses to be counted toward the M.P.H. program must include 10 semester hours of Field Study in Community Nutrition (NTR 515) and 1 semester hour of Graduate Seminar in Public Health (NTR 509). M.P.H. courses to be counted toward the M.S. include Public Health Administration (Ph 520), Biostatistics (Ph 530), and Epidemiology (Ph 540).
Safety

Graduate study with a major in Safety (thesis and non-thesis options) leads to the Master of Science degree. Graduate students may concentrate in safety management or in emergency management. The M.S. degree program requires completion of 33 semester hours. Degree requirements include completion of the 18-hour core curriculum and completion of a concentration area (15 hrs.). Concentration course options include specific courses offered by the Departments of Human Resource Development, Industrial Engineering, Civil and Environmental Engineering, and Political Science (Public Administration) in addition to those offered by the Department of Health and Safety Sciences. A list of courses is available for each concentration. Students may elect an internship experience with private industry or non-profit organizations to fulfill part of their course requirements. Curricular experiences will assist graduates in preparation for certified safety professional (CSP) examination.

The graduate program contributes to the University of Tennessee's mission of health protection by preparing safety professionals with the knowledge and skills necessary to create and maintain safer human environments in the workplace (industrial and commercial), home, school, and community. The offering of all core classes and required concentration courses on an evening class schedule enables those working full-time in a safety-related field to pursue the M.S. degree with a major in Safety on a part-time basis.

For more information, refer to the website: http://hss.he.utk.edu/safety

GRADUATE COURSES

443 Sports & Recreational Safety (3) Accident prevention and injury control in sports activities; philosophy of sports safety; human environmental factors and interrelationships in sports injury and control; risk-taking and decision solution strategies; and contributions of sports medicine to safety. 3 hrs. and 2 labs. Sp

452 Safety Principles and Practices (3) General principles, practices, and procedures in occupational and community safety. Historic and present safety issues, programs and practices addressing safety of individuals and groups in work-site, school, community, transportation, and industrial settings. Prereq: Junior or Senior standing or consent of instructor. F, Su

460 Fire Risk Management (3) Development, implementation, and management of comprehensive fire safety program. Basic fire risk management concepts, interpretation of codes and exposure to basic fire analysis techniques; fire service; Senior standing or consent of instructor. Su

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

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

532 Behavioral Problems in Safety Education & Accident Prevention (3) Problems of behavior, causes of accidents, and application of principles of psychology in development of safe behavior in all segments of environment. F

533 Problems and Research in Accident Prevention (3) Safety problems found in wide variety of accidents which occur in community; findings of current research in behavioral sciences as related to variation incidence of accidents. Sp

534 Organization, Administration and Supervision of Safety Programs (3) National, state and local level programs; administrative, instructional, and supervisory aspects. Implementation of relevant programs. Sp

535 Emergency Management (3) Civil and defense problems: tornados, floods, fires, mass civil disasters, and nuclear and personnel attack by alien countries. F

536 Safety Instrumentation (3) Selection, calibration, maintenance, and use of sampling instruments available to safety practitioner for evaluating exposures to workers of physical stresses and airborne contaminants. F

537 Advanced Emergency Management (3) Advanced study in emergency and hazard mitigation, planning, response and recovery. Theory and practice in identification of appropriate emergency warning systems, hazard assessment, facility inspection, plan development and implementation. Prereq: 535. Sp

572 Graduate Workshop in Safety (3) Special safety education problems. For advanced graduate students, teachers, supervisors, and administrators. May be repeated. Maximum 12 hrs.

590 Special Topics (1-3) Advanced study in selected disciplinary or professional area of safety education/management. May be repeated. Maximum 12 hrs.

593 Directed Independent Study (1-3) Individual identification and study of problems in safety. Extensive reading and critical analysis of safety literature. Specific proposal to instructor before registration. May be repeated. Maximum 12 hrs. E

601 Internship/Research in Safety and Health (3-6) Field experience. Significant problem identified, researched, and reported in acceptable form. May be repeated. Maximum 6 hrs. (Same as Health 601.) E

History

(College of Arts and Sciences)

MAJOR

DEGREES

History .............................................. M.A., Ph.D.

William B. Wheeler, Head

Professors:

Bergeron, Paul H., Ph.D. ............... Vanderbilt

Chmielewski, Edward V. (Emeritus), Ph.D. Harvard

Cutter, E. Wayne, Ph.D. ............... Texas

Farris, W. Wayne, Ph.D. ............... Washington

Finger, John R. (Emeritus), Ph.D. Washington

Hahn, Arthur G., Ph.D. ............... Chicago

Hsiao, Wen-Ping (Lindsay Young Prof.), Ph.D. Harvard

Haskins, Ralph W. (Emeritus), Ph.D. California

Klein, Milton M. (Emeritus) (Distinguished Prof.), Ph.D. Columbia

Moser, Harold, Ph.D. ............... Wisconsin

Norrell, R. Jeff (Bernadotte Schmitt Prof.), Ph.D. Virginia

Matney, James A. (Emeritus), Ph.D. Illinois

Ratner, Lorman A. (Emeritus), Ph.D. Cornell

Utley, Jonathan G. (Emeritus) Illinois

Wheeler, W. Bruce, Ph.D. ............... Virginia

Associate Professors:

Ash, Stephen V., Ph.D. ...................... Tennessee

Bast, Robert J., Ph.D. ....................... Arizona

Bohstedt, John, Ph.D. ...................... Harvard

Bradley, Owen P., Ph.D. ............... Cornell

Brunnett, Palmira R., Ph.D. .......... Chicago

Bumran, Thomas E., Ph.D. .......... Toronto

Diamond, Todd A., Ph.D. .......... Wisconsin

Higgs, Catherine A., Ph.D. .......... Yale

Pinckney, Paul J., Ph.D. .......... Vanderbilt

Assistant Professors:

Appier, Janis, Ph.D. .......... California (Riverside)

Brosnan, Kathleen, Ph.D. .......... Chicago

Dessel, J. P., Ph.D. ....................... Arizona

Glover, Loril, Ph.D. ....................... Kentucky

Lulevicius, Vejas G., Ph.D. .... Pennsylvania

Pfleider, G. Kurt, Ph.D. ............... Rutgers

Sahadeo, Jeff, Ph.D. ....................... Illinois

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 and group III teaching 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).

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 3 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 followed within one week by a one-hour oral examination with the single grade of pass/fail.
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 the following semester, excluding summer. A second failure on any one of the three parts (regardless of which one) will cause the student to be dropped from the History graduate program. Likewise, a student who does not repeat a failed exam within the allotted time (one semester) will be dropped from the program.

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

Doctoral Fields

Group I:
- Premodern Europe
- Modern Europe
- United States (colonial to present)

Group II:
- To be defined by the student's doctoral committee from within one of the following fields:
  - United States
  - Colonial and Early Republic
  - 19th century
  - 20th century
  - Regional
  - Military and Foreign Relations
  - Social and Cultural
  - American Political
  - European
  - Medieval
  - Early Modern
  - Modern
  - Political and Diplomatic
  - Intellectual and Cultural
  - Social and Economic

Group III (Examined Teaching Field): World Civilization

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

GRADUATE COURSES

415 Western Economic Thought Since the 18th Century (3) Methods of study of doctrinal history. Origins and evolution of major doctrines: classical and neoclassical economics, economics of Keynes and his followers, principal developments of second half of 20th century. Major writing requirement. May be used toward graduate degree in History. Prez: Introductory Economics or consent of instructor. (Same as Economics 415.)

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

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

510 Foundations of Graduate Study in History (3) Assumptions and methods of historians. Required of all candidates for advanced degrees. F.

511 Teaching World Civilization (3) Methodology, conceptualization, historiography, text-book selection and syllabus construction to prepare students to teach courses in world civilization.

512 Teaching Western Civilization (3) Methodology, conceptualization, historiography, text-book selection and syllabus construction to prepare students to teach courses in western civilization.

513 Teaching United States History (3) Methodology, conceptualization, historiography, text-book selection and syllabus construction to prepare students to teach courses in United States.

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/N only.


532 Topics in Modern Europe (3) Reading seminar: secondary sources on movements and trends that are multinational in focus. Focus varies. May be repeated. Maximum 15 hrs.

533 Topics in European National History (3) Reading seminar: secondary sources on intra-national topics, usually British, Russian, German or French. Focus varies. May be repeated. Maximum 15 hrs.

541 Topics in Early American History (3) Reading seminar: secondary sources on early North American history. Focus varies. May be repeated. Maximum 15 hrs.

542 Topics in 19th-Century United States (3) Reading seminar: secondary sources on 19th-century United States. Focus varies. May be repeated. Maximum 15 hrs.

543 Topics in 20th-Century United States (3) Reading seminar: secondary sources on 20th-century U.S. Focus varies. May be repeated. Maximum 15 hrs.

544 Topics in U.S. Environmental History (3) Reading seminar: secondary sources on U.S. environmental history. Focus varies. May be repeated. Maximum 15 hrs.

551 Topics in the History of Foreign Relations (3) Reading seminar: secondary sources on major relations. Focus varies. May be repeated. Maximum 15 hrs.

552 Topics in Military History (3) Reading seminar: secondary sources on military history, military operations, social impact of war, and naval strategic in foreign policy. May be repeated. Maximum 15 hrs.

555 Topics in United States Social and Economic History (3) Reading seminar: secondary sources on...
U.S. social and economic history. Focus varies. May be repeated. Maximum 15 hrs.

556 Topics in European Social and Economic History (3) Reading seminar: secondary sources on social or economic history of European nations. Focus varies. May be repeated. Maximum 15 hrs.

557 Topics in Cultural and Intellectual History (3) Reading seminar: secondary sources on cultural and intellectual history. Focus varies. May be repeated. Maximum 15 hrs.

558 Topics in United States Regional and Local History (3) Reading seminar: secondary sources on regions, states, and cities of the South. Focus varies. May be repeated. Maximum 15 hrs.

559 Topics in Jewish History (2) Reading seminar: secondary sources on Jewish history. Focus varies. May be repeated. Maximum 15 hrs.

561 Topics in Latin American History (3) Reading seminar: secondary sources in Latin America. Focus varies. May be repeated. Maximum 15 hrs.

562 Topics in Asian History (3) Reading seminar: secondary sources on Asian history. East Asia and Middle East. Focus varies. May be repeated. Maximum 15 hrs.

568 Seminar in United States Regional and Local History (3) Research seminar: primary sources in regional and local history. Focus varies. May be repeated. Maximum 15 hrs.


570 Seminar in History (3) Research seminar: secondary sources for new topics. Focus varies. May be repeated. Maximum 15 hrs.

580 Topics in History (3) Reading seminar: secondary sources for new topics. Focus varies. May be repeated. Maximum 15 hrs.

585 Topics in World History (3) Reading seminar in transnational themes involving analysis of two or more world cultures. Focus varies. May be repeated. Maximum 9 hrs.

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

592 Off-Campus Study (1-15) See College of Arts and Sciences.

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

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

621 Directed Readings (3) Directed readings to prepare candidate for doctoral comprehensive examination. May be repeated. Maximum 1 per doctoral field. S/NC only.

632 Seminar in Modern European History (3) Research seminar in primary sources culminating in scholarly paper in modern European history. Focus varies. May be repeated. Maximum 15 hrs.


651 Seminar in Military and Foreign Relations History (3) Research seminar in primary sources culminating in scholarly paper in military or foreign relations history. Focus varies. Not restricted by national grouping. May be repeated. Maximum 15 hrs.

658 Seminar in United States Regional and Local History (3) Research seminar in primary sources culminating in scholarly paper in regional and local history. Focus varies. May be repeated. Maximum 15 hrs.

**ADMISSION REQUIREMENTS**

A completed file for review includes the Graduate School application form, departmental application, Graduate Record Examination (GRE) scores for the general section, and three Graduate School Rating Forms completed by individuals who can attest to the potential for graduate education. Forms may be obtained from the Dean’s Office, College of Human Ecology.

**THE DOCTORAL PROGRAM**

Graduate study leading to the Doctor of Philosophy degree in a major in Human Ecology is available in the Departments of Child and Family Studies; Consumer and Industry Services Management; Health and Safety Sciences; Human Resource Development; and Nutrition. Concentration areas are child and family studies, community health, human resource development, nutrition science, textile science, and retail and consumer sciences. A major challenge of the doctoral program in Human Ecology is to draw upon basic research generated from the natural sciences, social sciences, and humanities, and to provide a holistic perspective that contributes to the improvement of individual and family well being. Within the College of Human Ecology, research from one discipline is enhanced by encompassing and utilizing the findings of research from other disciplines.

The Ph.D. is a research degree granted only to individuals who demonstrate proficiency in conducting original research. Course requirements for the degree are determined by the student's faculty committee, based upon college and departmental requirements and student needs and interests. The Graduate School sets minimum requirements for the doctoral degree.

More specific information about the course of study is given under the individual academic departments that administer the Ph.D. concentrations.

**MINOR IN GERONTOLOGY**

An interdepartmental/interdisciplinary minor in gerontology gives the graduate student an opportunity for combining the knowledge and experience about aging in American society with his/her own major concentration.

Core courses and a practicum are offered by the College of Social Work and selected departments within the colleges of Human Ecology, Education, and Arts and Sciences. A cross-listed minor for the degree contributing programs is designed to integrate experiences from different sources and to demonstrate the multi-faceted nature of working within an aging society.

**Declaration of a Minor**

Prior to earning more than one-half the total hours required for this minor, students must complete a "Declaration of a Minor in the College of Human Ecology" form. Copies of this form are available in the Dean's Office, Room 110, Jessie Harris Building.

**Core Experience**

Students must complete a core experience of 12 semester hours taken from at least three different departments including nine hours taken from outside the major department. Coursework needs to comply with the following framework:

1. **Coursework.** 9 hours required. A variety of coursework can be taken toward satisfaction of this requirement. Courses which are offered on a regular basis include: Health 406, 465, Health/Public Health 560, Nutrition 518, Public Health 523, Retail and Consumer Studies 560, Social Work 566, Sociology 415, Psychosocial Education Studies 504, 522, 525, 528.

2. **Applied practicum.** 2 hours required. Students should register under practicum experiences in the "home" department of the supervising faculty.

3. **Human Ecology 565.** 1 hour required. Cross-listed with participating departments.

4. **Successful completion of a written comprehensive examination covering subject matter of the minor.**

**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. Billie Collier, Associate Dean in Human Ecology, for a current list.

**Admission to Candidacy**

When application is made for admission to candidacy, indication of the minor must be noted on the Admission to Candidacy form.

**ACADEMIC COMMON MARKET**

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT on an in-state tuition basis. The Ph.D. program in Human Ecology is available to residents of Alabama, Kentucky, Mississippi, or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Student Services.

**GRADUATE COURSES**

450 Special Topics: Human Ecology (1-3) Study in selected professional area within College of Human Ecology. Topics vary. May be repeated. Maximum 6 hrs.

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

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or the student is on 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 framework. F/A

520 Directed Study in Human Ecology (1-3) Integrative topics. Prereq: At least 9 hrs of graduate study in college including courses from at least two departments or consent of instructor. May be repeated. Maximum 6 hrs. E

525 Practicum in Human Ecology (1-15) Field based experiences. Prereq: Consent of instructor. E

545 Evaluation in Home Economics Education (3) Assessment of programs and pupil progress; techniques, methods and purposes. Prereq: 540, Coreq: 575, F/Sp, A

574 Analysis of Teaching for Professional Development (2) Strategies to document and analyze effec-
Human Resource Development
(College of Human Ecology)

MAJORS DEGREES
Human Ecology ..................................... Ph.D.
Human Resource Development ............... M.S.

Billie J. Collier, Interim Head

Professors:
Brewer, Ernest W. (Lielson), Ed.D. .............. Tennessee
Campbell, Clifton P. (Emeritus), Ed.D. Maryland
Chock, Garald D. (Emeritus), Ph.D. ............. Kansas State
Cooke, Carroll B. (Emeritus), Ph.D. .............. Wisconsin
Craig, David G. (Emeritus), Ed.D. .............. Cornell
Dejonge, Jacqueline O., Ph.D. ............. Iowa State
Haskell, Roger W. (Emeritus), Ph.D. .... Purdue
Mathews, John I. (Emeritus), Ph.D. .............. Arizona State
Petry, Gregory C., Ph.D. ................. Missouri

Associate Professor:
Stout, Vickie J., Ed.D. ................. Tennessee
Assistant Professors:
Bartley, Sharon, Ph.D. ................. Tennessee
Kupritz, Virginia, Ph.D. .......... Virginia Tech
Lim, Doo, Ph.D. ............... Illinois
Pierce, Randal, Ph.D. ................. Ohio State

The Department of Human Resource Development advances economic development through the integration of occupational education, training, career development, and organizational development. HRD required (core) courses and HRD electives are offered in evening/online formats for workshops in areas of Human Resource Development; those who work with individuals to help them enter the workforce; those who train individuals already in the workforce; and those who help individuals in the workforce advance their potential.

THE MASTER'S PROGRAM

The Master of Science degree with a major in Human Resource Development provides a flexible graduate program for professionals wishing to pursue in-depth study within and across subject areas of Human Resource Development; those who work with individuals to help them enter the workforce; those who train individuals already in the workforce; and those who help individuals in the workforce advance their potential.

The M.S. degree with a major in Human Resource Development offers two concentrations, each providing opportunities for specialized interests. Both concentrations require a thesis. The training and development concentration is designed to meet the needs of professionals who work in programs encompassing all areas of human resource development. Applicants without an undergraduate degree in an area related to human resource development may be required to take 501 as a prerequisite and complete an internship as part of their program. The teacher licensure concentration is specified for students who seek initial teacher licensure in family and consumer sciences education, business and marketing education, and technology education. This program requires admission to Teacher Education and has specific prerequisites.

Admission Requirements

Training and Development Concentration applicants are to submit an application for admission to The Graduate School, three letters of reference from persons familiar with their potential for success in doctoral work, a statement describing personal career objectives, and a sample of written work directly to the Department of Human Resource Development.

Applicants must hold a bachelor's degree from an accredited institution and present evidence of ability to do Ph.D. work, including having maintained a graduate GPA of 3.3 on a 4.0 scale or better. If the applicant has prior work experience in human resource development, a reference letter should also be provided by the work supervisor. Recent Graduate Record Examination scores are required of all applicants.

Any person whose native language is not English must submit results of the Test of English as a Foreign Language (TOEFL). A minimum score of 600 is required for admission consideration.

Degree Requirements

The Doctor of Philosophy degree with a major in Human Resource Development requires a 36-hour thesis program that includes 3 hours of research methodology and 3 hours of statistics. Students must submit a dissertation and defend it. The dissertation is a scholarly document that demonstrates the student's ability to conduct independent research in the field of human resource development. Students must also complete an internship as part of their program.

THE PH.D. CONCENTRATION

Admission Requirements

Applicants are to submit an application for admission to The Graduate School, a statement describing personal career objectives, and a sample of written work directly to the Department of Human Resource Development.

Applicants must hold a master's degree from an accredited institution and present evidence of ability to do Ph.D. work, including having maintained a graduate GPA of 3.3 on a 4.0 scale or better. If the applicant has prior work experience in human resource development, a reference letter should also be provided by the work supervisor. Recent Graduate Record Examination scores are required of all applicants.

Any person whose native language is not English must submit results of the Test of English as a Foreign Language (TOEFL). A minimum score of 600 is required for admission consideration.

Degree Requirements

The Doctor of Philosophy degree with a major in Human Resource Development requires a 36-hour thesis program that includes 3 hours of research methodology and 3 hours of statistics. Students must submit a dissertation and defend it. The dissertation is a scholarly document that demonstrates the student's ability to conduct independent research in the field of human resource development. Students must also complete an internship as part of their program.

THE PH.D. CONCENTRATION

Admission Requirements

Applicants are to submit an application for admission to The Graduate School, a statement describing personal career objectives, and a sample of written work directly to the Department of Human Resource Development.

Applicants must hold a master's degree from an accredited institution and present evidence of ability to do Ph.D. work, including having maintained a graduate GPA of 3.3 on a 4.0 scale or better. If the applicant has prior work experience in human resource development, a reference letter should also be provided by the work supervisor. Recent Graduate Record Examination scores are required of all applicants.

Any person whose native language is not English must submit results of the Test of English as a Foreign Language (TOEFL). A minimum score of 600 is required for admission consideration.

Degree Requirements
Departamental Core (27 hours): Must include 510, 511, 512, 557, 559 or equivalents and 12 hours of 600.

Specialization (12 hours): Must support a career path of the faculty member or manager of education/training.

Cognate (6 hours): Must be obtained from an academic unit outside the department, support specialization, and be represented by a committee member.

Research and Statistics (15 hours): Statistics must include descriptive statistics such as multivariate analysis and computer application, 6 hours minimum; research methodology must include 504 and 610 or equivalents, 6 hours minimum.

Internship (0-6 hours): Required for those choosing career path. 

Dissertation (24 hours): Must be original research project. 

The department offers an alternative approach to residence for the Ph.D. degree. This alternative residence involves, among other requirements, a two-year, continuous enrollment in the Research Forum in Human Resource Development.

Detailed information regarding the Ph.D. concentration program of study may be obtained from the departmental liaison for graduate studies.

Note: For latest update, check the homepage of Department of Human Resource Development. (http://hrd.he.uky.edu).

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 on an in-state tuition basis. The M.S. program is available to residents of the state of Kentucky. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Student Services.

GRADUATE COURSES

455 Learner and Program Evaluation (3) Assessing effectiveness of training or educational programs; developing program improvement criteria; data collection, database management, and statistical analysis; and measuring learner progress. Prereq: 210 Microcomputer Applications or equivalent and 320 Program Planning for Training, Development and Education.

476 Supervised Occupational Experience (3) Practical field experience in business/industry/community-based settings related to area of study. Prereq: Senior standing and consent of advisor. May be repeated. Maximum 9 hrs. E

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


502 Registration for Use of Facilities (3-15) Registration for use of facilities. S/NC only. E

503 Problems in Lieu of Thesis (3) May be repeated. Maximum 6 hrs. S/NC only. E


505 Selection, Placement, and Follow-up Procedures in Human Resource Development (3) Methods and procedures utilized in establishing criteria for trainee selection and placement in instructional programs and in jobs. Collecting, analyzing, and reporting follow-up data appropriate for making program improvements. Prereq: Consent of instructor. Sp, Su

506 Developing Organizational Resources (3) Strategies for developing human and organizational resources through community partnerships and learning. Effective utilization of human resources through active learning programs. Sp

507 Internship in Human Resource Development (3) Practical field experiences in selected settings under supervision of practitioner and departmental representative. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. S/NC only. E


512 Human Resource Management (3) Process systems approach to human resource management: interdependent human resource activities (planning, work design, staff development, training and development, compensation, etc.) and organizational goals. F

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. Approval form must be filed in office of department head. May be repeated. Maximum 6 hrs. E

516 Microcomputer Software Development (3) Advanced software design in BASIC, programming for educational and training program development. Prereq: 515 or consent of instructor.

517 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, writing, debugging, and running educational programs using sequential data files. Prereq: Teaching, administrative, or related experience in education or training, or consent of instructor.

518 Computer Operations and Programming in Education (3) Operating procedures and BASIC programming for education and training applications. Hands-on experience in operating and programming microcomputers, writing, debugging, and running educational programs using sequential data files. Prereq: Teaching, administrative, or related experience in education or training, or consent of instructor.

521 Design and Development of Instruction (3) Curriculum development and program planning; design of instruction, development of teaching materials for classroom and educational purposes. Intended for students in family and consumer sciences, business, marketing, technology and/or industrial education. F


531 Leadership Development for Business Education and Marketing Education Professionals (3) Change management with implications for continuous quality improvement of self and one's work and work place. Sp

533 Administration of Industrial Education Programs (3) Developing, staffing, administering and evaluating programs, out-of-school training programs, in-school training programs, and responsibilities of businesses, private sector organizations/agents, and state and federal government agencies. F

534 Administration of Industrial Education Programs (3) Developing, staffing, administering and evaluating programs, out-of-school training programs, in-school training programs, and responsibilities of businesses, private sector organizations/agents, and state and federal government agencies. F

535 Planning Technical Education Facilities (3) Preparation of educational specifications, site selection, and working relationships with other professionals involved in process of technical-education facilities. Prereq: Consent of instructor. Sp, Su

536 Program Planning (3) Instructual systems analysis and analysis of development, implementation, and evaluation of trade, technical supervision, and related training. Prereq: Curriculum development and consent of instructor. Sp

537 Methods of Teaching Conceptual Content (3) Proper selection and effective application of methods for teaching and learning conceptual content. Communicating knowledge, strategies for concept content comprehension, retention, and application.

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.

559 Program Evaluation (3) Concepts, principles, practices, theories, and trends related to program evaluation. Planning and conducting a comprehensive program evaluation in a variety of settings. Fundamentals of design, measurement, return-on-investment (ROI), and presentation and dissemination of results to stakeholders.

580 International Perspective of Workforce Training (3) Examination and comparison of workforce training systems in highly industrialized countries. In-school training programs, out-of-school training systems, updating training of incumbent workers, transfer of new 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 maintaining funded programs, and closing out projects at end of funding support.

664 Self-Directed Work Teams (3) Theory and practice of implementing self-directed work teams, motivating employees, increasing employee productivity via teams and related issues.

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

611 Curriculum Planning in Human Resource Development (3) Curriculum theory, models, contents, planning evaluation and implementation of specialized program areas. Prereq: 555 or equivalent.


610 Research in Human Resource Development (3) Proposal development, theoretical base, which describes problem/issue, qualitative and quantitative studies, and data collection; and technical and evaluation of research in human resource development. Prereq: 6 hrs of advanced statistics courses and consent of instructor.

611 Internship in Human Resource Development (3) Field experience in a business/industry setting. 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

Impact development of industrial education, Philosophical problems: justification, values, principles and concepts 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 technical-education facilities. Prereq: Consent of instructor. Sp, Su

554 Program Planning (3) Instructual systems analysis and analysis of development, implementation, and evaluation of trade, technical supervision, and related training. Prereq: Curriculum development and consent of instructor. Sp

555 Curriculum Planning (3) Developing performance-based, criterion-referenced instructional programs. Su

556 Organizational Development (3) Strategies and interventions for organizational development: training and development of staff. Models, assessment, organizational change and consultant's role. Prereq: 512 or consent of instructor. F

557 Methods of Teaching Conceptual Content (3) Proper selection and effective application of methods for teaching and learning conceptual content. Communicating knowledge, strategies for concept content comprehension, retention, and application.

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.

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

611 Curriculum Planning in Human Resource Development (3) Curriculum theory, models, contents, planning evaluation and implementation of specialized program areas. Prereq: 555 or equivalent.


610 Research in Human Resource Development (3) Proposal development, theoretical base, which describes problem/issue, qualitative and quantitative studies, and data collection; and technical and evaluation of research in human resource development. Prereq: 6 hrs of advanced statistics courses and consent of instructor.

611 Internship in Human Resource Development (3) Field experience in a business/industry setting. 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

Impact development of industrial education, Philosophical problems: justification, values, principles and concepts of industrial education. Prereq: Consent of instructor. F, Su
Industrial and Organizational Psychology

(College of Business Administration)

MAJOR DEGREES
Industrial and Organizational Psychology .......................................................... Ph.D.

Robert T. Ladd (Liaison), Director

Committee:
Fowler, Oscar S., Management
James, Lawrence R., Management
Larsen, John M., Jr. (Emeritus), Management
Rentsch, Joan R., Management
Rush, Michael C., Management
Schumann, David W., Marketing, Logistics & Transportation
Wehr, David J., Management

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

It is intended that students entering the I/O program will represent widely different undergraduate and graduate backgrounds including psychology, business administration, engineering, science, and liberal arts.

The first-year program provides the opportunity to take courses that will assist the students in attaining a reasonable level of sophistication in areas of deficiency.

ADMISSION REQUIREMENTS

Applicants for admission should request information and application forms from both the Office of Graduate Student Services (218 Student Services Building) and the Director, Industrial and Organizational Psychology Program, (408 Stickley Management Center, The University of Tennessee, Knoxville, TN 37996-0545).

Two separate applications must be completed: one application for admission to The Graduate School (apply for major in Industrial and Organizational Psychology) and one application for admission to the Industrial and Organizational Psychology program. Deadline: New students are admitted in fall semester only, and applications must be received by the Graduate Student Services Office by February 1.

The master's degree in Industrial and Organizational Psychology is generally not required of individuals pursuing a doctoral degree.

General Requirements
At least one year of college mathematics and one course in statistics are required.

Ordinarily, an undergraduate grade-point average of 3.7 or above is required with no evidence of special weakness in mathematical and physical sciences.

Test scores on each section of the general portion (verbal and quantitative) of the Graduate Record Examination (GRE) are required. Customarily, these students admitted to the program have performed at or above the 68-79th percentile on the general tests. (This corresponds to a raw score of approximately 600 on each of the tests.)

THE DOCTORAL PROGRAM

The Ph.D. degree with a major in Industrial and Organizational Psychology can be completed with a minimum of 90 semester hours in the major. Students must be in residence full time for one year; must maintain an overall 3.0 grade-point average with no more than one grade below B in the I/O Psychology, General Psychology, and Research core; must complete an applied research project prior to beginning dissertation work; must pass a comprehensive examination; and must pass a final oral examination on their dissertation research.

Course Requirements:

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>I/O Psychology Core</td>
<td>9</td>
</tr>
<tr>
<td>Research Core</td>
<td>12</td>
</tr>
<tr>
<td>Statistical Principles (Statistics 537 &amp; 538 or equivalents)</td>
<td></td>
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<tr>
<td>Multivariate Statistics (Statistics 579, 679 or equivalent)</td>
<td></td>
</tr>
<tr>
<td>Advanced Research Methods (605 or equivalent)</td>
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<tr>
<td>General Psychology Core</td>
<td>9</td>
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<tr>
<td>One course in each of the following areas: biological bases of behavior, cognitive bases of behavior, history and systems of psychology.</td>
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<tr>
<td>I/O Psychology Seminars</td>
<td>9</td>
</tr>
<tr>
<td>600 level I/O psychology courses, from a program committee approved list.</td>
<td></td>
</tr>
<tr>
<td>Approved Electives</td>
<td>9</td>
</tr>
<tr>
<td>Courses supporting the student's course of study.</td>
<td></td>
</tr>
<tr>
<td>Supervised practicum, internship, or field training (690)</td>
<td>15</td>
</tr>
<tr>
<td>Ethics (635 or equivalent)</td>
<td>3</td>
</tr>
<tr>
<td>Didactication (690)</td>
<td>24</td>
</tr>
<tr>
<td>TOTAL</td>
<td>90</td>
</tr>
</tbody>
</table>

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 on an in-state tuition basis. The Ph.D. program is available to residents of Kentucky, Virginia, or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Student Services.

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 complete. May not be used toward degree requirements. May be repeated. S/NC only. E

525 Research in Industrial/Organizational Psychology (1-13) Available only to students admitted to program or by prearrangement with program director. May be repeated. Maximum 6 hrs. S/NC or letter grade.

Industrial Engineering

(College of Engineering)

MAJOR DEGREES
Industrial Engineering .................... M.S., M.S.-MBA

A. B. Badiru, Head

Professors:
Badiru, A. B., PE, Ph.D. ............ Central Florida
Bontadelli, J. A. (Emeritus), PE,
Ph.D. ....................................... Ohio State
Implementing various production strategies, analysis of production planning and scheduling systems, and supplier and distribution integration. Dual degree students can select manufacturing systems engineering as an option.

Product Development and Manufacturing
The product development and manufacturing concentration is a non-thesis option, available only to students taking the dual M.S.-MBA program.

DUAL M.S.-MBA PROGRAM
The College of Business Administration and the College of Engineering offer an integrated program leading to the conferral of the Master of Business Administration degree with a major in Business Administration (concentration in operations management) and the Master of Science degree with a major in Industrial Engineering (concentration in manufacturing systems engineering or product development and manufacturing).

The Industrial Engineering program is also open to students with undergraduate engineering majors other than industrial engineering.

The establishment of the dual program addresses the critical need for personnel trained in both engineering and management who can integrate an increasingly complex body of knowledge for rapid introduction of new products to the marketplace. The objective of the dual degree program is to prepare graduates to take a leading management role in companies that must react quickly to a dynamic market where forces of competition require rapid changes in design and manufacturing and a short product development cycle.

Admission Requirements
Applications are accepted for fall semester only. Applicants for the M.S.-MBA program must make separate application to, and be competitively and independently accepted by, the Graduate School for the Master of Business Administration degree program and the Master of Science degree program in a major in Industrial Engineering, and by the Dual Program Committee.

Students will initially apply for the MBA program, indicating on their application their intent to pursue the dual M.S.-MBA program and the Industrial Engineering major (refer to the MBA program for separate instructions). Students accepted for both the MBA and the M.S. with a major in Industrial Engineering degree programs will be assigned to Dual Program Committee advisors, who will be responsible for course approval and supervision of the student's progress through the dual program.

Applications by U.S. citizens and permanent residents received after the MBA application deadline (March 1) will be considered as space allows. Additional information is required and different application dates are established by The Graduate School for international students.

Curriculum
All engineering students enrolled in the dual program must complete common coursework designed to provide them with an integrated, multidisciplinary teamwork experience. The MBA curriculum consists of 33 hours of common coursework in the College of Business Administration and 15 hours of common coursework in the College of Engineering. Engineering common coursework includes a culminating 3-hour integrated project course requiring a comprehensive report, and a final examination as required by the Dual Program Committee.

During the second year dual degree candidates will take courses in their engineering major. The coursework for each option is designed to provide students with a concentration in their major and advanced skills to accomplish their team work assignments.

Curriculum for Dual M.S.-MBA Degree

August - First Year
BA 511 MBA Core I
Fall - First Year
BA 512 MBA Core II
IE 504 Product Development Process 1
IE 511** Survey of Manufacturing Systems Engineering 1-3
IE 512 Manufacturing Systems Engineering 3
IE 513 MBA Core III 9
IE 506 Product Selection and Evaluation 2
IE 508 Integrated Product, Process, and Manufacturing System Design 3
Spring
BA 514 Internship
IE 509 Project Management 1
IE 503* Survey of Manufacturing Systems Engineering 3
IE 511** Advanced Topics in Manufacturing Systems 3
IE 509 Project Management 1
IE 510 Advanced Topics in Manufacturing Systems 3
IE 524 Advanced Integrated Manufacturing Systems 3
IE 542 Elective (IE 514, 519, or 523) 3
Summer
IE 509 MBA "hub" course elective 3
IE 509 Project Management 1
IE 522 Optimization Methods in Industrial Engineering 3
IE 512** Process Development and Market Feasibility 3
IE 542 Elective (IE 514, 519, or 523) 3
Summer (first session)
IE 594 Culminating Integrated Project Report 3

TOTAL 66-69

*The IE 503 core is required for students enrolling in this option with undergraduate degrees in disciplines other than Industrial Engineering.

**Students in manufacturing systems engineering concentration may substitute other selected IE courses for these courses.

The dual degree candidate must satisfy the curriculum and graduation requirements of the engineering major being pursued and the College of Business Administration. Students withdrawing from the dual degree program before completing both degrees will not receive credit toward graduation in either degree program for courses taken in the
6. Knowledge of theoretical and practical evolution of information sciences and technologies and their relationship with other disciplines.
7. Competence in creating, managing, and accessing information in a variety of formats.

B. To provide services to the state, region, and nation in association, consulting and continuing education activities which will promote the development and improvement of information systems and services such that the school's contributions reach beyond its immediate academic programs. The school will provide:

1. Continuing education for information professionals and, on a selective basis, to persons outside the information field.
2. Advisory services to information organizations.
3. Leadership for professional associations.
4. To conduct basic and applied research which promotes the generation of new knowledge, services and technology. The school will encourage:
   1. Research which strengthens its instructional and public service programs.
   2. The use of a variety of research methods.
   3. Sharing the results of its research.
   4. Increased research quality and productivity.

ADMISSION REQUIREMENTS

Applicants to the Information Sciences program must have a minimum undergraduate grade-point average of 3.0 or a satisfactory graduate degree grade-point average for admission as a potential candidate for the M.S. degree. The verbal, quantitative and analytical aptitude portions of the Graduate Record Examination (GRE) are required of all applicants unless a graduate degree has been completed prior to application for admission. Applicants should take the GRE at least one semester in advance of application for admission and are expected to score 1500 points or better.

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

THE MASTER'S DEGREE

The program leading to the Master of Science involves a total of 42 semester hours of graduate courses including 5 required courses of all students. Either a thesis or a non-thesis option is available with 6 hours required for thesis credit. At least 36 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.

Required Courses:

Five courses are required of all students: 490, 520, 530, 560, and 580. (Students seeking licensure see track requirements below.) These courses address the evolving information environment; organization and representation of information; information access and retrieval; developing and managing collections; and principles and concepts of the information sciences. Three courses, 490, 520 and 530, are prerequisite to all courses for students enrolled in the M.S. degree program.

Individualized Curriculum Approach

Students, in consultation with their advisor, may wish to pursue a curricular focus to develop an individualized program of study. Graduates of the school have prepared themselves for a variety of careers, including positions as: corporate information specialist, public librarian, records manager/archivist, web page designer, indexer/abstractor, online information retrieval specialist, medical or law librarian, reference librarian, youth services specialist, and many others. Students are encouraged to take advantage of the individualized curricular approach.

Whatever individualized curriculum is chosen, all students who complete the program receive an M.S. degree accredited by the American Library Association (ALA). For those pursuing Tennessee Department of Education licensure as a school library information specialist, stipulated requirements apply. See following section.

The Tennessee State Department of Education School Library Information Specialist Requirements

The Tennessee State Department of Education requires School Library Information Specialists to hold the master's degree. The School of Information Sciences offers four tracks for School Library Information specialist endorsement.

Initial Endorsement for Non-Licensed Teachers with no Master's Degree in Library or Information Sciences: For those students who do not hold the master's degree, the requirements for initial endorsement include the 5 required courses plus 551, 567, 571, 572, 585, and 596. In addition, students must complete two corequisite courses from the College of Education (5 credit hours) which do not count toward the master's degree requirements. Students pursuing the initial endorsement must follow the non-thesis option. Upon completion of the requirements, students will earn a master's degree in Information Sciences and a Tennessee State Department of Education license as a School Library Information Specialist.

Initial Endorsement for Non-Licensed Teachers with a Master's Degree in Library or Information Sciences: For those students who hold an ALA-accredited master's degree and have approval of the faculty advisor, the requirements are a maximum of 24 hours within the School's program, including the required 596. In addition, students must complete two corequisite courses from the College of Education (5 credit hours) beyond the required 24 hours. Upon completion of the requirements, students will receive a Tennessee State Department of Education license as a School Library Information Specialist.

Additional Endorsement for Licensed Teachers with a Master's Degree:

The requirements include the 5 required courses plus 551, 567, 571, 572, 585 and 596 (which must be taken twice). Upon completion of the requirements, students will earn a Tennessee State Department of Education additional endorsement as a School Library Information Specialist.

Additional Program Requirements

Thesis Option: Students electing the thesis option will write a master's thesis under close supervision of a thesis committee. Six hours of Thesis (IS 500) must be taken within the 42 hours required for graduation. (Students may register for more than 6 hours of 500, but only 6 hours will count toward graduation. Students must be registered for IS 500 in the semester they complete and defend their thesis. The oral defense of the thesis (final comprehensive examination) substitutes for the written examination that is taken by non-thesis students. The writing of the master's thesis serves as the culminating experience.

Non-Thesis Option: Upon completion of the program, all students who elect the non-thesis option must take and pass a written comprehensive examination. A culminating experience is also required which must be completed in one of the student's last two terms with a grade of B or better (except as noted) selected from the following and approved by the student's advisor: 590 Problems in Information Sciences, 591 Supervised Readings in Information Sciences, 592 Seminar in Information Sciences, 593 Independent Study, 594 Graduate Research Participation (S/NC only), 596 Student Teaching in School Library Information Center (S/NC only), 598 Practicum (S/NC only).

FINANCIAL ASSISTANCE OPPORTUNITIES

Employment with the University of Tennessee Libraries may provide a work-study opportunity for selected students who wish to obtain experience in academic librarianship while pursuing the degree. Such students usually work at least 20 hours each week and thus may extend the period required for the degree. Similar opportunities exist with some other libraries and information agencies in the Knoxville area.

Work opportunities in a scientific-technical environment are available through subcontracts with Oak Ridge National Laboratory and the Department of Energy. A limited number of graduate teaching assistantships are available through the school. Assistantships of this type carry a waiver of tuition and fees as well as a stipend and require that recipients work 10 hours per week in the school.

For application forms and information about financial aid and other information about the M.S. in Information Sciences, write
measurement and reverse engineering principles and other selected topics. Prereq: 401.

525 Systems Modeling and Simulation (3) Modeling of discrete systems using simulation software and Monte-Carlo simulation. Problem definition, input distributions, output data analysis, model validation and verification, variance reduction techniques, animation of models, and design of simulation experiments. Case studies in variety of domains for simulation modeling. Prereq: Consent of instructor.

526 Advanced Applications of Systems Modeling and Simulation (3) Modeling of discrete, continuous, and combined systems using current simulation software. Development of flexible simulation models to enhance accessibility of simulation models for experimental development. Development of distributed simulation models to represent and test production and supply chain systems. Prereq: 306 Simulation or 526. (Same as Management Science 526.)

527 Lean Production Systems (3) Characteristics and performance of mass and lean production systems. Lean production concepts and principles. Planning, designing, and implementing lean production systems: single-piece flow, setup time reduction, cost management, maintenance support and other selected topics. Application at enterprise level to achieve strategic competitive goals. Prereq: 515 or consent of instructor.

591-92-93 Special Topics in Industrial Engineering (1-3,1-3,1-3) Individual or group research projects. Prereq: Consent of instructor. May be repeated.

594 Culminating Integrated Project Report (3) (Same as Mechanical Engineering 594).

601 Operations Research Models in Engineering Economy (3) Mathematical programming techniques applied to capital budgeting, advanced topic multiple attribute decision analysis; Bayesian analysis of sequential decision making; artificial intelligence in complex decision analyses. Prereq: 518, 523.

602 Nonlinear Optimization (3) (Same as Management Science 602.)


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 one's academic work. Prereq: Enrollment in engineering management. May be repeated. Maximum 6 hrs. S/N only.

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

531 Motivation and Culture in Engineering Management (3) Motivation theories and principles to improve individual and organizational capabilities. Success in meeting goals, improving creativity, innovation, and leadership and personal interpersonal skills. Improvements through organizational structure, policies, and work design. Prereq: 533 or consent of instructor.

532 Productivity and Quality Engineering (3) Productivity and quality measures defined and used to analyze current competitive position of important sectors of American industry with respect to national and international competition. Study of management theorists and systems which promote or inhibit productivity or quality improvements.

533 Theory and Practice of Engineering Management (3) Manager's perspective; business definition; strategic planning and management; marketing and competition in global economy; finance, organizations, and systems thinking; team building; corporate culture and leadership in new organization; and quality, empowerment, and leadership in organizations. Principle application to work settings and case studies.


535 Management of Technology (3) Creativity and innovation; incorporation of advanced technology equipment; application of systems thinking; new methods in business and manufacturing organizations; justifying technology; assimilating and managing changes in management roles; and impacts of new technologies. Prereq: 539 and Industrial Engineering 518.

536 Project Management (3) Development and management of engineering and technology projects. Project proposal preparation: resources and cost estimating, project planning, organizing, and controlling; network diagrams and other techniques. Role of project manager: team building, conflict resolution, and contract negotiations. Discussion of typical problems and alternative solutions. Case studies and student project. Prereq: 537 or consent of instructor.

537 Analytical Methods for Engineering Managers (3) Survey of management analysis and control systems through IE techniques. Qualitative and quantitative methods: methods analysis, work measurement, incentive systems, wage and salary development, production and inventory control, facility layout, linear programming, and applied operations research techniques. Not for credit for students with undergraduate degrees in industrial engineering.

538 New Venture Formation (3) Factors other than technical ones which enter into successful establishment of manufacturing or service enterprise. Organizational and financial planning and evaluation. Cost control location, market analysis to determine commercial feasibility of new ventures. Prereq: 539.

539 Strategic Management in Technical Organizations (3) Strategic planning process and strategic management in practice; corporate vision and mission; product, market, organizational, and financial strategies; external factors; commercialization of new technologies; and competition beyond. Prereq: 533 and Industrial Engineering 518 or consent of instructor.

540 Labor Relations (3) Negotiation and administration of labor agreements. Survey of historical, legal, and structural environments that influence the collective bargaining process. Collective bargaining simulation.

541 Total Quality Management and Beyond (3) Continuous improvement in capabilities, competitiveness, and productivity of organizations. Principles of total quality management; systems theory and analysis; performance measurement; application of statistical techniques in continuous improvement. Team building and leadership issues, and case studies. Prereq: 516.


543 Legal and Ethical Aspects of Engineering Management (3) Legal aspects imposed by government and ethical considerations in engineering practice. Selected readings, lecture, discussion, and student presentations. Current topics from government and industry.

Information Sciences

(Office of the Provost)

MAJOR

Information Sciences .................................. M.S.

Elizabeth Aversa, Director

Professors:

Aversa, Elizabeth, Ph.D. .................... Drexel
Tenopir, Carol, Ph.D. .......................... Illinois
Wilson, P. (Emeritus), Ph.D. ............ Michigan

Associate Professors:

Fisher, Patricia L., Ph.D. .................. Florida State
Pemberton, J. Michael, Ph.D. ............ Tennessee
Pollard, Richard, Ph.D. ..................... Brunel (UK)
Robinson, William C., Ph.D. .......... Illinois

Assistant Professors:

Bilal, Dania, Ph.D. ............................ Florida State
Raber, Douglas, Ph.D. ................... Indiana
Wang, Pelling, Ph.D. ......................... Maryland
Watson, Jinx, Ed.D. ...................... Vanderbilt
Whitney, Gretchen, Ph.D. ........ Michigan

The School of Information Sciences provides a program leading to the preparation of librarians and information professionals for work in all types of libraries and information centers. The program of study includes a graduate curriculum leading to the Master of Science degree. The program is accredited by the American Library Association. A Ph.D. degree program may also be pursued with a major in Communications, concentration in information sciences.

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

A. To prepare students to understand the nature of information and the role of the library and other information agencies in the management of information resources, and the facilitation of information transfer.

B. To equip students with the knowledge of the roles of various organizations/institutions in promoting the flow of information.

3. An understanding of the role of the information professional as mediator between information resources and their users.

4. An understanding of the roles of various tools and technologies in facilitating access to information.

5. An understanding of the structure and content of information resources in various formats and subjects.
130 Information Sciences

6. Knowledge of theoretical and practical evolution of information sciences and technologies and their relationship with other disciplines.
7. Competence in creating, managing and accessing information in a variety of formats.
B. To provide services to the state, region, and nation in association, consulting and continuing education activities which will promote the development and improvement of information systems and services such that the state'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.
C. 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 grade-point average for admission as a potential candidate for the MS degree.

The verbal, quantitative and analytical aptitude portions of the Graduate Record Examination (GRE) are required of all applicants unless a graduate degree has been completed prior to application for admission. Applicants should take the GRE at least one semester in advance of application for admission and are expected to score 1500 points or better.

A 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 in Information Sciences involves a total of 42 semester hours of graduate courses including 5 courses required of all students. Either a thesis or a non-thesis option is available, with 6 hours required for thesis credit. At least 36 hours must be taken in the School of Information Sciences, allowing up to 6 hours outside the University.

Required Courses
Five courses are required of all students: 490, 520, 530, 560 and 580. (Students seeking licensure see track requirements below.) These courses address the evolving information environment; organization and representation of informational access and retrieval; developing and managing collections; and principles and concepts of the information sciences. Three courses, 490, 500 and 530, are prerequisite to all courses for students enrolled in the M.S. degree program:

Individualized Curriculum Approach
Students, in consultation with their advisor, may wish to pursue a curricular focus to develop an individualized program of study. Graduates of the school have prepared themselves for a variety of careers, including positions as: corporate information specialist, public librarian, records manager/archivist, web page designer, information retrieval specialist, medical or law librarian, reference librarian, youth services specialist, and many others. Students are encouraged to take advantage of the individualized curricular approach.

Whatever individualized curriculum is chosen, all students must complete the program receive a M.S. degree accredited by the American Library Association (ALA). For those pursuing Tennessee Department of Education licensure as a school library information specialist, stipulated requirements apply. See following section.

Tennessee State Department of Education Library Information Specialist Requirements
The Tennessee State Department of Education requires School Library Information Specialists to hold the master's degree. The School of Information Sciences offers four tracks with School Library Information Specialist endorsement.

1. Initial Endorsement for Non-Licensed Teachers with no Master's Degree in Library or Information Sciences: For those students who do not hold the master's degree, the requirements for initial endorsement include the 5 required courses plus 551, 567, 571, 572, 573, 585, and 596. In addition, applicants must complete two corequisite courses from the College of Education (5 credit hours) with a grade of B or better.

2. Initial Endorsement for Non-Licensed Teachers with a Master's Degree in Library or Information Sciences: For those students who hold an ALA-accredited master's degree and have approval of the faculty advisor, the requirements are a maximum of 24 hours within the School's program, including the required 556. In addition, students must complete two corequisite courses from the College of Education (5 credit hours) beyond the required 24 hours. Upon completion of the requirements, students will earn a Tennessee State Department of Education license as a School Library Information Specialist.

3. Additional Endorsement for Licensed Teachers with a Master's Degree: The requirements include the 5 required courses plus 551, 567, 571, 572, 585 and 596 (which must be taken twice). Upon completion of the requirements, students will earn a Tennessee State Department of Education additional endorsement as a School Library Information Specialist.

Additional Program Requirements
Thesis Option: Students electing the thesis option will write a master's thesis under close supervision of a thesis committee. Six hours of Thesis (S/NC only) must be taken during the 42 hours required for graduation. (Students may register for more than 6 hours of 500, but only 6 hours will count toward graduation.) Students must be registered for 5 500 in the semester they complete and defend their thesis. The oral defense of the thesis (final comprehensive examination) substitutes for the written examination that is taken by non-thesis students. The writing of the master's thesis serves as the culminating experience.

Non-Thesis Option: Upon completion of the program, all students who elect the non-thesis option must take and pass a written comprehensive examination. A culminating examination will be taken by all students who complete the program. For those students who have taken the non-thesis option, the examination may be completed in one of the student's last two semesters with a grade of B or better (except as noted) selected from the following and approved by the student's advisor: 596 Problems in Information Sciences, 591 Supervised Readings in Information Sciences, 593 Independent Study, 594 Graduate Research (S/NC only). Additional Program Requirements: 595 Student Teaching in School Library Information Sciences, 596 Teaching and Observation in School Library Information Sciences, 597 Credit (S/NC only), 599 Practicum (S/NC only).

FINANCIAL ASSISTANCE OPPORTUNITIES
Employment with the University of Tennessee Libraries may provide a work-study opportunity for some students who wish to obtain experience in academic libraries while pursuing the degree. Such students usually work at least 20 hours each week and may extend the pay period required for the degree. Similar opportunities exist with 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 Oak Ridge Associated Universities. A limited number of graduate teaching assistantships are available for academic year salaries. Students interested in obtaining a graduate teaching assistantship must follow the procedures described above. Students desiring to be graduate teaching assistants should indicate their interest on the graduate teaching assistantship application form.

For application forms and information about financial aid and other information about the M.S. in Information Sciences, write to:

Dr. William J. Garvey
Assistant to the Dean
School of Information Sciences
Tennessee State University
Knoxville, TN 37996-0076

Further financial assistance is available from the Tennessee State Department of Education, the Tennessee Higher Education Commission, the Tennessee Student Assistance Corporation, and the Bank of Tennessee. (Contact the office of the Office of Student Financial Aid, 131 Information Sciences Building, 37996-0076.)

Students who are employed in a scientific-technical environment are required to work at least 20 hours per week in the school.

Assistantships of this type carry a weekly stipend and fees as well as an in-state tuition waiver. Students are required to take 10 hours per week in the school.

For application forms and information about financial aid and other information about the M.S. in Information Sciences, write to:
Instructional Technology, Curriculum and Evaluation

(Recent changes and updates are reflected here)

MAJOR DEGREES

Education.................M.S., Ed.S., Ed.D., Ph.D.

M. Everett Myer, Head

Professors:
Desart, Donald J., Ph.D. .......... Maryland
Doak, E. Dale (Emeritus), Ed.D. ........ Colorado
French, Russell, Ph.D. .......... Ohio State

Hipple, Theodore W., Ph.D. .......... Illinois
Myer, M. E. (Liaison), Ed.D. .......... Florida
Roeseke, Edward L. (Emeritus), Ed.D. .......... Ohio State

Associate Professors:
Connelly, Mary Jane, Ed.D. .......... VPI
Grant, A. D., Ph.D. .......... Wisconsin
O'Bannon, Blanché, Ed.D. .......... Memphis
Norris, Ailen, Ph.D. .......... Virginia

The Department of Instructional Technology, Curriculum and Evaluation offers graduate programs leading to degrees, majors, and concentrations in:

Master of Science

Education

Track 1-curriculum
Track 1-instructional technology

Educational Specialist

Education

Curriculum
Instructional technology

Doctor of Education

Instructional technology

Doctor of Philosophy

Instructional technology

See Education under Fields of Instruction for full description of all degree requirements.

The mission of department focuses on the preparation of teachers and instructors in curriculum and in the preparation of various other professionals who desire to utilize educational research and instructional technology.

GRADUATE COURSES

475 Utilization of Instructional Media (3) Basic computer concepts and applications for use in education.

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

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

503 Problems in Lieu of Thesis (2-3) May be repeated. Maximum 9 hrs. E

518 Educational Specialist Research and Thesis (3) May be repeated. P/NP only. E

520 Techniques of Research in Education (3) Study and application. F

521 Computer Applications in Education (3) Use and integration of technology in educational settings to support teaching and learning. Prerequisites: Basic computer operations or consent of instructor.

532 Instructional Research: Analysis and Application (3) Analysis of research on instruction. Translation and application of research findings into instructional performance.

535 Program Evaluation in Education (3) Issues and practices in planning and conducting program and curriculum evaluation in variety of settings. Fundamentals of design, measurement, philosophy, ethics, and underlying values; proper role and use of evaluation.

541 The High School Curriculum (3) Identification of problems associated with curriculum study. Trend and structure of high school curriculum framework, assessment of trends in programs of local, regional, and national significance.

552 School Law for Educators (3) Case and statutory material for public school educators; problems concerning law and public education.

557 The Junior High and Middle School Curriculum (3) Curriculum and instruction design for junior high and middle school. Characteristics of students, curriculum design, instructional patterns, and organization and structure of junior high and middle school.

558 Curriculum Planning and Development (3) Foundations and principles of curriculum planning and development. Historical analysis of curriculum theory, principles of planning and development, and classroom applications for improved learning.

560 Student Assessment (3) Processes for assessing and reporting student progress; interpretation and use of available assessment data. Methods of assessment other than tests and measurements: portfolios, performance tasks, exhibitions.

561 Educational Statistics (3) Applications of descriptive and inferential statistics to educational and instructional problems. Use of electronic calculators in educational research. Prerequisite: One year of college mathematics, an elementary course in statistics, or consent of instructor.

566 Administering Instructional Media Programs (3) Leadership and responsibilities of professional media administrator in variety of organizational settings.

569 Media and Technology Production Techniques (3) Workshop strategy: basic photography, video production, and single camera TV production. Use of electronic calculators in educational research. Prerequisite: One year of college mathematics, an elementary course in statistics, or consent of instructor.

570 Instructional Systems Design (3) Theory of education and systems design to solve instructional problems in educational settings.

571 Desktop Publishing for Educators (3) Use of computer-based desktop publishing tools and related hardware in designing and producing instructional and informational products. Prerequisite: 521, 570, or consent of instructor.

573 Introduction to Multimedia in Instruction (3) Selection of computer-based instructional software and use to produce instructional materials based on specific learner characteristics and objectives. Prerequisite: 521 or consent of instructor.

575 The Internet: Implications for Teaching and Learning (3) Projects and surveys theories for using Internet as an instructional tool. Variety of browsers, search engines, and web page construction software. Prerequisite: 521 or consent of instructor.

576 Advanced Interactive Multimedia for Instruction (3) Design and production of educational and interactive Web sites using advanced software. Development of effective interactive methods for enhancing teaching and learning supported by principles of planning, designing, creating, testing, and evaluating. Prerequisite: 521, 570, 573, 575.

577 Introduction To Data Processing in Curriculum and Instruction (3) Analysis of current applications in educational computing and data processing. Curriculum, instructional, research, and classroom management applications from main-computers to super computers. Prerequisites: Consent of instructor.

580 Techniques for Research in Curriculum and Instruction (3) Fundamentals of research methodology applicable to curriculum, instruction, an other areas of educational inquiry. Critical reading of research and development of skills needed for proposal development.

581 Instructional Theory and Design (3) Relationship of curriculum to instruction; examination of
695 Special Topics (1-3) May be repeated. S/NC or letter grade. 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, Asian Studies, Cinema Studies, Comparative Literature, Environmental Studies, Latin American Studies, Legal Studies, Judaic Studies, Linguistics, Medieval Studies, Urban Studies and Women's Studies. Certain courses within these programs are available for graduate credit as listed below. See the Undergraduate Catalog for program descriptions and directors.

African and African-American Studies

GRADUATE COURSES


443 Topics in Black Literature (3) (Same as English 443.)

450 Issues and Topics in African-American Studies (3) Problems, topics, issues, and individuals. May be repeated. Maximum 6 hrs.

452 Black African Politics (3) (Same as Political Science 452.)


483 African-American Women in American Society (3) Historical and contemporary socio-econo-political factors in American society as related to Black women. (Same as Women's Studies 483.)

510 Special Topics (3) May be repeated. Maximum 6 hrs.

American Studies

GRADUATE COURSES

423 Geography of American Popular Culture (3) (Same as Geography 423.)

510 Special Topics (3) May be repeated. Maximum 6 hrs.

Asian Studies

GRADUATE COURSES

471 Selected Topics in Asian Studies (3) Content varies. May be repeated. Maximum 9 hrs.

510 Special Topics (3) May be repeated. Maximum 6 hrs.

Legal Studies

GRADUATE COURSES

400 Mass Communications Law and Ethics (3) (Same as Communications 400.)

424 Psychology and Law (3) (Same as Psychology 424.)
Urban Studies

GRADUATE COURSES

401 The City in the U.S. (3) (Same as Planning 401.)
441 Urban Geography of the United States (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.
410 Gender Role Development: Implications for Education and Counseling (3) (Same as Counselor Education and Counseling Psychology 410.)
422 Women Writers in Britain (3) (Same as English 422.)
425 Women's Health (3) (Same as Health 425.)
426 Methods of Historical Linguistics (3) (Same as German 426, French 426, and Spanish 426.)
429 Romance Linguistics (3) (Same as French 429 and Spanish 429.)
430 Topics in Hispanic Linguistics (3) (Same as Spanish 430.)
435 Structure of the German Language (3) (Same as German 435.)
436 History of the German Language (3) (Same as German 436.)
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.)
476 Second Language Acquisition (3) (Same as English 476.)
477 Pedagogical Grammar for ESL Teachers (3) (Same as English 477.)
485 Special Topics in Language (3) (Same as English 485.)
490 Language and Law (3) (Same as English 490 and Legal Studies 490.)
510 Special Topics (3) May be repeated. Maximum 6 hrs.

Journalism and Public Relations

(College of Communications)

MAJOR

Communications ........................................ M.S., Ph.D.
James A. Crook, Director

Professors:
Adamson, June N. (Emeritus), M.S. ...................... Tennessee
Ashdown, Paul G., Ph.D. ......................... Bowling Green
Bowles, Dorothy, Ph.D. ................................... Wisconsin
Cade, Dozier C. (Emeritus), Ph.D. .................... Iowa
Caudill, C. Edward, Ph.D. ............................. North Carolina
Crook, James A., Ph.D. ................................. Iowa State
Everett, George A. (Emeritus), Ph.D. ............... Iowa
Haskins, Jack B. (Emeritus), Ph.D. ................... Minnesota
Leeper, B. Kelly (Emeritus), Ph.D. ...................... Southern Illinois
Littmann, Mark (Chair of Excellence), Ph.D. ............. Northwestern
Miller, M. Mark, Ph.D. .................................. Michigan State
Singsletary, Michael W., Ph.D. ......................... Southern Illinois
Towner, Willis L., Jr., Ph.D. ............................ Wisconsin
Tucker, Willis C. (Emeritus), M.S. ....................... Kentucky

Associate Professors:
Foley, Daniel, M.S.J. ............................. Northwestern
Heller, Robert B., M.A. ............................... Syracuse
Morrow, Jerry L., Ph.D. ............................... Toledo

Assistant Professors:
Fall, Lisa T., Ph.D. ............................... Michigan State
Richert, Bonnie P., Ph.D. ............................. Tennessee
White, Candace L., Ph.D. ............................... Georgia

The School of Journalism and Public Relations offers a concentration area for the master's with a major in Communications and participates in the interdisciplinary doctoral program. See Communications for additional information.

Journalism

GRADUATE COURSES

403 International Communications (3) Development and operations of world mass communications channels and agencies. Comparative analysis of mass 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.

412 Opinion Writing (3) Analysis of editorial positions, practices, and pages. Writing of editorials and columns for newspapers, magazines, and company publications. Study and use of rhetorical devices and logic. Prereq: Writing for Mass Communication or consent of instructor. (Same as Political Science 412.)

414 Magazine Article Writing (3) Techniques of writing in-depth articles of mass circulation and specialized magazines. Organizing and presenting material, problems in specialized areas: business, science, agriculture, humanities. Prereq: Writing for Mass Communication or consent of instructor.

416 Issues in Journalism (3) Topics vary. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

420 Print Media Management (3) Current business practice among print news media, especially newspapers. Problems in management and production and outlook for new technologies. Prereq: 6 hrs mathematics and/or accounting and senior standing. Sp


433 Advanced Editing (3) Sensitivity to language and editing skills. Headline writing, layout, and production. Prereq: Editing. Sp

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 science writing and write series of articles for general public based on scientific journals, news conferences, technical meetings, and interviews. Prereq: Consent of instructor. (Same as Information Sciences 450.)

451 Environmental Reporting (3) Writing for news media on such environmental issues as strip-mining, water pollution, air pollution, allergens, nuclear power, fossil fuel power, and solid wastes. Presentations from interviews and of experts in environmental science and reporting. Exemplary popular literature in environmental reporting. Prereq: Editing for majors; consent of instructor for non-majors.

455 Issues in Science Communications (3) Topics vary. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

Medieval Studies

GRADUATE COURSES

510 Special Topics (3) May be repeated. Maximum 6 hrs.

Linguistics

GRADUATE COURSES

400 Topics in Linguistics (3) Content varies. May be repeated. Maximum 6 hrs.
411 Linguistic Anthropology (3) (Same as Anthropology 411.)
423 The Development of Diachronic and Synchronic Linguistics (3) Development of Western linguistic thought from Hebrews and Greeks through modern times. Readings from Boas, Sapir, Bloomfield, and others. Prereq: 9 hrs of courses required for Linguistics major (300-level or above) or consent of instructor.
425 Introduction to Descriptive Linguistics (3) (Same as French 425, German 425, and Spanish 425.)
426 Methods of Historical Linguistics (3) (Same as German 426, French 426, and Spanish 426.)
429 Romance Linguistics (3) (Same as French 429 and Spanish 429.)
430 Topics in Hispanic Linguistics (3) (Same as Spanish 430.)
435 Structure of the German Language (3) (Same as German 435.)
436 History of the German Language (3) (Same as German 436.)
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.)
476 Second Language Acquisition (3) (Same as English 476.)
477 Pedagogical Grammar for ESL Teachers (3) (Same as English 477.)
485 Special Topics in Language (3) (Same as English 485.)
490 Language and Law (3) (Same as English 490 and Legal Studies 490.)
510 Special Topics (3) May be repeated. Maximum 6 hrs.
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.-M.B.A., J.D.-M.P.A.

Thomas C. Galligan, Jr., Dean

Professors:
Ansley, Frances Lee, LL.M. ...........Harvard
galligan, Jr., Thomas C., LL.M., Columbia Hardin, Patrick, J.D. ..................Chicago Hess, Amy M., J.D. ..............Virginia Jones, Dunvard S. (Emeritus), J.D.

Associate Professors:

530 Fund Raising and Proposal Writing (3) History, philosophy and practice of philanthropy in U.S. Sources of funds from foundations, corporations and public agencies. Research and preparation of fund-raising proposals.

550 Publishing on World Wide Web (3) (Same as Journalism 560.)

571 Public Relations Management (3) Analysis and management of problems in communication between organizations and their publics. Measurement and evaluation of effectiveness of communication programs. Prereq: 470 or consent of instructor.

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

598 Internship (3) Professional work in public relations supervised by communications manager with faculty approval. No retroactive credit for previous work experience. Prereq: Completion of core curriculum.

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: Editing or Advertising Creative Strategy or Electronic Field Production or equivalent.

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.

Public Relations

GRADUATE COURSES

412 Opinion Writing (3) (Same as Journalism 412.)

416 Issues in Public Relations (3) Topics vary. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

470 Public Relations Campaigns (3) Research, planning and communication and evaluation of major public relations campaigns. Oral and written presentation of public relations project from inception to completion. Extensive out-of-class work. Prereq: 320 Public Relations Communications and 370 Public Relations Cases or consent of instructor. F, Sp

516 Seminar in Public Relations Issues (3) Topics vary. May be repeated. Maximum of 6 hrs.

520 Press-Government Relations (3) (Same as Journalism 520.)

525 Public Opinion (3) (Same as Journalism 525.)
Concentration in Business Transactions

Students interested in a concentration in business transactions must complete all of the following law courses:

- 818 Fundamental Concepts of Income Taxation
- 826 Introduction to Business Transactions
- 827 Business Associations
- 972 Income Taxation of Business Organizations
- 940 Land Finance Law
- 840 Commercial Law
- 842 Contract Drafting Seminar
- 853 Representing Enterprises

None of the above courses may be taken on an S/NC basis (with the exception of 826).

*This course is not required for students who have an undergraduate major in accounting, finance, or business administration, who hold the M.B.A. degree, or who are enrolled in the dual J.D.-M.B.A. program. Waivers may be granted to students who have acquired the requisite business knowledge through other coursework or practical experience.

Concentration in Advocacy and Dispute Resolution

Students interested in a concentration in advocacy and dispute resolution must complete all of the following courses:

- 813 Evidence
- 815 Introduction to Advocacy and Professional Responsibility
- 905 Advocacy Clinic
- 920 Trial Practice
- 921 Pretrial Litigation
- 922 Advanced Trial Advocacy
- 928 Case Development and Resolution

Students electing a concentration in advocacy and dispute resolution may not take any of the above courses on an S/NC basis.

DUAL J.D.-MBA DEGREE PROGRAM

The College of Business Administration and the College of Law offer a coordinated dual program leading to the conferral of both the Doctor of Jurisprudence and Master of Business Administration degrees. In this program, a student may earn the M.B.A. and J.D. degrees in about five years rather than the five years that otherwise would be required. Students pursuing the dual degree program should plan to be enrolled in coursework or an internship for one summer term in addition to taking normal course loads for four academic years.

Admission Requirements

Applicants for the J.D.-M.B.A. program must be competitively and independently accepted by, the College of Law for the J.D. and the Graduate School of Business Administration for the M.B.A. degree, and by the Dual Program Committee.

Students who have been accepted by both colleges may apply for approval to pursue the dual program anytime prior to, or after, matriculation in either or both colleges. Such approval will be granted, provided that dual program studies are started prior to entry into the last 28 semester hours of J.D. coursework and prior to the third semester of the MBA program. Students interested in entering the dual degree program should submit a letter of application to the Dual Program Committee. Upon receipt of the application, the Dual Program Committee will determine eligibility and assign students to advisors who will be responsible for course approval and supervision of the student's progress through the dual program.

Curriculum

A dual program candidate must satisfy the graduation requirements of each college. Students withdrawing from the dual program before completion of both degrees will not receive credit toward graduation from either college for courses in the other college, except as such courses qualify for credit without regard to the dual program. The College of Law will award up to 9 semester hours of credit toward the J.D. for acceptable performance in approved graduate-level courses offered by the College of Business Administration. The College of Business Administration will award up to 6 semester hours of credit toward the MBA for acceptable performance in approved courses offered in the College of Law. The approval of courses is the responsibility of the 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. During the first year in the MBA program, students register as graduate students. After the first two years, any term in which students take law courses or a mixture of law and graduate courses, they are classified and registered as law students. If taking only graduate courses, they are classified and registered as graduate students.

Approved Dual Credit

MBA courses in which the student has earned a B grade or higher and are to be counted toward the J.D. program must include 9 semester hours approved by the College of Law. The 6 hours of law courses in which the student has earned a 2.0 or higher and are to be counted toward the MBA must be selected from those approved by the Dean of the MBA Program.

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 Master of Political Administration degrees. In this program, a student may earn the M.P.A. and J.D. degrees in about four years rather than the five years that otherwise would be required. Students pursuing the dual degree program should plan to be enrolled in coursework or an internship for one summer term in addition to taking normal course loads for four academic years.

Admission Requirements

Applicants for the J.D.-M.P.A. program must make separate application to, and be competitively and independently accepted by, the College of Law for the J.D. degree and the Department of Political Science. 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 entry into the last 29 semester hours required for the J.D. degree and prior to entry into the last 15 semester hours required for the M.P.A. degree.

Curriculum

A dual degree candidate must satisfy the graduation requirements for both the J.D. and the M.P.A. degrees, as well as the requirements for the dual program. The College of Law will award a maximum of 9 semester hours of credit toward the J.D. degree for successful completion of approved graduate-level courses (500 or 600 level) offered in the Department of Political Science. The M.P.A. program will award a maximum of 9 semester hours of credit toward the M.P.A. degree for successful completion of approved courses offered in the College of Law. All courses for which cross-credit is awarded must be approved by the J.D.-M.P.A. coordinators in the College of Law and the Department of Political Science. All candidates for the dual degree must successfully complete Administrative Law (Law 821) and are encouraged to take Local Government (Law 824). An internship is strongly recommended for students in the dual degree program, as it is for all M.P.A. candidates, but an internship is not required.

During the first two years in the dual program, students will spend one academic year completing the required first year of the College of Law curriculum and one academic year taking courses solely in the M.P.A. program. During those first two years, students may not take courses in the opposite area without the approval of the J.D.-M.P.A. coordinators in both academic units. In the third and fourth years, students are strongly encouraged to take both law and political science courses each semester.
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 C+ or higher and a grade of No Credit for any lower grade. The official academic record of the student maintained by the Registrar of the University shall show the actual grade assigned by the instructor without conversion.

POLICY FOR GRADUATE STUDENTS TAKING LAW COURSES

Students pursuing a graduate degree in another college may, upon approval of the College of Law and the major chairperson, take up to 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. If a C or above is earned in a law course, an S will be recorded on the transcript. If a student earns below a C, an NC will be recorded, and the course cannot be used toward meeting degree requirements. Grades for law courses will not be reflected in the cumulative average. Law courses may be taken for credit only by students enrolled in a graduate degree program.

Different rules apply to the student enrolled in the Dual J.D.-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 other 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 G.P.A.'s will be shown on the permanent transcript.

PROFESSIONAL COURSES

801 Civil Procedure I (3) Binding effect of judgments, selecting proper court, ascertainment of applicable law, and federal and state practice.

802 Civil Procedure II (3) Pleading, joinder of claims and parties, discovery, trials, trials, judgments and appeals. Emphasis on practice. 402 Civil Procedure.

803 Contracts I (3) Basic agreement process and legal protections afforded contracts: offer and acceptance, consideration and other bases for enforcing promises: the statute of Frauds; unconscionability and other controls of promissory liability: Introduction to relevant portions of Article 2 of the Uniform Commercial Code.

804 Contracts II (3) Continuation of Contracts I: issues arising after contracts are made: interpretation and enforcement of duties of good faith: conditions, impracticability and frustration of purpose: remedies: third party beneficiaries: assignment and delegation. Considerable coverage of Article 2 of the Uniform Commercial Code with respect to remedies, anticipatory repudiation, impracticability and good faith.

805 Legal Process I (3) Lawyer-like use of cases and statutes in prediction and persuasion: Analysis and synthesis of common law decisions: statutory interpretation: fundamentals of expository legal writing and legal research.

806 Legal Process II (3) Continuation of Legal Process I: Formal legal writing, appellate procedure, and oral advocacy.

807 Torts I (3) Intentional torts, defenses and privileges related to intentional torts: negligence: standard of care, professional malpractice, and liability of owners and occupiers of land: defenses based on plaintiff's conduct: contributory and comparative negligence: assumption of fault, failure to take precautions, and avoidable consequences: causation, proximate cause: duty rules; and questions of joint and several or several liability.

808 Torts II (3) Vicarious liability and related concepts: strict liability for dangerous animals and abnormally dangerous activities: products liability: nuisance, defamation and invasion of privacy: economic torts: misrepresentation and interference with contract and prospective opportunities: immunities: those of government, government employees, charities and family members, and damages.

809 Criminal Law (3) Substantive aspects of criminal law; general principles applicable to all criminal conduct; specific analysis of particular crimes; defenses to crimes.

810 Property (4) Introductory course treating issues of ownership, possession, and title in the areas of landlord-tenant relations; estates in land and future interests; co-ownership and marital property; real estate transactions; eminent domain and the takings clause; administration of estates and trusts; and servitude and servitudes.

812 Constitutional Law (4) Fundamental principles of American constitutional law: federalism, separation of powers, equal protection of law, and constitutional protection of other fundamental individual rights.

813 Evidence (4) Rules regulating introduction and exclusion of oral, written and demonstrative evidence at trials and other proceedings, including relevancy, testimony, competence, impeachment, hearsay, privilege, expert testimony, authentication, and judicial notice. Coreq: 920 for students electing concentration in advocacy.

814 Legal Profession (3) Legal, professional and ethical standards applicable to lawyers. Not open to students who have taken 815.

815 Introduction to Advocacy and Professional Responsibility (3) Theory and morality of advocacy in adversarial system, and legal, ethical, and professional standards applicable to lawyers and especially lawyers as advocates.


821 Administrative Law (3) Administrative agency decision-making processes and judicial review of administrative actions: procedural standards for informal and formal administrative adjudication and rule-making (attention to federal Administrative Procedure Act); constitutional due process standards in administrative settings; and availability, scope and timing of judicial review of agency actions.

822 Legislation (3) Interpretation and drafting of statutes: legislative processes, political power: comparison of judicial views on legislative process with both realities of legislative process and applicable constitutional principles.

826 Introduction to Business Transactions (2) Non-technical introduction to business transactions and the functional relationships among the various actors in business transactions. Analysis of business transactions with regard toward novel issues. Not available for students with business background.

827 Business Associations (4) Legal problems associated with formation, operation, and dissolution of unincorporated and incorporated business firms; legal rights of firm members: principals and agents, partners and limited partners, members, managers, and governors of limited liability companies, and corporate shareholders, directors, and officers; and others with whom members interact in connection with firm's business.

828 Corporate Finance (3) Legal issues arising in conjunction with corporate financial transactions: issuance of stock and securities, distributions to shareholders, mergers and other corporate acquisitions. Legal valuation of corporate securities.

830 Securities Regulation (3) Basic structure of federal securities law: Legal problems associated with raising of capital by new and growing enterprises; securities transactions by promoters, officers, directors and other insiders; regulation of public-offer companies: litigation under Rule 10b-5 and other antifraud provisions; and provision of legal and other professional services in connection with securities transactions. Recommended preq or coreq: 827.

833 Representing Enterprises (3-5) Casebook course for concentration in business transactions. Simulated business transactions and completion of major planning drafting project. Transactions vary: formation of new enterprises, acquisition of businesses, development of real estate project, various financing transactions and corporate reorganization. Prereq: Completion of two courses for concentration in business transactions.

834 Antitrust (3) Federal antitrust laws; monopolization, price-fixing, group boycotts, and anticompetitive practices generally; government enforcement techniques and private treble damage suits.

840 Commercial Law (4) Basic coverage of most significant provisions of Uniform Commercial Code: security interests in personal property (Art. 9 of U.C.C. and relevant Bankruptcy Code provisions); commercial paper, including checks, drafts, notes and other negotiable instruments (Arts. 3 and 4 of U.C.C.); sales of goods, including coverage of portions of Art. 2 of U.C.C. not covered in Contracts.

842 Contract Drafting Seminar (2) Practical fundamentals of drafting contracts of different types.

843 Debtor-Creditor Law (3) Basic elements of federal bankruptcy law: claims, property of estate, automatic stay, trustee's avoidance powers, assumption and rejection of contracts, priority of distributions, and distinction between liquidation and rehabilitation. Enforcing judgments outside of bankruptcy.

847 Advanced Constitutional Law (2-3) Advanced study of issues in American constitutional law. Specific course offerings vary. Subjects include: constitutional structure and the American constitutional order; the federalism, separation of governmental powers; relationship between legislative and executive branches, relationship among states and between states and federal government, and constitutional amendment process; state constitutional law. Tennessee constitutional amendment process; federal constitutional law: Bill of Rights and 14th Amendment to Constitution: constitutional rights as protected by Bill of Rights and 14th Amendment. Prereq: 8.12. May be repeated under different topics.

848 Civil Rights Actions (3) Litigation to vindicate constitutional rights in private actions against the government and its officials, as well as rights protected by other civil rights legislation: foundations of cause of action under 42 U.S.C. sec. 1983: actions against...
889 Advanced International Law (3) Political, social and economic influences on development of federal labor relations laws; employer and employee self-organization; union and employer unfair labor practices; strikes, lockouts, boycotts, and collective bargaining processes; enforcement of collective agreements; individual rights of employees; federal preemption and state regulation.

890 Employment Law (3) Legal regulation of employment relationships; legal, social and economic influences in employment relationships; national and international developments in employment; discrimination; legally prescribed minimum standards of compensation and safety; constraints on termination of employment; regulation of retirement systems.

891 Arbitration Seminar (2) Arbitration of labor agreements; judicial and legislative developments; nature of process; relationship to collective bargaining; selected arbitration problems on various topics under collective agreements; and role of lawyers and arbitrators. Prereq: 895.

892 Labor Relations Seminar (2) Selected labor relations law problems. Prereq: 895.

905 Advocacy Clinic (6) Supervised fieldwork requiring students to assume substantial responsibility for representing clients with complex legal problems. Exploration and development of fundamental professional skills involved in practicing law: interviewing and counseling; relationship with other attorneys, planning for transactions and dispute resolutions, initiating and defending claims, conducting factual investigations, and presenting evidence. Prereq: 920 and third-year standing.

906 Mediation Clinic (3) Mediation process, theory, strategy, tactics and skills through readings, simulations, and service as mediators in general sessions court and other settings; mediation ethics, relationship of mediation to other dispute resolution methods; roles of attorneys in mediation, and writing of mediation agreements.

915 Conflict of Laws (3) Jurisdiction, foreign judgments, and conflict of laws.

916 Federal Courts (3) Jurisdiction of federal courts; conflicts between federal and state judicial systems.

921 Pre-Trial Litigation (3) Civil pre-trial process. Drafting of actual pre-trial documents in civil cases: complaint, motions for preliminary injunction, class certification papers, motions to dismiss and for summary judgment, and various discovery papers.

922 Advanced Trial Advocacy (3) Study and development of trial skills: trial preparation, advanced direct and cross-examination, expert witnesses, jury selection, jury instruction, technology in courtroom, and motion practice. Prereq: 920.

925 Appellate Practice Seminar (2) Federal and Tennessee Rules of Appellate Procedure, local rules of federal circuits; review of complete records of several United States Supreme Court cases and preparation of an appellate brief based on record of actual case.

927 Interviewing, Counseling and Negotiation (3) Development of conceptual and practical frameworks for understanding interviewing, counseling and negotiation and lawyer’s role in tasks. Readings of different methods, strategies and perspectives from recent literature including lawyering skills. Simulations and videotape critiques, drafting of documents. Relevant ethical issues and perspectives. Not open to students who have taken 904 or 906.

928 Case Development and Resolution (4) Theory and development of skills for case development and management: interviewing, counseling, and fact-investigation. Ways of resolving disputes without litigation. Not open to students who have taken 927.

932 Teaching Clients the Law (3) Communication of law as basis for decision by persons other than lawyers. Development of skills by team-teaching a practical law course to high school or adult students and by writing research papers that synthesize Tennessee or federal law in plain language.

935 Gratuities and Gifts (4) Nature, creation, termination, and effect of gifts; charitable contributions; charitable remainder trust; gift taxation; charitable organizations.


940 Land Finance Law (3) Financing devices: mortgage, deed of trust and land contracts; problems of priority, transfer of property, and federal government officials under the Bivens doctrine; institutional and individual immunities; relationship between state and federal courts in civil rights actions; and remedies for violations of constitutional and other civil rights.

849 Discrimination and the Law (3) Comparison of race, sex, and other forms of discrimination with respect to education, employment, housing, political participation, and economic activity; historical landmarks and current issues in discrimination.

850 Supreme Court (3) History of Supreme Court and of procedures by which Court arrives at decisions influencing the role and power of the presidency. Prereq: 825 or 826.
555 Research Rotation (2) Laboratory rotations with faculty members on clearly defined projects. Written proposal and oral report may be required. Maximum 6 hrs.

506 Computational Biology and Genome Informatics (3) Computational basis of nucleotide and protein sequence analysis; pairwise sequence comparison, multiple sequence alignment; genome and species trees. Genome annotation and feature finding. Computational protein structure analysis; threading homology modeling, ab initio methods. Prereq: Computer Science 140. Data Structures or consent of instructor.

509 Biotechnology Seminar (1-2) Topics of importance to biotechnology. May be repeated. Maximum 6 hrs.

510 Special Topics in Life Sciences (1-3) Specializations in biotechnology, cellular, molecular, and developmental biology; environmental toxicology; ethology; plant, physiology, and genetics; and physiology. May be repeated. Maximum 9 hrs.

515-16 Introduction to Genome Science and Technology I, II (1,1) Introduction to research in genome science & technology concentration. 516—Science and ethics of practice of science. S/NC only.

520-21 Genome Science and Technology I, II (4,4) Overview of genomics, advanced genetics principles, computational biology and bioinformatics. 521—Computational biology and informatics, analytical technologies and special techniques.

540-41 Colloquium (1,1) Invited speakers. Topics announced in advance. Required every semester in residence after first year. May be repeated. Maximum 6 hrs.

550 Mammalian Genetics and Genomics (3) Genetic variation, inheritance, phenotypic traits, molecular genetics and genomics, mutations in laboratory rodents and other mammals. Prereq: 520-21.

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.

595-96 Special Topics in Genome Science and Technology (1-3) Tutorials or lectures in variety of special topics to be chosen by instructor. May be repeated. Maximum 6 hrs.

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.

615-16 Introduction to Genome Science and Technology I, II (1,1) Introduction to research in genome science & technology concentration. 516—Science and ethics of practice of science. S/NC only.

620 Seminar in Strategic Management I (3) Analysis of concepts and research in strategic management. May be repeated. Maximum 6 hrs.


640 Seminar in Advanced Organization Theory (3) Analysis of concepts and research in advanced organization theory. May be repeated. Maximum 6 hrs.

660 Seminar in Organizational Theory (3) Analysis of concepts and research in organizational theory. May be repeated. Maximum 6 hrs.

670 Seminar in Organizational Behavior (3) Analysis of concepts and research in organizational behavior. May be repeated. Maximum 6 hrs.

680 Seminar in Strategic Management (3) Analysis of concepts and research in strategic management. May be repeated. Maximum 6 hrs.

690 Seminar in Organizational Behavior (3) Analysis of concepts and research in organizational behavior. May be repeated. Maximum 6 hrs.

DEGREES

Management Science

Management Science (College of Business Administration)

MAJORS

Management Science, M.S., Ph.D.

James, Lawrence R. (Pilot Chair of Excellence), Ph.D. ................................................................. University of Utah
Kealy, A. H. (Emeritus), MBA, Ph.D. ......................................................... Pennsylvania State University
Lamb, Robert T., Ph.D. ................................................................. Georgia State University
Larsen, John M., Jr. (Emeritus), Ph.D. ......................................................... Duke University
Purdue Miller, Alex (W. B. Stokely Prof.), Ph.D. ......................................................... Washington State University
Reese, Don (Emeritus), Ph.D. ................................................................. Alabama A&M University
Rush, Michael C., Ph.D. ................................................................. Akron University
Srinivasan, M. M., Ph.D. ................................................................. Northwestern University
Stein, Michael J., Ph.D. ................................................................. Rensselaer Polytechnic Institute
Yancey, S. C. (Emeritus) (W. B. Stokely Prof.), Ph.D. ......................................................... Pennsylvania State University
Whitlock, G. H. (Emeritus) (Distinguished Prof.), Ph.D. ......................................................... Tennessee State University

Associate Professors:
Bowers, Melissa R., Ph.D. ................................................................. Clemson University
Edrissineh, Anahita P., Ph.D. ................................................................. British Columbia
Elenkov, Detelin S., Ph.D. ................................................................. Mount Holyoke College
Fowler, Oscar S., Ph.D. ................................................................. Georgia State University
Haley, Usha C., Ph.D. ................................................................. New York University
Judge, William Q., Ph.D. ................................................................. North Carolina State University
Maddox, Robert C., Ph.D. ................................................................. Texas A&M University
Rentsch, J. R., Ph.D. ................................................................. Maryland Institute of Technology
Woehr, D., Ph.D. ................................................................. Georgia Tech

Assistant Professor:
Smith, Anne D., Ph.D. ................................................................. North Carolina State University

BUSINESS ADMINISTRATION CONCENTRATIONS

For complete listing of MBA and Ph.D. program requirements, see Business Administration.

MBA Concentration: Operations Management

Minimum course requirements: 540, 541, and one course from the following: Management Science 526, 551, Statistics 566, Industrial Engineering 522, 526, or an applicable course approved by the designated faculty.

Ph.D. Concentration: Management

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

MINOR IN ENVIRONMENTAL POLICY

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

GRADUATE COURSES

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

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

511 Organizational Theory: Integrated Structure and Behavior (3) Cases, group projects, discussion; organizational theories, organizational effectiveness; contextual factors of organizational environment, size, technology; organizational structure configurations, organization design; social influences on organization effectiveness; motivation, leadership, group behavior, intergroup relations, organization change and development.

521 Human Resource Management (3) Personnel functions and human resources management. Community relations, recruitment, selection, performance evaluation, wage and salary administration, legal framework as it affects personnel.

531 Management of Technology-Based Organizations (3) Role of technology and innovation in formulation and implementation of strategy. Management of research and development function and coordination with other functions. Management of scientists and engineers.

540 Logistics and Operations Management (3) Analysis of methods and models for understanding supply chain flows and processes. Introduction to management strategies and techniques applicable to the design of systems in logistics and operations processes. Prereq: Business Administration 501, 511, 512, and 513 or consent of instructor. (Same as Logistics and Transportation 510)

541 Operations Management I (3) Techniques applicable to the 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.

571 International Management (3) Analysis of environmental factors affecting international firms and impact of internal and external factors on managerial decisions.

581 Environmental Management (3) Managerial frameworks for addressing environmental issues. Most pressing environmental challenges; options compatible with sustained business performances. 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 (3) In-depth consideration of current issues. Managerial impact of emerging topics. Prereq: Consent of instructor.

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

601 Research Methods (3) Seminar covering broad range of issues related to research methods. Classical and open systems models, organization growth and change, organizational effectiveness and design of complex organizations.

611 Seminar in Strategic Management (1-3) Analysis of concepts and research in strategic management. May be repeated. Maximum 6 hrs.

612 Seminar in Strategic Management II (1-3) Analysis of concepts and research in strategic management. May be repeated. Maximum 6 hrs.

613 Seminar in Strategic Management III (1-3) Review and analysis of important books and monographs in strategic management. Understanding evolution of thought and emergence of distinct paradigms.
program during the student's first semester and must approve all courses on a semester-by-semester basis.

Recognizing the diverse backgrounds and needs of Management Science M.S. students, the Management Science Committee is prepared to waive some of the above requirements on an individual basis. The total course load will remain 40 hours for all students.

THE DOCTORAL PROGRAM

The Ph.D. program in Management Science is designed to prepare students for research related to the application of mathematical tools to complex decision making. Three primary objectives of the program are:

1. to provide, through management science coursework, a thorough knowledge of common Management Science/Operations Research mathematical models and their uses;

2. to provide sufficient advanced study in a supporting area to qualify the graduate for a joint faculty position in the supporting area and management science. 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. Applications are encouraged from all majors, but a mathematics background equivalent to the completion of at least two years of college calculus and proficiency in a computer language is required. The program is designed to be completed in four semesters by full-time students. However, students may start the program in any semester and may pursue an M.S. degree program in Management Science on a part-time basis.

Course Requirements

<table>
<thead>
<tr>
<th>Course Requirements</th>
<th>Hours</th>
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<tbody>
<tr>
<td>Core Requirements</td>
<td>16</td>
</tr>
<tr>
<td>Management Science</td>
<td>531, 532, 533, 534, and 691 or 692</td>
</tr>
<tr>
<td>Statistics</td>
<td>563</td>
</tr>
<tr>
<td>Applied specialization area (approved by advisor)</td>
<td>9</td>
</tr>
<tr>
<td>Technical elective</td>
<td>6</td>
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<tr>
<td>Statistics (500 level or above as approved by advisor)</td>
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<tr>
<td>Mathematics (400 level or above as approved by advisor)</td>
<td></td>
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<tr>
<td>Industrial Engineering (400 level or above as approved by advisor)</td>
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<tr>
<td>Other elective (as approved by advisor)</td>
<td></td>
</tr>
<tr>
<td>Electives selected from mathematics, statistics, computer science, business, management science, industrial engineering, or other approved area</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
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</tbody>
</table>

A thesis option is available to qualified students. The Management Science Committee will work closely with the student in tailoring a program to his/her needs. The committee must approve a tentative overall options may be approved. In exceptional circumstances, the faculty will consider waiving the mathematics and/or statistics qualifying examinations.

These requirements generally are completed by the end of the first year of the program.

There is no foreign language requirement.

Comprehensive Examination

Prior to admission to candidacy for the degree, and normally after completion of the second year of the program, the student must pass a written comprehensive examination covering the theory of deterministic and stochastic management science models. Topics included in this examination are determined on an individual basis. Students will be expected to demonstrate an integrative ability that goes beyond simple mastery of course content.

Research and Dissertation

The student must complete 24 semester hours of Management Science 600: Doctoral Research and Dissertation, through which he/she is expected to make a significant contribution to the science. A final oral examination is conducted over the dissertation and such other segments of the program that the faculty committee deems appropriate. This effort, which is beyond the minimum 48 hours of coursework, normally is completed in the third year of the program.

ACADEMIC STANDARDS

A graduate student in the College of Business Administration whose grade-point average falls below 3.0 will be placed on probation. A student on probation will be dropped from the program unless his/her cumulative graduate grade-point average is 3.0 or higher at the end of the probationary period. The probationary period is defined as the next semester's coursework 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.

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/C only. E

526 Advanced Applications of Systems Modeling and Simulation (3) (Same as Industrial Engineering 526)

531 Mathematical Programming (3) Linear programming solution procedures, duality, sensitivity, and
532 Stochastic Models in Management Science (3)
Discrete-time Markov chains, Poisson processes, continuous-time Markov chains, renewal theory, and queueing theory. Prereq: Statistics 563 and Mathematical Analysis or consent of instructor. E

533 Computational Mathematical Programming (3)
Computational aspects of mathematical programming models, in particular for large systems. Prereq: 531 and proficiency in computer language. E

534 Management Science Methods in Business (3)
Application of methods from 531, 532, and 533 to real world problems in business/industry. E

551 Leveraging Information Through Descriptive and Prescriptive Modeling (3) Concepts and tools for evaluating business operations (descriptive modeling) and for determining optimal operational or tactical strategies (prescriptive modeling). Visualization, optimization, and simulation concepts reinforced through hands-on experience with technologies, geographic information systems (GIS), spreadsheet-based models, simulation packages, and supply chain optimization software. (Same as Information Management 522.) E

593 Management Science Problems (1-6) Directed study on subject of mutual interest. E

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

621 Network Flows (3) Treatment of network optimization algorithms, transportation and transshipment models and primal-dual and primal-based tree methods. Prereq: 531 or equivalent. E

631 Integer Programming (3) Theoretical and computational aspects of linear programming with integer variables, branch and bound, cutting plane, and group theoretical algorithms. Prereq: 531 or equivalent. E

651 Nonlinear Optimization (3) Kuhn-Tucker theory in nonlinear programming, solution procedures for constrained and unconstrained nonlinear programs, search techniques, quadratic programming, duality and sensitivity analysis. Prereq: 531 or equivalent. Proficiency in computer language. (Same as Industrial Engineering 602.) E

681 Special Topics (3) Prereq: 531, 532 and consent of instructor. May be repeated. Maximum 9 hrs.

691-92 Management Science Seminar (1, 1) Subjects selected from current literature. S/N/C only.

Marketing, Logistics and Transportation

(Master of Business Administration)

MAJOR DEGREES
Business Administration MBA, Ph.D.

Richard C. Reizenstein, Acting Head

Professors:
Barnaby, D. J., Ph.D. Purdue
Cadotta, E. R., Ph.D. Ohio State
Davis, F. W., Jr., Ph.D. Michigan State
Dicer, G. N., DBA Indiana
Langley, C. J. (Dove Prof.), Ph.D. Penn State
Mentzer, J. T. (Harry J. Bruce Chair of Excellence), Ph.D. Michigan State
Schumann, D. W., Ph.D. Missouri
Woodruff, R. B. (Proffitt's Prof.), DBA Indiana

Associate Professors:
Dabhokar, P. A., Ph.D. Georgia State
Foggijn, J. H. (Liaison), DBA Indiana
Gardial, S. F., Ph.D. Houston
Holcomb, M. C., Ph.D. Tennessee
Nokel, C. D., Ph.D. Ohio State
Reizenstein, R. C., Ph.D. Cornell
Rentz, J. O. (Liaison), Ph.D. Georgia

Assistant Professors:
Kahn, K. B., Ph.D. Virginia Tech
Moon, M. A., Ph.D. North Carolina
Ruzicka, M. E., Ph.D. Arizona State

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—510 and two courses approved by the logistics faculty. For marketing—520 and two courses approved by the marketing faculty.

Ph.D. Concentration: Logistics and Transportation, Marketing
Minimum course requirements for logistics and transportation—611, 612, 614, 615. For marketing—611, 612, 613, 614, 615, and 616.

Logistics and Transportation

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/N/C only. E

504 Logistics and Supply Chain Operations (3) Organizations' internal functional areas and external interactions with suppliers and customers. Operations, interactions, and issues within context of supply chains. Prereq: Business Administration 501.

506 Logistics and Supply Chain Strategy (3) Development of strategy for logistics systems and supply chain operations. Executive-level integration of logistics strategy with marketing, production, finance, and other decision areas. Prereq: Business Administration 501.


508 Executive-In-Residence Seminar in Logistics and Transportation Strategy (3) Capstone, integrative case course in logistics and transportation strategy; participation in Executive-In-Residence program that provides student interaction with top-level logistics and transportation executives.

509 Logistics and Supply Chain Analytical Techniques (3) Application of various methods and models for analyzing supply chain processes. Understanding, definition, and articulation of problems and potential solutions to enterprise issues commonly faced by managers, consultants, and project analysts. Prereq: Business Administration 501. (Same as Information Management 521.)

540 Logistics and Operations Management (3)
(Continued from Management 540.)
611 Seminar in Theoretical Foundations (3) Theoretical foundations and frameworks common to business research. Historical and philosophy of science perspectives. (Same as Logistics and Transportation 611.)

612 Research Methods I (3) Research process: philosophical foundations, problem formulation, grounded theory, qualitative methods and analysis, measurement, sources of error, experimental design and analysis, and survey design and analysis. (Same as Logistics and Transportation 612.)

613 Research Methods II (3) Practical application of data analysis techniques. Experience with sophisticated statistical techniques using real marketing databases.

614 Contemporary Marketing Thought (3) Representative topics comprising content of marketing knowledge: macromarketing, markets, channels, and competitor behavior; marketing strategy; marketing mix tools; and ethical issues in marketing. Examination of research for contributions to advancing knowledge and opportunities for new research.

615 Seminar in Buyer Behavior Research (3) Theoretical perspective and research processes describing people in their roles as buyers, users, and evaluators of goods and services. Important research issues and practical applications related to buyer behavior.

616 Measurement (3) Measurement and measurement process: design and development of tools, process of testing, and determination of reliability and validity.

617 Special Topics (3) Topics vary: marketing strategy, advertising, behavior, influence and persuasion theory and strategy, pricing issues, international marketing issues, and nonprofit organization marketing issues.

693 Independent Study (1-6) Directed research on subject of mutual interest to student and staff member. May be repeated.

Materials Science and Engineering
(College of Engineering)

MAJORS

Materials Science and Engineering M.S., Ph.D.
Polymer Engineering M.S., Ph.D.

Patrick R. Taylor, Head

Professors:

Benson, R. S., Ph.D. ................ Florida State
Brooks, C. R. (Emeritus), Ph.D. .... Tennessee
Buchanan, Raymond A., Ph.D., Vanderbilt
Clark, Edward S. (Emeritus), Ph.D., California
Daehne, N. B. (UTSI), Ph.D. ....... Michigan State
Fellers, J. F., Ph.D. .................. Akron
Hansen, Marion G., Ph.D. .......... Wisconsin
Liaw, P. K. (Racheff Chair of Excellence), Ph.D. ................ Northwestern
Lownodes, Douglas H., Ph.D. ..... Colorado
Lundin, Carl D., Ph.D. .............. Rensselaer
McIntyre, Carl J., Ph.D. ............. Kentucky
Oliver, Ben F. (Emeritus), Ph.D. ...Penn State
Pedrazz, A. J., Ph.D. ............... La Plata (Argentina)
Pharr, George M., Ph.D. .......... Stanford
Phillips, Paul J., Ph.D. ............ Liverpool (UK)
Spruell, Joseph E., Ph.D. ......... Tennessee
Stansbury, E. E. (Emeritus), Ph.D. ... Cincinnati
Taylor, Patrick R. (Liaison), Ph.D. .... Illinois

Assistant Professors:

Becker, William T., Ph.D. .......... Ohio State
Meek, Thomas T., Ph.D. .......... Delaware

Assistant Professor:

Kit, Kevin, Ph.D. ................. Delaware

Graduate programs are offered leading to the degrees of Master of Science and Doctor of Philosophy in Materials Science and Engineering or Polymer Engineering. Both the Materials Science and Engineering and Polymer Engineering programs are flexible and interdisciplinary in nature. Students may be admitted from a wide range of disciplines; these include physics, chemistry, chemical engineering, mechanical engineering, electrical engineering, materials engineering, and engineering science programs.

Areas of concentration within the Materials Science and Engineering degree program include metallurgy, polymers, and materials. Specializations include, but are not limited to: ceramics; composites; electronic materials; physical metallurgy; materials processing; welding metallurgy and materials joining; corrosion science and engineering; biomedical materials; and mechanical and physical behavior of materials.

Areas of concentration within the Polymer Engineering degree 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 Materials Science and Engineering or Polymer Engineering. Additional requirements include:

1. A major consisting of 12 semester hours of graduate courses in materials science and engineering or polymer engineering. The materials science and engineering major must include 511, 512, 515, and 516 for the metallurgy concentration; 511, 512, 540, and 541 for the polymers concentration; and 511, 512, and two graduate specialization courses approved by the student's faculty committee for the materials concentration. The polymer engineering major must include 640, 541, 543, 544, 549, and 550 unless similar material has been covered in prior coursework.

2. Additional courses up to 12 hours total in related areas.


4. Satisfactory performance on a comprehensive oral examination administered by the faculty committee.

All resident students are required to register for and participate in the graduate seminar in materials science and engineering or polymer engineering, as appropriate, during each semester in which it is offered. Three hours of MSE 503 or 504, Seminar, graded Satisfactory/No Credit, may be counted toward degree requirements.

Non-Thesis Option

Any candidate may apply for a non-thesis option. Upon acceptance, a supervisory committee of three will be appointed. At least two members of the committee will be from the faculty in the major area, either materials science and engineering or polymer engineering. The requirements for completion of the non-thesis option are as follows:

1. Completion of a total of 30 hours of graduate coursework. At least 18 of those hours must be in the department, and up to 12 hours may be in related areas. Three hours of MSE 503 or 504, Seminar, graded Satisfactory/No Credit, may be counted toward degree requirements. The materials science and engineering major and the polymer engineering major must include the same courses required for the thesis option. The candidate's degree program must be approved by the faculty committee.

2. Satisfactory completion of a culminating experience such as MSE 590 (Critical Review).

3. Satisfactory performance on a comprehensive examination administered by the faculty committee.

THE DOCTORAL PROGRAM

After one year in residence and with the approval of the faculty, a student may proceed directly to the doctoral program without completion of a master's degree. Departmental requirements for completion of the doctoral degree are:

1. a. For students proceeding directly to the Ph.D. from the baccalaureate degree; 48 graduate course credit hours with at least six hours of 600-level courses. Six hours of MSE 503 or 504, Seminar, graded Satisfactory/No Credit, may be counted toward degree requirements. At least 30 credit hours must be courses taught in the department. The materials science and engineering major and the polymer engineering major must include the same courses required for the master's thesis option.

b. For students having a master's degree in Materials Science and Engineering, Polymer Engineering, or Metallurgical Engineering; 18 additional graduate course credits with at least six hours of 600-level courses. Three hours of MSE 503 or 504, Seminar, graded Satisfactory/No Credit, may be counted toward degree requirements. At least 12 credit hours must be courses in the department.

2. Students must complete at least 24 hours of dissertation credits.

3. Satisfactory performance on a 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.

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 (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

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 mechanics 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.

525-25 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. Prereq: 421 or consent of instructor.

528 Ceramic Matrix Composites: Material and Mechanics (3) (Same as Engineering Science 528.)

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; Kirkendall effect; high diffusivity 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 transformation.

531 Advanced Corrosion (3) Analysis of corrosion processes in terms of polarization measurements and Pourbaix diagram. Influence of environmental and mechanical factors contributing to pitting, crevice, fretting, wear, fatigue and stress corrosion. Prereq: 470 or consent of instructor.


540 Basic Polymer Chemistry (3) Synthesis, reac-tion and degradation of polymers. Molecular character-ization: solution methods and spectroscopy. Prereq: 301, 320 or consent of instructor.

541 Fluid Mechanics and Polymer Processing (3) Navier-Stokes equations and illustrative problems; applications in chemical engineering and polymer engineering, packed and fluidized beds, multiphase systems. Basic concepts in rheology; applications in polymer processing: extrusion, fiber spinning, injection molding. (Same as Chemical Engineering 541.)

542 Further Topics in Polymer Processing (3) Detailed analysis of and selection poly-process ing operations. Prereq: 540.


544 Polymer Solution Thermodynamics and Char-acterization (3) Theories of solutions, statistical thermodynamics, Characterization, treatment of char-mography, viscosity, light scattering and osmotic 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, 2) Experimental techniques and instrumentation associated with characterization, x-ray and light scattering, calorimetry, rheometry, mechanical properties of solid polymers, polymer processing operations. Coreq: 543 or consent of instructor. 549-S/N only.

560 Principles of Ceramic Processing (3) Treatment of ceramic processing; raw materials preparation and characterization; powder consolidation; drying, firing, sintering techniques and mechanisms. Prereq: 360 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 oxides glasses, nitrates, glasses, water glasses, and chalcedony glasses. Prereq: 360, Chemistry 371.

571 Electron Microscopy (3) Operation of electron microscope; kinematic and dynamical diffraction theories; structure determination and analysis of lattice defects. Prereq: 405 or equivalent.

572 X-Ray Diffraction (3) Symmetry of crystals, space group theory, reciprocal lattice and application to diffraction structures and single crystal x-ray techniques; introduction to structural determination; characterization of orientation; application to inorganic, metallic and polymer structures.

576 Special Topics in Materials Science and Engi-neering (1) Preparation of critical review of literature in area related to materials science and engineering. Must be taken by student with instructor's approval. 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 Solidification and Crystal Growth (3) Theories of solidification, flow field flow, growth mechanisms; growth stability theory, thermodynamic applications, rapid solidification theory, metastability. Prereq: Consent of instructor.

625 Materials Lifetime Science and Engineering I (3) Fundamentals of aqueous and high-temperature corrosion and fatigue; methods of materials lifetime modelling. Prereq: 531 and 532, or consent of instructor.

626 Materials Lifetime Science and Engineering II (3) Interactions between corrosion and fatigue at ambient and high temperatures; lifetime modelling of materials simultaneously subjected to corrosion and fatigue. Prereq: 625.

627 Case Studies in Materials Lifetime Science and Engineering (3) Studies of, and participation in, industrial analyses of lifetimes of structural materials subjected to aqueous-corrosion/fatigue and high-tempera-ture-oxidation/fatigue, performed as part of the student's industrial and national-laboratory internship programs. Prereq: 531 and 532, or consent of instructor.

628 Graduate Seminar in Materials Science and Engineering (3) Interactions between corrosion and fatigue at ambient and high temperatures; lifetime modelling of materials simultaneously subjected to corrosion and fatigue. Prereq: 625.

641 Advanced Rheology and Viscoelastic Theory (3) Continuum mechanics, formulation of viscoelastic theories for describing deformation and flow of polymeric materials; flow in polymer processing problems. Recommended for MS candidates working in rheological areas. Prereq: 541.
642 Advanced Topics in Polymer Processing (3)
Application of theories of macroscopic behavior and 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; crystalization of polymers; crystallization under stress. Prereq: 543.

671 Quantitative Microscopy (3) Principal acoustic, optical, x-ray, neutron, electron 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
(College of Arts and Sciences)

MAJOR
DEGREES

Mathematics ................. M.M., M.S., Ph.D.

John B. Conway, Head

Professors:
Alexiades, V., Ph.D. ............... Delaware
Aliakos, N. (Emeritus), Ph.D. ...... Brown
Anderson, D. F., Ph.D. ............. Chicago
Bradley, John S. (Emeritus), Ph.D. .... Iowa
Caruth, J. H. (Emeritus), Ph.D. ....... Louisiana State
Clark, C. E. (Emeritus), Ph.D., Louisiana State
Conway, J. B., Ph.D. .......... Louisiana State
Daverman, Robert J., Ph.D. .......... Wisconsin
Dobbs, D. E., Ph.D. ............ Cornell
Dydek, J., Ph.D. ............... Warszaw
Frandsen, Henry (Emeritus), Ph.D. ... Illinois
Gross, L. J., Ph.D. .......... Cornell
Hinton, D. B., Ph.D. .......... Tennessee
Husch, L. S., Ph.D. ........... Florida State
Johannson, K., Ph.D. .......... Texas A & M
Jordan, Samuel, Ph.D. ........ Wisconsin
Karakashian, O., Ph.D. ........ Harvard
Kupershmidt, B. A. (UTSI), Ph.D. .... MT
Lenhart, S., Ph.D. ........... Kentucky
McConnel, R. M. (Emeritus), Ph.D. .... Duke
Mathews, H. T. (Emeritus), Ph.D. .... Tulane
Miller, D. D. (Emeritus), Ph.D. .... Michigan
Mulay, S. P., Ph.D. ........... Purdue
Rajput, B. S., Ph.D. ........... Illinois
Reddy, K. C. (UTSI), Ph.D. ........ Indian IT
Richter, Stefan, Ph.D. .......... Michigan
Rosinski, J., Ph.D. ........... Wroclaw
Schaefer, P. W., Ph.D. .......... Maryland
Serbin, Steve, Ph.D. ........... Cornell
Simenson, H., Ph.D. ........ Cal Tech
Sonke, K. (Emeritus), Ph.D. .......... Oregon State
Sonke, R. P., Ph.D. ........ Oregon State
Stallman, F. W. (Emeritus), Ph.D. ....... U. of Wisconsin
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:
Collins, Charles R., Ph.D. .......... Minnesota
Feng, Xiaobing, Ph.D. .......... Purdue
Freire, A., Ph.D. ............... Princeton
Gavrilets, Sergey, Ph.D. .......... Moscow State
Guo, Bo, Ph.D. ............... Massachusetts
Kimbie, K. R. (UTSI), Ph.D. .......... Ohio State
Kuo, Y., Ph.D. ............... Cincinnati
Pleut, Conrad, Ph.D. .......... Maryland
Smith, J. Ph.D. .............. California
Xiong, Jie, Ph.D. ............ North Carolina

Assistant Professors:
Chen, Xia, Ph.D. ............... Case Western
Davis, Reld, Ph.D. .......... Tennessee
Dwyer, Jerry, Ph.D. .......... Ireland
Kachi, Yasuyuki, Ph.D. .......... Tokyo
Matthews, Gretchen, Ph.D. .......... Louisiana State
Schulze, Timothy, Ph.D. .......... Northwestern
Tzermias, Pavlos, Ph.D. .......... California

The Mathematics Department has three graduate degrees: (1) the Master of Mathematics degree, intended primarily for teachers, (2) the Master of Science degree, designed to prepare students for industrial employment and teaching, and (3) the Doctor of Philosophy degree, designed to prepare students for industrial employment and for college and university teaching and research. Contact the department office for additional information.

A student offering mathematics as a minor for the master's degree is required to obtain at least 6 hours of resident graduate credit in courses numbered above 400 and approved by both the major department and the Department of Mathematics.

For additional information, please visit the graduate website on the Department of Mathematics' homepage at www.math.utk.edu.

THE MASTER OF MATHEMATICS PROGRAM

Before admission to the Master of Mathematics program, the applicant must have either (a) certification for teaching secondary mathematics in at least one state, or (b) three years of elementary school, secondary school, or community college teaching experience. Applicants must have successfully completed one year of calculus (141-42 or equivalent) and a course in matrix algebra (251 or equivalent).

The following requirements must be met:
1. Complete 30 hours of coursework of which 21 must be at the 500 level. The coursework must include 504, 505, 506, 507, and 6 hours in 509. At most, 6 hours may be taken outside the Department of Mathematics (selected in consultation with the advisor).
2. Pass a final examination upon completion of all coursework.

In exceptional circumstances, part of admission requirement (b) might be satisfied concurrently with coursework. Normally Master of Mathematics degree students will start the program by taking 504 during the summer.

THE MASTER OF SCIENCE PROGRAM

The department offers two options for the Master of Science degree. The first option requires a thesis for which 6 hours must be earned along with 24 additional hours of work in acceptable courses numbered above 400. Of the additional hours, 6 may be in an area outside the department and 15 must be in courses in mathematics numbered above 500.

After one semester of graduate study, a student whose advisory committee gives its approval may choose the non-thesis option, for which 30 hours in courses numbered above 400 are required. Of these, 21 hours (at least 15 of which must be in mathematics) must be in courses numbered above 500. Of the 30 hours, 9 in courses approved by the advisory committee may be taken in fields other than mathematics. For this option it is also required that a written final examination be passed and that credit be received for a reading course (598) in which a term paper or project is required.

Concentration in Applied Mathematics

For this concentration, available under the thesis or the non-thesis option, the student must complete the following:
1. Prerequisite courses:
d. Matrix Algebra II 453.
2. One hour of Seminar in Applied Mathematics 510 or Seminar in Mathematical Ecology 599.
3. One course each from the following five areas:
e. Statistics - Statistics 525, Stochastic Modeling 527, Statistical Methods 571 (Statistics), Biometry 560 (Ecology and Evolutionary Biology).

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 must satisfy either or is encouraged to complete the interdisciplinary mathematical ecology concentration. A student may elect to switch from one to the other provided the constraints of the latter option have not been violated. A student's status after electing such 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 at least one, 600-level sequence in mathematics outside the student's area of specialization. The sequences' area should not be one covered by the standard program. The student may take this examination only twice.

4. Pass a one-year, 600-level sequence in a foreign language, normally French, German or Russian. This requirement must be completed no later than the start of a student's seventh year (as a mathematics graduate student at UT).

Standard Program

Demonstrate knowledge in five subjects selected from the groups listed below by passing written examinations in three 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, or 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 the requirements.

c. A student may take a collection of written examinations a maximum of 3 times, but no one failing 4 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 UT graduate program in mathematics more than one year may take written examinations at one time during the year without having that sitting for the examinations or any failure counts 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 the purpose, only one examination is permitted for each of up to two subjects, and the use of a written examination must be declared before the examination is taken so that the sitting for the examination and any failure are not counted toward the limits in condition c.

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 once.

The student also must earn grades of B+ or better each semester in the courses associated with two additional subjects from the groups 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.

GRADUATE COURSES

400 History of Mathematics (3) Development of major ideas in mathematics from ancient to modern times and influence of ideas in science, technology, philosophy, art, and literature areas. Writing emphasis course: at least one in-class essay examination and 3000 words of writing outside classroom. Prereq: Matrix Algebra I and Introduction to Abstract Mathematics.

401 Mathematics and Microcomputers (3) Primarily for students seeking certification as mathematics teachers at secondary level. Use of computers to study concepts and proofs. Does not satisfy the major requirements for a B.S. or M.S. in mathematics. Prereq: Calculus I.

404 Applied Vector Calculus (3) Topics from multivariable and vector calculus, line and surface integrals, divergence theorem and theorems of Gauss and Stokes. Prereq: Calculus II or Biocalculus II.


421 Combinatorics (3) Introduction to problems of construction and enumeration for discrete structures: sequences, partitions, graphs, finite fields and geometries, or experimental designs. Prereq: Probability and Statistics or consent of instructor.

423 Probability I (3) Axiomatic probability, multivariate distributions, conditional probability and expectations, methods of moment generating/characteristic functions. Laws of large numbers and central limit theorem. Prereq: 300-level probability or consent of instructor.

424 Probability II (3) Elements of stochastic processes: Random walk, Markov chains and Poisson processes. Other topics as selected by instructor. Prereq: 423.

425 Statistics (3) Derivation of standard statistical distributions: F, t, χ²; independence of sample mean and variance; basic limit theorems; point and interval estimation, Bayesian estimates; statistical hypothesis testing; Neyman-Pearson theory; likelihood ratio and other parametric and non-parametric tests; sufficient statistics. Prereq: Probability I or consent of instructor.


443 Complex Variables I (3) Theory of functions of complex variables, residue theory, and contour integrals. Prereq: Calculus III. Recommended prereq: 300- or 400-level mathematics course.

448-456 Advanced Calculus II, III (3, 3) Sequence, series, differentiation, and Riemann integration. Continuity functions, homeomorphisms, complex and topological invariants. Prereq: Calculus III and Introduction to Abstract Mathematics, or consent of instructor.

447-448 Honors: Advanced Calculus II, III (3, 3) Honors version of 445-46. Prereq: Calculus III and Introduction to Abstract Mathematics, or consent of instructor.

453 Matrix Algebra II (3) Matrix theory including Jordan canonical form. Prereq: Matrix Algebra I.

455-56 Abstract Algebra II, III (3, 3) Algebraic structures: groups, rings, fields, vector spaces and linear transformations. Prereq: Matrix Algebra I and Introduction to Abstract Mathematics, or consent of instructor.

457-58 Honors: Abstract Algebra II, III (3, 3) Honors version of Matrix Algebra and Introduction to Abstract Mathematics, or consent of instructor.

460 Geometry (3) Axiomatic and historical development of geometry, Euclidean, and hyperbolic geometry; topology of the plane and space; analytical geometry. Prereq: Calculus III and Introduction to Abstract Mathematics, or consent of instructor.

471 Numerical Analysis (3) Computation, instabilities, and rounding. Interpolation and approximation by polynomials and piecewise polynomials. Quadrature and numerical solution of linear and boundary value problems of ordinary differential equations, stiff systems. Prereq: Numerical Algorithms I or consent of instructor. (Same as Computer Science 471.)


475 Industrial Mathematics (3) Modeling, analysis, and computation applied to scientific/technical/industrial problems. Elective for either Computer Literacy for Mathematics or Numerical Algorithms, or consent of instructor.

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. 

499 Seminar in Mathematics (1-3) Topics vary. Requires out-of-class projects and/or class presentations by students. Credit hours announced for each seminar. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. 

500 Thesis (1-15) IPIN 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

504 Discrete Mathematics for Teachers (3) Mathematical logic and methods of argument, sets, functions and relations, graphs and graph theory. Prereq: 1 year of calculus or equivalent. Prereq: Not open to Mathematics students. (Same as Computer Science 504.)

505 Analysis for Teachers (3) Development of differential and integral calculus, proofs of basic theorems. Prereq: 2 years of calculus or equivalent. May not apply toward Mathematics degree. Prereq: 1 yr calculus or equivalent.


509 Seminar for Teachers (3) For students in Master of Mathematics program and for students in graduate programs in College of Education. May not apply toward M.S. degree in mathematics. Prereq: 1 yr calculus or equivalent.

510 Applied Mathematics Laboratory (1) Computer applications in applied mathematics; software packages for matrix analysis, symbolic algebra, and differential equations. Prereq: 511 or 512. May be repeated. Maximum 12 hrs.


515-16 Applied Analytical Mathematics (3,3) Analysis of advanced techniques in current models for applied problems: dimensional analysis and scaling, perturbation theory, variational approaches, transform techniques, stability and bifurcation theory, wave propagation, boundary value problems, numerical methods, stability and bifurcation, distributions, integral equations. Prereq: 446 or 448, 453, and either 511-12 or both 431 and 435.

517-18 Mathematical Methods in Physics (3,3) (Same as Physics 571-72.)

519 Seminar in Applied Mathematics (1-3) May be repeated. Maximum 12 hrs.

521-22 Enumerative Combinatorics (3,3) Sieve methods, recursion, generating functions, and permutation groups applied to enumeration of discrete structures. Prereq: 435 or 436.

523-24 Probability (3,3) Pertinent facts from measure theory, definition of abstract probability spaces; Kolmogorov's existence theorem; series of independent random variables; laws of large numbers; general theory of distributions of random vectors and their characteristic functions; weak convergence concepts; probability measures. Prereq: 445 or 447, and 453, 455.

525-26 Statistics (3,3) Limit theorems for sums of independent random variables; characteristic functions; moment generating functions; convergence results; central limit theorem; limit theorems in Euclidean spaces; infinitely divisible distributions and central limit problem; general concept and properties of conditional expectation, martingales, Doob's martingale convergence theorem. Prereq: 445-46. Recommended prereq: 423.

527 Stochastic Modeling (3) Models in probability applied to real world situations; queuing theory; branching processes; Monte Carlo simulation. Prereq: 445-46 or consent of instructor.


534 Calculus of Variations (3) Necessary conditions for extrema, Euler's equation, broken extremals, Weierstrass-Erdmann conditions. Sufficient conditions for extrema-Legendre's and Jacobi's conditions, conjugate points, Multipliers, Integrals. Prereq: 431.

535-36 Partial Differential Equations (3,3) First order equations, classification of equations and properties of elliptic, hyperbolic, and parabolic equations in several variables. Prereq: 445-46 and 231 or consent of instructor.

537-38 Mathematical Principles of Continuum Mechanics (3,3) Conservation principles, equations of equilibrium and motion for fluids and elastic solids, conservation of energy, entropy, stability, 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.

541-42 Real Analysis (3,3) Measure theory, Lebesgue integrals, functional analysis, Banach and Hilbert spaces, convergence of series, convexity properties, bifurcation phenomena, existence theory. Prereq: 431, 435, 446 or 448, or consent of instructor.


549 Seminar In Analysis (1-3) May be repeated. Maximum 12 hrs.

551-52 Modern Algebra (3,3) Groups, rings, modules and linear algebra, fields and Galois theory. Must be taken in sequence. Prereq: 455-56 or consent of instructor.

553 Linear Programming (3) Theory and applications. Prereq: Consent of instructor or 453 and programming ability.


555-56 Number Theory (3,3) Introduction to algebraic number theory. Prereq: 455-56 or consent of instructor.

559 Seminar in Algebra (1-3) Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. 


569 Seminar in Topology (1-3) May be repeated. Maximum 12 hrs.


575 Matrix Theory and Techniques in Numerical Analysis (3) Advanced topics in study of iterative and direct methods for large systems of linear equations; comparison and analysis, matrix computer architectures. Prereq: 453, 471-72, or consent of instructor. May be repeated. Maximum 9 hrs. (Same as Computer Science 575.)


Mechanical and Aerospace Engineering and Engineering Science

(College of Engineering)

MAJOR DEGREES

Aerospace Engineering  
M.S., Ph.D.

Engineering Science  
M.S., Ph.D.

Mechanical Engineering  
M.S., Ph.D.

T. E. Shannon, Interim Head

Professors:

Antar, B. (UTSI), Ph.D.  
Texas

Armillirii, R. V., Ph.D.  
VPI

Baker, A. J., Ph.D.  
New York

Carey, T. G. (Emeritus), Ph.D.  
Illinois

Collins, F. G. (UTSI), Ph.D.  
California

Crawford, R. A. (Emeritus) (UTSI), Ph.D.  
UTSI

Dareing, D. W., Ph.D.  
Illinois

Edmondson, A. J. (Emeritus) (UTSI), Ph.D.  
UTSI

Engels, R. C. (UTSI), Ph.D.  
VPI

Fiandro, G. A. (UTSI), Ph.D.  
Cal Tech

Forrester, J. H. (Emeritus) (UTSI), Ph.D.  
Iowa State

Fortey, J. W. (Emeritus) (UTSI), Ph.D.  
UTSI

Frankel, J. I., Ph.D.  
VPI

Garrison, G. W. (UTSI), Ph.D.  
NC State

Hodgson, J. W. (Emeritus) (UTSI), Ph.D.  
Georgia Tech

Jendrucko, R. J., PE, Ph.D.  
Virginia

Johnson, W. S., Ph.D.  
Clemson

Keeler, D. R. (UTSI), Ph.D.  
Florida

Keyhani, M., Ph.D.  
Ohio State

Kim, K. H. (Emeritus) (UTSI), Ph.D.  
NC State

Koons, R. J., Ph.D.  
Oklahoma

Landes, J. E., Ph.D.  
Lehigh

Lee, C. W. (Emeritus) (UTSI), Ph.D.  
Illinois IT

Liston, H., Jr., M.E.A., George Washington

Lo, C. F. (UTSI), Ph.D.  
Cornell

McCay, M. H. (UTSI), PE, Ph.D.  
Florida

McGy, T. D. (UTSI), Ph.D.  
Auburn

Maxwell, R. L. (Emeritus) (UTSI), PE, M.S.  
Case Western

Merkle, C. L., Ph.D.  
Princeton

Milligan, M. W., PE, Ph.D.  
Tennessee

Parang, M., PE, Ph.D.  
Oklahoma

Parsons, J. R., PE, Ph.D.  
NC State

Peters, C. E. (Emeritus) (UTSI), D.A.S.  
Brussels

Pin, H. (Emeritus) (UTSI), PE, Ph.D.  
Illinois IT

Pitts, D. R. (Emeritus) (UTSI), Ph.D.  
Georgia Tech

Remenyik, C. J., Ph.D.  
Georgia Tech

Schutz, R. J. (UTSI), Ph.D.  
Tennessee

Secco, W. E. (Emeritus) (UTSI), Ph.D.  
Tennessee

Shahroki, F. (UTSI), Ph.D.  
Oklahoma

Shanno, T. E., PE, Ph.D.  
Tennessee

Shobe, L. R. (Emeritus) (UTSI), PE, M.S.  
Kansas State

Smith, G. V., PE, Ph.D.  
Penn State

Snyder, W. T., Ph.D.  
Northwestern

Soliman, O., PE, Ph.D.  
Tennessee

Speckart, F. H. (IBM Prof.), PE  
New York

Stair, W. K. (Emeritus), M.S.  
Tennessee

Steinhoff, J. S. (UTSI), Ph.D.  
Chicago

Stoneking, J. E., PE, Ph.D.  
Illinois

Valkili, A. D. (UTSI), Ph.D.  
Tennessee

Venkatasevaran, S. (UTSI), Ph.D.  
Penn State

Wasserman, J., PE, Ph.D.  
Cincinnati

Weitman, Y. J. (Distinguished Prof.), Ph.D.  
Rensselaer

Wilkinson, H. J. (Emeritus) (UTSI), Ph.D.  
Tennessee

Wilson, C. C. (Emeritus) (UTSI), Ph.D.  
Purdue

Wu, J. M. (Emeritus) (UTSI), Ph.D.  
UTSI

Wu, J. Z. (UTSI), Ph.D.  
Beijing Institute

Wu, Y. C. (Emeritus) (UTSI)  
Cal Tech

Young, R. L. (Emeritus) (UTSI), PE, Ph.D.  
California Northwestern

Associate Professors:

Boulet, J. A. M., Ph.D.  
Stanford

Freeman, J. S., Ph.D.  
Wisconsin

Hamel, W. R., Ph.D.  
Tennessee

Hopkins, D. A. (UTSI), Ph.D.  
Tennessee

Lannert, G. S., Ph.D.  
Tennessee

Kasra, M., Ph.D.  
Cal Polytechnic (Canada)

Kawicki, G., Ph.D.  
West Virginia

Lyne, J. E., M.D., Ph.D.  
North Carolina

Madhurak, M. S., Ph.D.  
Drexel

Moulden, T. H. (UTSI), Ph.D.  
Tennessee

Nguyen, K., Ph.D.  
Colorado

Pionke, C., PE, Ph.D.  
Georgia Tech

Yu, N., Ph.D.  
California (San Diego)

Assistant Professors:

Kress, R. L., PE, Ph.D.  
Arizona

Zheng, M., Ph.D.  
Calgary (Canada)
Graduate programs leading to the degrees of Master of Science and Doctor of Philosophy are available in Mechanical Engineering, Aerospace Engineering, and Engineering Science. Changing from one of these programs to another requires departmental approval. Each applicant is advised as to any prerequisite courses before entering a program. A dual M.S.-MBA degree program with a concentration in product development and manufacturing is also available with a major in Mechanical Engineering or in Engineering Science.

In Mechanical Engineering, program concentrations include dynamics, control, and robotics; energy conversion and utilization; gas dynamics; heat transfer and fluid mechanics; machine design; power generation; product development and manufacturing (MS only); propulsion; space engineering; stress analysis; and thermodynamics.

In Aerospace Engineering, program concentrations include aeroacoustics; aerodynamics and performance; energy conversion and utilization; flight and aerospace mechanics; gas dynamics; heat transfer and fluid mechanics; propulsion; space engineering; structures and stress analysis; and thermodynamics.

In Engineering Science, program concentrations include applied artificial intelligence, biomedical engineering, computational mechanics, fluid mechanics, mechanics of composite materials, solid mechanics, industrial engineering (Ph.D. only), product development and manufacturing (MS only), optical engineering (UTSI only). In each of these concentrations, interdisciplinary programs are arranged to meet individual needs or interests. The flexibility and interdisciplinary aspect of the program concentrations are intended to be of particular interest to prospective students currently employed in research, development, or design activities and whose interests in continuing education (either full-time or part-time) lie at one of the interfaces between science and engineering or can best be met by interdisciplinary study in engineering. The program's course offerings and research activities are also intended to meet the needs of students who seek preparation for employment in engineering areas requiring specialization in mechanics or in related interdisciplinary studies such as biomechanics.

In Mechanical Engineering or Aerospace Engineering, entrance into the Master of Science program is available to qualified graduates of recognized undergraduate curricula in mechanics or aerospace engineering and to qualified graduates of other curricula who satisfy the necessary prerequisites. A program application is required in addition to the Graduate School application. Admission into the doctoral program will be granted to those applicants who have demonstrated superior achievement in their engineering backgrounds. The general GRE is required of all international applicants for admission.

In Engineering Science, entrance into the graduate program is available to graduates of recognized curricula in engineering, mathematics, or one of the physical or biological sciences. A program application is required in addition to the Graduate School application. The names and addresses of four references must be included with the program application. The general GRE is required of all international applicants for admission.

Each student must satisfactorily complete a program of study that has been approved by his/her advisory committee and complies with the requirements of the Graduate School. In Engineering Science, the student's major professor may be selected from a department other than the Department of Mechanical and Aerospace Engineering and Engineering Science; however, at least one member of the student's graduate advisory committee must be on the faculty of the Department of Mechanical and Aerospace Engineering and Engineering Science.

THE MASTER'S PROGRAM

In Mechanical Engineering, Aerospace Engineering, and Engineering Science, two M.S. options are offered. Option I requires a thesis and is the normal program for graduate students. Option II does not require a thesis and provides graduate students, including co-op and other off-campus students, the opportunity to focus their programs in special areas through extended coursework.

Credit requirements for these two options in Mechanical Engineering and Aerospace Engineering are:

<table>
<thead>
<tr>
<th>Course Areas</th>
<th>Hours Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option I</td>
<td>1</td>
</tr>
<tr>
<td>Thesis credit</td>
<td>6</td>
</tr>
<tr>
<td>Coursework</td>
<td>24</td>
</tr>
</tbody>
</table>

Courses in program (500-level or above) (min.)
Mathematics (400-level or above)
590 Selected Engineering Problems (max.)
Total

Credit requirements for these two options in Engineering Science are:

<table>
<thead>
<tr>
<th>Course Areas</th>
<th>Hours Required</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Thesis credit</td>
<td>6</td>
</tr>
<tr>
<td>Coursework</td>
<td>24</td>
</tr>
</tbody>
</table>

Engineering courses (Major concentration may include but is not restricted to course offered by the Department.) (min.)
Mathematics (400 level or above)
Related courses (May include additional courses in mathematics, computer science, or the physical and life sciences as well as engineering courses.) (max.)
590 Selected Engineering Problems (max.)
Total

For all program options, other 500 level engineering courses that are approved by the student's master's committee and the graduate programs committee may be substituted for the mathematics courses. All program options require participation in the departmental graduate seminars program, and passing a final examination on all work submitted for the degree. The final examinations in Option II will cover all coursework. The thesis option, Option I, requires submission and defense of a written thesis that demonstrates the ability to conduct and report an independent investigation.

DUAL M.S.-MBA PROGRAM

The College of Business Administration and the College of Engineering offer an integrated program leading to the conferral of the Master of Business Administration degree with a major in Business Administration (concentration in operations management) and the Master of Science degree with a major in Engineering Science or Mechanical Engineering (concentration in product development and manufacturing).

The Engineering Science program is intended to provide other engineering majors an opportunity to participate in this program with a flexible coursework plan based on their undergraduate degree.

The establishment of the dual program addresses the critical need for personnel trained in both engineering and management who can integrate an increasingly complex body of knowledge for rapid introduction of new products to the marketplace. The objective of the dual degree program is to prepare graduates to take a leading management role in companies that must react quickly to a dynamic market where forces of competition require rapid changes in design and manufacturing and a short product development cycle.

Admission Requirements

Applications are accepted for fall semester only. Applicants for the M.S.-MBA program must make separate application to, and be competitively and independently accepted by, the Graduate School for the Master of Business Administration degree program and the Master of Science degree program with a major in Engineering Science or Mechanical Engineering, and by the Dual Program Committee.

Students will initially apply for the MBA program, indicating on their application the intent to pursue the dual M.S.-MBA program and the appropriate engineering major (refer to the MBA program for separate instructions). Students accepted for both the MBA and the M.S. with a major in Engineering Science or Mechanical Engineering programs will be assigned to Dual Program Committee advisors, who will be responsible for course approval and supervision of the students' progress through the dual program.

Applications by U.S. citizens and permanent residents received after the MBA application deadline (March 1) will be considered as space allows. Additional information is required and different application dates are established by The Graduate School for international students.

Curriculum

All engineering students enrolled in the program must complete common coursework designed to provide them with an integrated, multidisciplinary teamwork experience. The MBA curriculum in product development and manufacturing consists of 33 hours of common coursework in the College of Business Administration and 15 hours of common coursework in the College of Engineering. Engineering common coursework includes a culminating 3-hour integrated
Dual degree candidates will take courses in their engineering major. The coursework for each option is designed to provide students with a concentration in their major and advanced skills to accomplish their teamwork assignments.

Curriculum for Dual M.S.-MBA Degree - Major in Mechanical Engineering

**August - First Year**
- ME 511 MBA Core I 3

**Fall - First Year**
- BA 512 MBA Core II 15
- ME 504 Product Development Process 1

**Spring**
- BA 513 MBA Core III 9
- ME 506 Product Selection and Evaluation 2
- ME 508 Integrated Product, Process, and Manufacturing System Design 3

**Summer**
- Internship 3
- BA 514 Integrated Business Simulation 3
- ME 509 Project Management 1

**Fall - Second Year**
- IE 511 Business Planning and Commercialization 3
- ME 509 Project Management 1
- ME 508 Engineering courses 9

**Spring**
- MBA "hub" course elective 3
- ME 509 Project Management 1
- ME 508 Engineering courses 9

**Summer (first session)**
- ME 594 Culminating Integrated Project Report 3

**TOTAL** 66

The dual degree candidate must satisfy the curriculum and graduation requirements of the engineering major being pursued and the College of Business Administration. Students withdrawing from the dual degree program before completing both degrees will not receive credit toward graduation in either degree program for courses taken in the other degree program, except as such courses qualify for credit without regard to the dual degree program. The M.S. and the MBA degrees will be awarded upon successful completion of the requirements of the dual program.

Approval Dual Credit

A maximum of 15 semester hours of the common program courses completed in the College of Engineering may be counted toward the MBA degree program.

THE DOCTORAL PROGRAM

All students must complete a minimum of 72 semester hours beyond the Bachelor's degree, exclusive of credit for the master's thesis. These shall include a minimum of 24 semester hours in Doctoral Research and Dissertation and a minimum of 48 semester hours in other courses.

In Mechanical Engineering or Aerospace Engineering, the courses must include:
1. A minimum of 12 semester hours of graduate credit in mathematics in courses numbered 400 and above with a minimum of 6 semester hours numbered 500 or above.
2. 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 more 500-level course(s) that are more appropriate.

In Engineering Science, the courses must include:
1. A minimum of 24 semester hours in engineering graduate courses, exclusive of thesis and dissertation credit. These courses will normally be numbered 500 and above, with at least 9 semester hours of 600-level courses, which constitute one or two areas of concentration selected by the student. The number of courses in this group to be taken will depend on the program selected by the student and the approval of his/her advisory committee.

2. A minimum of 12 semester hours in mathematics or computer science in courses numbered 400 and above, exclusive of a first course in ordinary differential equations. Additional requirements for all students include:
   1. Registration and participation in the graduate seminar in the major program.
   2. Meet all departmental examination requirements, which include passing a written and oral comprehensive examination.
   3. Presentation of a dissertation proposal to the student's advisory committee and approval of that proposal by that committee.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT on an in-state tuition basis. The M.S. program in Aerospace Engineering is available to residents of the states of Kentucky or South Carolina. The Ph.D. program in Aerospace Engineering is available to residents of the states of Arkansas or Kentucky. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Student Services.

GRADUATE CREDIT FOR UNDERGRADUATE COURSES

Students majoring in Mechanical Engineering or Aerospace Engineering may not normally use more than one 400-level engineering course to meet their advanced degree requirements. For students majoring in Engineering Science, four hundred-level courses in engineering may be used for graduate credit at the discretion of the advising committee. However, at least two-thirds of minimum required credit hours in a master's degree program must be at or above the 500 level. With the approval of the student's major department, a student whose major is outside the Department of Mechanical and Aerospace Engineering or Engineering Science may take senior (400-level) courses in the Department for graduate credit. Such students should consult with instructors regarding prerequisites for undergraduate courses.

Aerospace Engineering

NOTE: Not all the courses listed below are available at both UT and the UTSC campuses.

GRADUATE COURSES
424 Astronautics (3) Orbital mechanics, propulsion, atmospheric reentry of space vehicles; reentry thermal protection materials. Human factors in space flight, space environment and current topics. Prereq: 351 Compressible Flow, Coreq: Mechanical Engineering 344 Heat Transfer. F
425 Propulsion (3) Principles of propulsion devices; turbo-jet, ram jet and rocket engines. Prereq: 351. F
environment and space vehicle test facilities. Prereq: interactions; free molecule and rarefied gas flow.

525 Hypersonic Flow (3)
- Slender body flow; similarity solutions; thin-layer theory; shock interaction; small perturbation theory; slender body theory; similarity solutions for Newtonian viscous flow (Navier-Stokes) equations for small disturbances.
- Relations among thrust, drag, lift and vehicle lift coefficients. These properties are used to provide estimates of performance, stability, and control. Prereq: Math 512.

521 Viscous Flow (3)
- Derivation of fundamental equations of compressible viscous flow, boundary layer theory, momentum integration methods, analysis of solutions for Newtonian viscous flow (Navier-Stokes) equations for small disturbances. Torsional boundary layers, stability of boundary layers, transition to turbulence, 2-D turbulent boundary layer flow, compressible boundary layer flow. Prereq: Consent of instructor.

531 Experimental Methods in Fluid Mechanics (3)
- Experimental techniques with laboratory experiments; compressible flow, incompressible flow, turbulence measurements, flow visualization, wind tunnel experiments, water table experiments, supersonic flow experiments, boundary layer measurements, laser Doppler anemometry. Prereq: Math 512 or Math 515.

515-16 Air Vehicle Aerodynamics and Performance (3,3)
- Basic aerodynamics, aircraft design, flight testing, aircraft design, flight testing, and aircraft design, flight testing. Prereq: Math 511.

511 Inertial Flow (3)
- Kinematics and dynamics of inviscid fluids; potential flow about body, conformal mapping. Prereq: Math 542 or Math 541. Notes: only.

509 Registration for Use of Facilities (3-15)
- All phases of aerospace engineering, research, and administration. Prereq: Math 500 or equivalent. May be repeated. Maximum 6 hrs.

500 Thesis (1-15)
- Research and dissertation. Prereq: Math 500 or equivalent. May be repeated. Maximum 6 hrs.

690 Advanced Topics in Aerospace Engineering (3)
- Graduate courses in aerospace engineering. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

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

1. M500 (151) Gas Dynamics (3)
- Derivation of fundamental equations of compressible fluid flow, boundary layer theory, aircraft design, flight testing, and aircraft design, flight testing. Prereq: Math 511.

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- Derivation of fundamental equations of compressible fluid flow, boundary layer theory, aircraft design, flight testing, and aircraft design, flight testing. Prereq: Math 511.

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Engineering Science

GRADUATE COURSES

423 Fracture-Safe Design (3) Critical review of variables controlling fracture toughness: part and flaw geometry, temperature, loading rate, section size, material, environment, toughness by stress intensity factors, strain energy release rates. J integral, COD data, transition temperature tests; use of fracture toughness data in design. Prereq.: 321 and Materials Science and Engineering 475. 3 hrs or 2 hrs and 1 lab.

426 Fundamental Principles of Composites Material (3) (Same as Materials Science 472.)

429 Introduction to Ceramic Matrix Composites (3) (Same as Materials Science and Engineering 472.)

442 Fluid Mechanics II (3) Integral forms of linear and angular momentum equations and applications to pumps and turbomachinery; performance/similarity; differential conservation equations; internal one-dimensional incompressible and compressible flows; potential flow; methods of flow measurement; laboratory. Prereq.: Fluid Mechanics I, Differential Equations, Calculus III, Sp.

465 Dynamic Data Acquisition (3) Use and calibration of instrumentation for measuring dynamic events; Fourier analysis, transfer function analysis, digital signal processing, transduction, experimental parameter estimation with applications to modal vibration analysis. Prereq.: Circuits and Electro Mechanical Components, Mechanical Vibration. 2 hrs and 1 lab.

475 Design of Artificial Internal Organs (3) Design, development and evaluation of artificial internal organs; analysis of transport processes in therapeutic devices for design optimization; review of currently available devices; federal regulation and ethical considerations. Prereq.: 341, Mathematics 231.

494-95 Spectral Engineering Science Topics (1-3-3) Problems related to recent developments and practice. Open to juniors or seniors. Prereq.: Consent of instructor. May be repeated. Maximum 6 hrs.

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

502 Registration for Use of Facilities (3-15) Responsible for student not otherwise registered during any semester in any of University facilities and/or faculty until degree is completed. May be not used toward degree requirements. May be repeated. S/NC only. E

521-22 Advanced Strength of Materials (3,3) (Same as Mechanical Engineering 535-36 and Aerospace Engineering 552-53.)

523 Theory of Elasticity (3) Equations of equilibrium; strain-displacement relations compatibility, and constitutive equations in three-dimensions. Beans, disks, thick-walled tubes, plates with holes; stress concentrations; airy and complex potential stress function, plane stress and plane strain in rectangular and polar coordinates. Thermal stresses in beams, rings, plates, and shells; thermal buckling problems. 525 Theory of Plates (3) Classical bending theory of thin plates; thick plates; buckling and large deflection problems. Coreq.: 553.


534 Mechanical Vibrations (3) (Same as Mechanical Engineering 534 and Aerospace Engineering 535.)

536 Advanced Engineering Acoustics (3) Introduction to theory and application of acoustic analysis; vibration of continuous systems, plane and spherical waves, transmission phenomenon, radiation and scattering. Resonators, filters, absorption mechanisms, microphones, ultrasonics, sonar transducers. Prereq.: 435 or undergraduate vibrations course.

539 Continuum Mechanics (3) Cartesian tensors, transformation laws of coordinates, material conceptions; stress, strain, deformation, constitutive equations. Conservation laws for mass, momentum, energy. Applications in mechanics. (Same as Aerospace Engineering 539 and Mechanical Engineering 539.)

541 Fluid Mechanics I (3) (Same as Mechanical Engineering 541 and Aerospace Engineering 541.)

542 Fluid Mechanics II (3) (Same as Mechanical Engineering 542 and Aerospace Engineering 542.)

551 Finite Elements for Engineering Applications (3) Computational procedures for differential equation systems in engineering and science. Approximation, boundary conditions, error extrapolation estimation, finite element implementations; comparison to linear methods. Applications in 1, 2, and 3 dimensions, non-linear, unsteady problems, coupled equation systems. Examples from diverse technical fields; fluid mechanics, heat/mass transfer, elasticity, electromagnetics, systems. Computer projects. Prereq.: Bachelor's degree in engineering or natural science. (Same as Aerospace Engineering 561 and Mechanical Engineering 571.)


553 Computational Solid Mechanics (3) Finite element techniques in structural mechanics and linear elasticity. Two and three-dimensional formulations; isoparametric elements, numerical quadrature. Equation solving, matrix iteration techniques. Applications in beams, plates and shells: use of representative computer programs in PC and networked Unix-CAD software. Prereq.: 321 Mechanics of Materials I or equivalent. (Same as Mechanical Engineering 563 and Mechanical Engineering 573.)

554 Laser Processing of Materials (3) Physics and engineering associated with laser processing of metals and composites. Physics: lasers, optics, plasmas, transformation laws, basic continuum mechanics. Applications in veins, plates and shells: use of representative computer programs in PC and networked Unix-CAD software. Prereq.: 321 Mechanics of Materials I or equivalent. (Same as Mechanical Engineering 563 and Mechanical Engineering 573.)

556 Optical Engineering I (4) Mathematical descriptio of propagation, transmission, reflection, refractive index, energy...
spectra, Kolmogorov's hypothesis, large and small eddy structure for turbulent flows; turbulent diffusion by continuity, application to turbulent jets, wakes, pipe flow, and boundary layers. Prereq: 542. (Same as Aerospace Engineering 645.)

651-52 Advanced Topics In Computational Fluid Dynamics (3,3) Modern approximation theory for non-linear Navier-Stokes systems. Algorithm construction; finite element, finite volume, accuracy, convergence, stability; smooth and non-smooth solutions; shock, stress, and combustion mechanisms. Two- and three-dimensional, compressible viscous and inviscid flows; potential, Euler and complete Navier-Stokes descriptions: turbulence closure models, reacting flows; mixed subsonic-supersonic. Computer projects, production software. Prereq: 551, 552. (Same as Aerospace Engineering 651-52 and Mechanical Engineering 661-62.)

653-54 Advanced Topics In Computational Solid Mechanics (3,3) Frame mechanics; singularity solutions; non-linear constitutive problems, variable stiffness, initial strain-stress methods, plasticity, creep; geometrically non-linear problems, large deflection, stability, shell structures, solids, solids: accuracy, convergence, adaptive grids; systems of nonlinear equations, solvers. Use of production-level finite element software. Computer projects. Prereq: 553. (Same as Aerospace Engineering 653-54 and Mechanical Engineering 663-64.)

677 Computational Mechanics Seminar (1) Current developments in computational fluid/thermal structural mechanics. For independent thesis students only. May be repeated.

671 Advanced Topics In Applied Artificial Intelligence (3) (Same as Nuclear Engineering 671 and Mechanical Engineering 671.)

681 Advanced Topics In Engineering Mechanics (3) Advanced problems in mechanics, group or individually. Prereq: Consent of instructor. May be repeated with consent of department.

### Mechanical Engineering

**NOTE:** Not all the courses listed below are available at both the UT and UTSA campuses.

**GRADUATE COURSES**


455 Introduction to Design (2) Engineering economy, optimization, design for automation, reliability, patents and product liability; design of mechanical engineering; case studies. Participation in team design effort; design report. Prereq: Dynamics and Vibrations of Machines.


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, second law and economic analysis. Prereq: 332, 344. F, Sp.


484 Introduction to Maintenance Engineering (2) (Same as Nuclear Engineering 484, Industrial Engineering 484, and Materials Science and Engineering 484.)

506 Selected Topics In Mechanical Engineering (1,4-1,4) Problems and topics related to developments and practice in mechanical engineering. Prereq: Consent of instructor.

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

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

504 Product Development Process (1) Basic elements in product development process and project management. Business and engineering internships to development and commercial manufacturing of new products. Multidisciplinary teams to explore possible new product opportunities. Prereq: Consent of Instructor. (Same as Industrial Engineering 504.)


506 Product Selection and Evaluation (2) Development of operational requirements and features for new product having potential for business venture. Market potential, design feasibility and manufacturing requirements. Design alternatives created and evaluated against set of performance parameters determined from market analysis. Preferred product concept selected by end of semester. Prereq: 504. (Same as Industrial Engineering 506.)

507 Application of Linear Algebra In Engineering Systems (3) (Same as Mechanical Engineering 507 and Electrical Engineering 507) F

508 Integrated Product, Process and Manufacturing System Design (3) (Same as Industrial Engineering 508.)

510 Project Management (1) (Same as Industrial Engineering 509.)


521-22 Thermodynamics I and II (3,3) Macroscopic thermodynamics, including First and Second Law analyses, availability, phase and chemical equilibrium criteria, combustion, gas mixtures, and property relations, determination of thermodynamic properties from molecular structure, spectroscopic data, kinetic theory, statistical mechanics, quantum physics, Schrodinger equation. Prereq: 332.

523 Special Topics In Thermodynamics (3) Application of thermodynamics to topics of current interest in mechanical engineering. Prereq: Consent of instructor.

525 Combustion and Chemically Reacting Flows I (3) Fundamentals: thermal kinetic physics and conservation equations; phenomenological approach to laminar flames; diffusion and premixed flame theory; single droplet combustion; deflagration and detonation theory; combustion waves in laminar streams; flammability limits of premixed laminar flames; introduction to turbulent flames. Prereq: 522, 541, or consent of instructor.

526 Combustion and Chemically Reacting Flows II (3) Advanced topics: phenomenological approaches to turbulent flames; fundamentals of turbulent flow application of probability density functions to turbulent flow models; transition and extinction; flamelet approach; non-premixed reacting flames; spray combustion models; fluidized bed combustion; chemically reacting boundary layers; diesel and gas turbine engines; injectors; introduction to supersonic combustion and hypersonic flows. Prereq: 525.

533 Dynamics (3) Kinematics and dynamics of particles in three dimensions. Rotating coordinate systems. Hamilton's principle. Lagrange's equations of motion. Kinematics and dynamics of rigid bodies. Prereq: Mathematics 431 or Engineering Analysis. (Same as Aerospace Engineering 533 and Mechanical Engineering 533.)

534 Mechanical Vibrations (3) Vibrations of linear, discrete, undamped and damped systems. Lagrange's equations for holonomic systems. Modal analysis. Vibrations of connected mechanical systems. Transient and post dry-out heat transfer; condensation processes; critical heat flux; forced convection boiling and post dry-out heat transfer; condensation processes; heterogeneous nucleation; dropwise and filmwise condensation; flow condensation; liquid-solid phase change; moving phase fronts; mathematical modeling. Prereq: 449, 521.

541 Fluid Mechanics I (3) Derivation of equations governing flow of inviscid and viscous fluids (conservation of mass, Newton's second law, conservation of energy). Equations of state and constitutive relations. Euler and Navier-Stokes forms and dimensionalization. Exact solutions and introduction to potential and boundary layer flows. Prereq: Fluid Mechanics. (Same as Aerospace Engineering 541 and Engineering Science 541.)

591 Selected Engineering Problems (2-4) Enrollment limited to students in programs program. Prereq: Consent of advisor. May be repeated. S/NC only.

594 Culminating Integrated Project Report (3) Final phase of product development process. Multidisciplinary teams submit and defend comprehensive project report. Report includes all engineering and business concepts needed to convince potential investors to fund proposed business venture. Prereq: Consent of instructor. (Same as Industrial Engineering 594.)

595 Seminar (1) All phases of mechanical engineering, reports on current research at UT and UT SU. May be repeated. S/NC only.

599 Special Topics in Mechanical Engineering (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

600 Doctoral Research and Dissertation (3-15) Prereq: Consent of instructor. May be repeated.

610 Advanced Topics in Fluid Mechanics and Heat Transfer (3) Advanced theory and application of fluid mechanics and heat transfer; natural convection, multi-process flow, high-speed reacting and non-reacting flows, advanced boundary layer techniques, combustion, perturbation and variational methods of analysis, heat exchanger theory and control. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. Prereq: Consent of instructor.

613 Advanced Radiation Heat Transfer (3) Radiation heat transfer in absorbing, emitting and scattering media; interaction of thermal radiation with conduction and convection heat transfer. Prereq: 511, 512.


642 Advanced Topos in Thermodynamics (3) Comparison of macroscopic and microscopic approaches to equilibrium of pure substances, metastable states. Non-equilibrium thermodynamics. Prereq: Consent of instructor.

651-52 Advanced Topics in Computational Fluid Dynamics (3,3) (Same as Engineering Science 651-52 and Aerospace Engineering 661-62.)

653-54 Advanced Topics in Computational Solid Mechanics (3,3) (Same as Engineering Science 653-54 and Aerospace Engineering 653-64.)


671 Advanced Topics in Applied Artificial Intelligence (3) (Same as Nuclear Engineering 671 and Engineering Science 671.)

686 Telerobotic Systems (3) Analysis of modern telerobotic concepts, review of current research and literature in telerobotics. Detailed comparison of telerobotic systems, robotic systems, and telerobotic systems; human-machine interfaces, control system architecture, data communications, and networking. Virtual reality-based, and internet-based systems concepts. Prereq: 568 or consent of instructor.

689 Hybrid Electric Vehicle Advanced Controls (3) Nonlinear modeling and control issues associated with HEV powertrain control and overall vehicle systems. Adaptive and optimal control schemes for vehicle performance enhancement. Review of modern automotive control hardware and software trends and practices. Prereq: 599.

Medical Biology

See College of Veterinary Medicine and Comparative and Experimental Medicine
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 in carrying out of a suitable research program and in the naming of a thesis or dissertation committee.

THE MASTER'S PROGRAM

The program leading to the M.S. is designed to provide the student with broad basic knowledge, to permit the acquisition of technical competence in the fundamentals of research and to encourage creative and independent thinking. Two to three calendar years are usually needed for the course of study that has the following requirements: (1) 30 hours including 6 thesis credits; (2) a 3.0 GPA in all courses taken for graduate credit after 12 hours of credit have been earned in courses graded on the A-F system; (3) a 3.0 GPA in courses taken in the department; (4) a complete course sequence in biochemistry or molecular biology; (5) 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 or four years to complete the degree. Departmental requirements are: (1) a 3.0 GPA in all courses taken for graduate credit after 12 hours of credit have been earned in courses graded on the A-F scale; (2) a 3.0 GPA in courses taken in the department; (3) satisfactory performance in at least one semester as a teaching assistant; (4) one semester of physical chemistry; (5) one course in statistics; (6) two 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 in medically important areas of microbiology: microorganisms, pathogenesis and immunology. Prereq: Introduction to Microbiology. Lab, 430. Coreq: 420. Sp

430 Immunology (3) Principles of inflammation and immunity; immunoglobulin structure and theories of formation and diversity; complement, hypersensitivities, cell cooperation and recognition in immune mechanisms; soluble factors. Prereq: General Genetics. F


470 Microbial Ecology (3) Physiological 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/NC only. E

575 Applied Microbiology and Bioengineering (3) SAME AS Chemical Engineering 575, Environmental Engineering 575, and Biosystems Engineering 575.

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

592 Off-Campus Study (1-15) See College of Arts and Sciences.

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

595 General Seminar (1) Lectures and seminars by invited speakers, faculty, and graduate students. May be repeated. Maximum 3 hrs. S/NC 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/NC only. E

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/NC only. E

602 Journal Club in Microbial Pathogenesis (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/NC only. E

603 Journal Club in Immunology (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/NC only. E

604 Journal Club in Virology (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/NC only. E

605 Journal Club in Microbial Genetics (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/NC only. E

610 Topics in Microbial Physiology (1-3) Prereq: 410 or consent of instructor. May be repeated. Maximum 12 hrs.

620 Topics in Microbial Pathogenesis (1-3) Prereq: 420, 430 or consent of instructor. May be repeated. Maximum 12 hrs.

630 Topics in Immunology (1-3) Prereq: 430 or consent of instructor. May be repeated. Maximum 12 hrs.

640 Topics in Virology (1-3) Prereq: 440 or consent of instructor. May be repeated. Maximum 12 hrs.

650 Topics in Microbial and Molecular Genetics (1-3) Prereq: 411 or consent of instructor. May be repeated. Maximum 12 hrs.

670 Advanced Topics in Environmental Microbiology (1-3) Prereq: 570 or consent of instructor. May be repeated. Maximum 12 hrs.

Microbiology-Veterinary Medicine

See College of Veterinary Medicine and Comparative and Experimental Medicine

Modern Foreign Languages and Literatures

(Majors of Arts and Sciences)

MAJORS

French ............................................. M.A.
German .......................................... M.A.
Spanish .......................................... M.A.
Modern Foreign Languages .................. Ph.D.

Carolyn R. Hodges, Head

Professors:

Barrette, Paul E., Ph.D. ......................... California
Brady, Patrick (Shumway Chair of Excellence), D.U.P .......... Sorbonne
Campion, Edmund J., Ph.D. ................. Yale
Cobb, Carl W. (Emeritus), Ph.D. .......... Tulane
Elliot, Jacqueline C. (Emerita), M.A. ...... Illinois
Falen, James E. (Emeritus), Ph.D. .... Pulitzer
Fiere, Donald M. (Emeritus), Ph.D. ...... Indiana
Hendelman, Michael H., Ph.D. .......... Florida
Hellin, William H., Ph.D. ................. Florida State
Hedges, Carolyn R., Ph.D. ................. Chicago
Irving, Thomas B. (Emeritus), Ph.D. .... Princeton
Kratz, Henry (Emeritus), Ph.D. .......... Ohio State
Levy, Karen D., Ph.D. ......................... Kentucky
Maurino, Ferdinando D. (Emeritus), Ph.D. Columbia
Meillon, C. J., Ph.D. ......................... Chicago
Osborne, J. C. (Emeritus), Ph.D. ........ Northwestern
Pinsky, Clara (Emerita), Ph.D. .......... California
Ritzenthaler, Ursula C. (Emerita) ......... California
Rivera-Rodas, Oscar, Ph.D. .............. California
Romeiser, John B. (Liaison), Ph.D. ...... Vanderbilt
Vazquez-Bigl, A. M. (Emerita), Ph.D. .... Minnesota
Wallace, Albert H. (Emeritus), Ph.D. ... North Carolina
Washburn, Yulan M., Ph.D. ............... North Carolina

Associate Professors:

Beauvais, Margaret, Ph.D. .................... Texas
Brizzo-Skow, Flavia, Ph.D. ............... Washington
Cree, Bryant, Ph.D. ......................... California
DiMaria, Salvatore, Ph.D. ............... Wisconsin
Helmkund, Christine, Ph.D. .............. Wisconsin
LaCure, Jon, Ph.D. ........................... Indiana
Lauckner, Nancy A. (Liaison), Ph.D. ... Wisconsin
Lee, David E., Ph.D. .......................... Stanford
Nakuma, Constancio, Ph.D. ......... Sorbonne
Pervukhina, Natalia K., Ph.D. .......... Bryn Mawr
Young, Dolly, Ph.D. ......................... Texas

Assistant Professors:

Ayo, Alvaro A., Ph.D. ........................ Arizona
Blackwell, Stephen H., Ph.D. ............ Indiana
Cruz-Gamara, Nuria, Ph.D. .......... SUNY (Buffalo)
Essif, Les, Ph.D. ............................. Brown
Hoeng, Peter, Ph.D. ......................... Wisconsin
Kaplan, Gregory, Ph.D. ................. Pennsylvania
Maxim, Shod H., Ph.D. ..................... Texas
McAlpin, Mary K., Ph.D. ................. Columbia
Mehsori-Soulanne, Ph.D. ................. McGill
Silva-Filho, Eudice, Ph.D. ................. North Carolina

Modern Foreign Languages and Literatures

Phone: (502)938-7921
THE DEPARTMENT OF MODERN FOREIGN LANGUAGES AND LITERATURES OFFERS GRADUATE PROGRAMS LEADING TO THE MASTER OF ARTS DEGREE WITH MAJORS IN FRENCH, GERMAN AND SPANISH, AND THE DOCTOR OF PHILOSOPHY DEGREE WITH A MAJOR IN MODERN FOREIGN LANGUAGES. INQUIRIES SHOULD BE ADDRESSED TO THE HEAD OF THE DEPARTMENT.

THE MASTER’S PROGRAMS

French

Thesis Option:
1. Completion of a minimum of 24 semester hours in coursework plus at least 6 hours in course 500 Thesis. French 501 is required. A maximum of 6 hours may be taken at the 400 level, the rest at the 500 level, including French 501. Under certain conditions, the student may take 600-level seminars. If the student chooses to have a minor (such as Italian or Portuguese), at least 24 hours (including 6 hours of thesis) must be taken in the major, 6 in the minor.
2. A thesis, with a minimum of 6 semester hours in course 500.
3. A written examination covering the coursework and selected items from a master reading list.
4. A final oral examination covering the thesis.

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 French 501. Under certain conditions, the student may take 600-level seminars. If the student chooses to have a minor (such as Italian or Portuguese), at least 24 hours must be taken in the major, 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.

German

Thesis Option: The minimum requirements are 24 semester hours of coursework and 6 hours of Thesis 500. German 510 and 519-20 are required, as are three courses on German literature or culture, one of which may be at the 400 level. In addition, students must take three further courses, only one of which may be chosen from 411-12 or 485. All graduate teaching assistants should take 512, and other candidates may take 512 or any other 600-level course. A maximum of three 400-level courses may be counted toward the 30 semester hours of coursework. A common written exam over the designated reading list is required, as is a standardized language exam, such as the Zentrale Mittelstufenprüfung. Each non-thesis M.A. candidate will have a committee of three faculty members in German to whom the student will submit a dossier consisting of the seminar paper and one paper previously submitted in a graduate course. The length and type of the papers is described in greater detail in the Manual for Graduate Students in German.

Spanish

Thesis Option:
1. Completion of a minimum of 24 semester hours in coursework plus at least 6 hours in course 500 Thesis. Spanish 550 is required. A maximum of 6 hours may be taken at the 400 level, the rest at the 500 level, and under certain conditions the student may take 600-level seminars. If the student chooses to have a minor (such as Italian or Portuguese), at least 24 hours (including 6 hours of thesis) must be taken in the major, 6 in the minor.
2. A thesis, with a minimum of 6 semester hours in course 500.
3. A written examination covering the coursework and selected items from a master reading list.
4. A final oral examination covering the thesis.

Non-Thesis Option:
1. Completion of at least 30 semester hours, with a maximum of 6 at the 400 level, the rest at the 500 level, including Spanish 550. Under certain conditions, the student may take 600-level seminars. If the student chooses to have a minor (such as Italian or Portuguese), at least 24 hours must be taken in the major, 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.

THE DOCTORAL PROGRAM

The Ph.D. in Modern Foreign Languages requires advanced training in a major language and either a second language or applied linguistics.

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.

For candidates with French or Spanish as a first concentration, two tracks are available:

The coursework for Track I must be distributed as follows: at least 39 hours in the first concentration; at least 18 hours in the second concentration; and at least 6 hours in a cognate field or in either the first or second concentration approved by the student’s graduate committee.

The coursework for Track II must be distributed in this way: at least 45 hours in the first concentration; at least 12 hours in the second concentration; and at least 6 hours in a cognate field or in either the first or second concentration as approved by the student’s graduate committee. Because Track II students will have taken 12 graduate hours instead of 18 hours in the second concentration, they will normally not be eligible to teach that field at institutions which follow SACS guidelines for college foreign language teaching.

The coursework for all concentrations must be distributed as follows:

1. First Concentration: German. A minimum of 30 hours of German courses beyond the bachelor’s degree, distributed as follows:
   - 400 level: A maximum of 6 hours of 400-level classes taken for the M.A. may be applied.
   - 500 level: A minimum of 21 hours must be taken. These must include German 512, 519, 520, and 560. Thesis hours are excluded. If 512 is used as part of a second concentration in applied linguistics, another course must be substituted in the first concentration.
   - 600 level: A minimum of 12 hours must be taken, exclusive of dissertation hours.

2. Second Concentration: French or Spanish. A minimum of either 39 (Track I) or 45 (Track II) hours of French or Spanish courses beyond the bachelor’s degree, distributed as follows:
   - 400 level: A maximum of 6 hours of 400-level classes taken for the M.A. may be applied.
   - 500 level: A minimum of 21 (Track I) or 27 (Track II) hours must be taken. These must include French 512, 519, 584 or Spanish 512 and 550. Thesis hours are excluded. If 512 is used as part of a second concentration in applied linguistics, another course must be substituted in the first concentration.
   - 600 level: A minimum of 12 hours must be taken, exclusive of dissertation hours.

For candidates with French or Spanish as a second concentration, two tracks are available:

1. First Concentration: French or Spanish. A minimum of 39 (Track I) or 45 (Track II) hours of French or Spanish courses beyond the bachelor's degree, taken in the field of applied linguistics, another course must be substituted in the first concentration.
2. Second Concentration: French or German. A minimum of 18 (German or Track I) or 12 (Track II) hours beyond the bachelor's degree, taken in the field of applied linguistics or in a second language, either French, German, Italian, Portuguese (Track II only), Russian or Spanish. For Track I and German, 12 of these hours must be at the 500 level or above. For Track II, 3 of these hours must be at the 500 level or above.

French students choosing applied linguistics must take French 421 or 429; 425; 512; and 9 (Track I) or 3 (Track II) hours of appropriate electives in English or French.

German students choosing applied linguistics must take German 425, 435, 510, or 512; 3 hours of German linguistics, such as 426, 436, 631, or 632, and 6 hours of linguistics...
Languages is available to residents of the United States. The Ph.D. program in Modern Foreign Languages is available to residents of some states to enroll in certain graduate programs at UT on an in-state tuition basis.

The Ph.D. program in Modern Foreign Languages at UT is designed for students who wish to pursue advanced study and research in the field of modern languages and literatures. The program offers opportunities for students to specialize in a particular language or language group, and to develop research skills in areas such as linguistics, literature, and cultural studies.

**Asian Languages**

<table>
<thead>
<tr>
<th>GRADUATE COURSES</th>
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<tbody>
<tr>
<td>431 Readings in Chinese Literature (3) Prereq: Mastery of intermediate-level Chinese or consent of instructor. May be repeated. Maximum 9 hrs.</td>
</tr>
<tr>
<td>451 Readings in Japanese Literature (3) Prereq: Mastery of intermediate-level Japanese or consent of instructor. May be repeated. Maximum 9 hrs.</td>
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**French**

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<tr>
<th>GRADUATE COURSES</th>
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<tbody>
<tr>
<td>411 French Literature of the 16th Century (3) Highlights of 16th-century French literature. Excerpts from Rabelais and Montaigne; readings from writers from Lyons and members of the Pleiade. Prereq: 300-level literature course.</td>
</tr>
<tr>
<td>413 French Literature of the 18th Century (3) Major works of Enlightenment. Prereq: 300-level literature course.</td>
</tr>
<tr>
<td>416 Survey of Francophone Literature (3) Examination of French literature outside metropolitan France, particularly Africa and Caribbean. Prereq: 300-level literature course.</td>
</tr>
<tr>
<td>420 French Cinema (3) French cinema from earliest days through New Wave directors. Prereq: 300-level literature course. May apply toward major.</td>
</tr>
<tr>
<td>421 Phonetics (3) Foundation in science of phonetics. Practical exercises and individual performance. Graduate credit not offered to students majoring in Romance language. Prereq: Intermediate Composition and Conversation or equivalent.</td>
</tr>
<tr>
<td>422 Advanced Grammar (3) Improving one's written and oral proficiency in French. Prereq: Intermediate Composition and Conversation or French for Business.</td>
</tr>
</tbody>
</table>

**Graduate Teaching Assistants with a second concentration**

Students choosing applied linguistics as a second concentration are strongly urged to take their cognate work in a second language. With the consent of the student's graduate committee, the 6 hours in the cognate field may be substituted by 6 hours in either the first or second concentration.

**Additional requirements**: For any languages taken as a first or second concentration, a student must demonstrate competence by taking a test. The test will include reading, writing, listening, and speaking, and should be completed by the time the student reaches 40 hours of study beyond the bachelor's degree. Standardized examinations that may be used for this purpose include applicable portions of either the National Teachers Examination, the MLA Examination for Teachers and Advanced Study, Students, or the proficiency standards of the United States Foreign Service Institute (FSI). For students choosing applied linguistics as an area of second concentration, reading competence in a second language is required. Competence will be determined by translation of a text from the foreign language into English, the text to be administered by the department.

A comprehensive examination on the language and literature of the first and second concentrations must be passed before the student may be admitted to candidacy. The candidate is required to defend his/her dissertation in an oral examination. Central emphasis is put on the doctoral dissertation as a final test of the candidate's scholarly qualifications.

Graduate Teaching Assistants with a second concentration in another language should have the opportunity and will be strongly encouraged to instruct in the languages of both their first and second concentration, subject to staffing needs.

Doctoral students are strongly encouraged to reside and study abroad and will be assisted in identifying potential sources of financial support (e.g., Fulbright, Fulbright-Rotary fellowships).

**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 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 Student Services.
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. No credit for students having completed 101-02 or 107. 332 may be repeated. Maximum 6 hrs. Undergraduate credit only.

411-12 Advanced Conversation and Composition (3,3) Prereq: 311-12 or equivalent or consent of department.

415 Special Topics (3) Topics vary. May be repeated. Maximum 6 hrs.

420 Selected Topics in German Literature from 1750 to the Present (2) Prereq: 6 hrs of 300-level courses (excluding 331-32 and courses in English translation) or equivalent.

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, and Linguistics 425.)

426 Methods of Historical Linguistics (3) Phonetics, distinctive feature analysis, sound change types, nature of sound change, principles of reconstruction, and fundamental assumptions about language change through time. Survey of non-phonological linguistic language families, Proto-Indo-European, and other proto languages. Prereq: 6 hrs of upper division foreign language courses (excluding courses in translation and graduate reading courses). (Same as French 426, Spanish 426, and Linguistics 426.)

435 Structure of the German Language (3) Contrastive English-German segmental and supersegmental phonemes, contrastive English-German linguistic structures, selected topics in advanced German grammar and syntactic analysis. Prereq: 6 hrs of upper division German language courses (excluding courses in translation and graduate reading courses). (Same as Linguistics 435.)

436 History of the German Language (3) Development of German language from Indo-European through Proto-Germanic, Old High German, Middle High German, Intermediate and external linguistic history of German speech. Prereq: 6 hrs of upper division German language courses (excluding courses in translation or graduate reading courses). (Same as Linguistics 436.)

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 Literature of the Rinascimento (3) From Pulci to Tasso, Quattrocento 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 1930 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 1930. Films 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.

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

502 Off-Campus Study (1-15) See College of Arts and Sciences.

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

Portuguese

GRADUATE COURSES

400 Portuguese for Speakers of Another Romance Language (3) Accelerated class for beginning students of Portuguese with strong background in another Romance language. Introduction to grammar, reading and culture of Portugal and Brazil. Prereq: 3 hours at 300-level in another Romance language or equivalent.

431-32 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.

Russian

GRADUATE COURSES

401-02 Advanced Grammar, Conversation, and Composition (3,3) Prereq: Russian Composition and Conversation or equivalent. (Same as Russian and East European Studies 401-02.)

430 Selected Topics in Russian Literature (3) Content varies. May be repeated. Maximum 9 hrs.

451-52 Senior Seminar (3,3) For majors in Russian; minors admitted at discretion of instructor. Intensive study of language, literary style, and literary criticism based on selected major novels. (Same as Russian and East European Studies 451.)

510 Russian Phonetics and Advanced Grammar (3) Phonetics, pronunciation, stylistics, and selected topics in Russian grammar. For teachers and prospective teachers. Prereq: Consent of instructor.

550 Studies in Russian Literature (3) Content varies. May be repeated. Maximum 9 hrs.

591 Foreign 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 and Translation (3) Structure of grammatical system of Spanish. In-depth analysis of sentence structure with emphasis on written and oral communication. Techniques for improving pronunciation and vocabulary. Techniques for creating and using graded reading material. Application of methods and strategies for teaching Spanish. Prereq: 421 or consent of instructor.

423 Advanced Composition and Conversation (3) Developmental sequence in the development of effective speaking skills at advanced level, wide range of topics and situations. Variety of in-class and extra-class activities. Not available for credit for students whose level of proficiency in Spanish is superior as defined by the ACTFL Proficiency Guidelines or for graduate students in the Spanish M.A. or Ph.D. programs. Prereq: 323 Intermediate Composition and Grammar.

425 Introduction to Descriptive Linguistics (3) (Same as French 425, German 425, and Linguistics 425.)

426 Methods of Historical Linguistics (3) (Same as German 426, French 426, and Linguistics 426.)

429 Romance Linguistics (3) (Same as French 429 and Linguistics 429.)

430 Topics in Hispanic Linguistics (3) Spanish language through different areas of linguistic: phonology, morphology, syntax, semantics, sociolinguistics, dialectology and second language acquisition. Prereq: 323 Intermediate Composition and Grammar, 332 Survey of Spanish Literature: 1700-1930, 333 Survey of Spanish American Literature: 1700-1930 and completion of an additional 9 hours of upper division Spanish. May be repeated. Maximum 6 hrs with consent of department. (Same as Linguistics 430.)

433 Images of Woman in Hispanic Literature (3) Major Hispanic texts (and/or women authors) in light of relation of female in individual and collective role of society, context, role of women in society, patriarchal tradition, woman as cultural and aesthetic value ("the feminine symbolic"); and feminist theoretical issues. Prereq: 323 Intermediate Composition and Grammar, 330 Textual Analysis and completion of 9 additional hours of upper division Spanish.

434 Hispanic Culture through Film (3) Analysis of selected films on subjects concerning life, culture, and artistic traditions in the Hispanic world; exploration of ideological, philosophical, social, and political implications of films and comparison of them with treatments of related subjects in Spanish literature, political, cultural, and social contexts. Taught in English. Graduate credit available only for Latin American Studies and Cinema Studies majors. 1 hr lecture, 2 hrs screening, and 1 hr discussion. (Same as Latin American Studies 443 and Cinema Studies 445.)


480 Social Forces in Hispanic Literary Expression (3) Analysis of major Hispanic texts that address factors and events that influenced and/or contributed to the social and cultural evolution of Hispanic world, including literature itself. Prereq: 323 Intermediate Composition and Grammar, 332 Survey of Spanish Literature: 1700-1930 and completion of 9 additional hours of upper division Spanish. May be repeated. Maximum 6 hrs with consent of department.

482 Trends in Hispanic Thought (3) Intellectual and philosophical currents represented in literary works, fine art, and mass media. May be repeated. Maximum 6 hrs with consent of department.

484 Race, Ethnicity, and Nation in Hispanic Literature (3) Close reading and analysis of literary texts that deal with social, ethnic, and cultural issues, and their relationship with regard to identity and concepts of nationhood. Topics: mestizaje; conceptual distinctions between race and ethnicity in Latin America; indigenous; acriticism; issues of monopoly and empire; relationships between Jews, Christians, and Moors in Spain. Prereq: 323 Intermediate Composition and Grammar, 332 Survey of Spanish Literature: 1700-1930 and completion of 9 additional hours of upper division Spanish. May be repeated. Maximum 6 hrs with consent of department.

486 Literature and Artistic Movements in the Hispanic World (3) Relationships (thematic, cultural, socio-political, aesthetic, philosophical, etc.) between specific trends in literature and other artistic media, and the historical contexts in which those relationships emerged. Prereq: 323 Intermediate Composition and Grammar, 332 Survey of Spanish Literature: 1700-1930 and completion of 9 additional hours of upper division Spanish. May be repeated. Maximum 6 hrs with consent of department.

489 Topics in Hispanic Civilization (3) Analysis of major trends, issues and movements in the civilizations of Spain and Latin America, and their impact on the modern world. May be repeated. Maximum 6 hrs with consent of department.

500 Thesis (1-15) PrN P only. E

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester or quarter, but who does not use a study facility, and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/N/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. Required of all M.A. and Ph.D. students holding Graduate Teaching Assistantships, except those whose previous training or experience warrant their being excused by department.

531 Old Spanish (3) Evolution of Spanish language from its origins through 15th century.

532 Medieval Spanish Literature (3) Literary works of 11th through 15th century. Application of literary theories to understanding of literature, nature and evolution of major literary genres during Spanish Middle Ages, and socio-historical contexts of medieval works. May be repeated. Maximum 6 hrs with consent of department.

533 Golden Age Prose (3) Wide range of prose fiction in Spain during 16th and 17th centuries: Moresco, picarosnuevo, sentimental, pastoral and exemplary novel, and dialogues.

534 Don Quijote (3) Cervantes' masterpiece in sociocultural and literary context of its times: study of thematic, structural, and stylistic issues: crisis of aristocratic "quixotic" madness; dimensions of "derracient" cognitive and ethical perspectives, satiric irony, culture of sentiment, and Cervantes' legacy to subsequent literary traditions. Content varies. May be repeated. Maximum 6 hrs with consent of department.

535 Golden Age Poetry (3) Garcilaso, Fray Luis de Leon, San Juan de la Cruz, Lope de Vega, Quevedo, and Góngora.

537 Golden Age Drama (3) Major dramatists of period: Lope de Vega, Tirso de Molina, Ruiz de Alarcón, Guillén de Castro, Calderón de la Barca, Moreto, and Rojas Zorrilla.


541 19th-Century Spanish Prose (3) Cosmopolitanism, Realism, and naturalism in a novel, short story, and essay as represented in: authors such as Benito Uran, Zorrilla, Espronceda, and others.

542 20th-Century Spanish Literature: Generation of '98 through Civil War (3) Principal achievements and representative directions in literature of Spain from Civil War years.

543 20th-Century Spanish Literature: Post-Civil War through Present (3) Principal achievements and representative directions in literature of Spain from Post-Civil War period to present.

550 Techniques of Literary Analysis and Research Methods (3) Theoretical and critical essays on various techniques of literary analysis. Exploration of bibliographical and research materials.

551 Special Topics in 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 analysis of selected works from Colonial Spanish American period and their Continental sources. Indigenous and colonial authors. May be repeated. Maximum 6 hrs with consent of department.


572 Spanish American Narrative: Boom to Present (3) Critical study of major trends and movements that established Spanish American narrative during first half of 20th century. Content varies. May be repeated. Maximum 6 hrs with consent of department.

573 Regional Approaches to Interpreting Spanish American Narrative (3) Interpretation of Spanish American literature taking into consideration regional differences attributable to such factors as race, geography, immigration, and economic development. Key regions include Mexico and Central America, Caribbean, Andean countries, and the Southern Cone. Course readings vary between specific regional perspectives and transregional ones. May be repeated. Maximum 6 hrs with consent of department.

575 Spanish American Modernismo and Vanguardismo (3) Critical study of principal writers and literary works associated with Spanish American modernismo and vanguardismo published between 1880 and 1950. Concepts and expressions of modernity as
The concentration in music education is designed for persons who hold a Bachelor's degree in Music or Music Education and certification to teach music in the public schools. Both thesis and non-thesis options are available.

Music Education

GRADUATE COURSES

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 research techniques to analysis of existing research literature in music education. Prereq: Consent of instructor.

550 Curriculum Development and Evaluation in Music Education (3) Principles of curriculum development and evaluation applied to music education programs. Formulating objectives; construction of evaluation instruments; survey of appropriate literature. Prereq: Consent of instructor.


570 Studies in Multicultural Music Education (3) Study of music literature, art, and customs of various cultures appropriate for students in K-6. Strategies and techniques for teaching music at this level.

571 Musical Repertoire Laboratory (1) Performance of music from various cultures; production of musically appropriate for students in grades K-8. Singing, dancing, acting, and costumes, set design, traditional and non-traditional instrumental ensembles. Limited to students majoring or concentrating in art, dance, or theatre. Prereq or coreq 570. May be repeated. Maximum 2 hrs.


575 Professional Internship in Teaching (1-8) Teaching and training-related experiences in professional settings in public schools. Enrollment limited to post-baccalaureate students in professional year program. Prereq: Admission to Teacher Education program and consent of School of Music. May be repeated. Maximum 12 hrs. S/NC only. F, Sp.

580 Seminar in Music Education (3) Class investigation and individual reporting of pertinent topics and issues in music education. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

590 Special Topics in Music Education (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

591 Clinical Studies (4) Group and individual seminar activities during full-time internship. Application and evaluation of professional core competencies. Compilation and presentation of portfolio and analysis of teaching project. Coreq: 575.

593 Special Problems in Music Education (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

Music Ensemble

GRADUATE COURSES

502 Jazz-Saxophone Ensemble (1) May be repeated. Maximum 4 hrs.

503 Small Jazz Ensemble (1) May be repeated. Maximum 12 hrs.
504 Jazz Ensemble (1) May be repeated.
505 Studio Orchestra (1) May be repeated. Maximum 12 hrs.
506 Trombone Choir (1) May be repeated.
510 Percussion Ensemble (1) May be repeated.
511 Marimba Choir (1) May be repeated.
515 Chamber Music Ensemble (1) May be repeated. Maximum 12 hrs.
520 UT Singers (1) May be repeated.
530 Chamber Singers (1) May be repeated.
540 Opera Theatre (1) May be repeated.
550 Concert Band (1) May be repeated.
552 Symphonic Band (1) May be repeated. Maximum 12 hrs.
553 Wind Ensemble (1) May be repeated. Maximum 12 hrs.
554 Varsity Band (1) May be repeated.
559 Marching Band (1) May be repeated.
560 Symphony Orchestra (1) May be repeated.
569 Women’s Chorale (1) May be repeated.
599 Accompanying (1) May be repeated.

Music General
GRADUATE COURSES
500 Thesis [1-6] P/NP only. E
501 Graduate Recital (2) E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
510 Music Bibliography (3) Bibliographic methodology in music. F
511 Lecture Recital (2) E
520 Musical Styles (3) Elements of design and their role in definition of musical styles. Prereq: Consent of instructor.
521 Special Topics in Performance (1-3) Prereq: Consent of department head. E
540 Secondary Applied Music (1) May be taken by music majors desiring applied study on a 2nd or 3rd instrument. May be repeated for a maximum of 4 hours credit on each instrument. Admission by audition. Requires payment of Applied Music fee. E

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.
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.

Music Jazz
GRADUATE COURSES
410 Advanced Improvisation (3) Further development of individual skills and solving individual problems in jazz improvisation. Prereq: 210 and 220.
420 Jazz Pedagogy (1) Methods and materials relating to teaching of jazz, designing and administering jazz programs, and rehearsal techniques for jazz ensembles. Prereq: Studio music and jazz major or consent of instructor.
520 Seminar in Jazz (3) Topic varies.
Music Technology

GRADUATE COURSES

540 Computer Music Transcription (3) Projects in notation, playback, and publication of music incorporating elements of word processing, graphic design, sequencing, and page layout. Study of MIDI protocol as applied to computer music work station design. No credit toward M.M. concentration in Music Technology with technology emphasis. Prereq: Consent of instructor.

550 Computer Projects (3) High-level programming languages used to design and implement computer-managed instruction; Internet development tools; writing of documentation for computer projects. Prereq: 540 or equivalent.

560 Technology in Music Research (3) Use of technology for research projects in music analysis or pedagogy; development and execution of research project. Prereq: 550.

Music Theory

GRADUATE COURSES

430-40 Counterpoint III (1-3) 430-Study of species counterpoint in modal and tonal styles, works of Palestrina and J.S. Bach. 430-40 - Prereq: 210 Theory III and 230 Advanced Ear Training IV with grade C or higher. 440 - Prereq: 430 with grade C or higher.

450 Choral Arranging (2) Analysis of scores and vocal/choral techniques for various age groups through high school, college, and church choir, non-vocal musical activities appropriate to various age groups as used in church music programs (e.g., Orff, handbells, rhythm activities, etc.).

510 Vocal Literature Seminar (3) Topics vary. May be repeated. Maximum 8 hrs.

520 Performance Techniques for Singers (1) Improvisation, movement, and basic techniques for dramatic vocal performance. Prereq: Vocal major or consent of instructor. May be repeated for credit. Maximum 2 hrs.

530 Opera Performance (2) Prereq: Consent of instructor. May be repeated. Maximum 4 hrs.

540 Opera Production (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

550-60 Advanced Vocal Pedagogy I, II (2,2) 550-Study of vocal production, examination of different methods. 560-Study of teaching materials, observation of studio teaching, analysis of vocal problems in selected students, and supervised teaching.

570 Vocal Chamber Music Performance (2) Prereq: Consent of instructor.

580-85 Choral Literature I, II (2,2) Choral music from middle ages to present with consideration of historical development of major choral genres.

590 Advanced Choral Conducting (3) Expansions and continued refinement of conducting techniques; development of choral rehearsal skills. Prereq: Consent of instructor.

594 Project in Choral Conducting Performance (1-3) 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

DEGREES

Nuclear Engineering .......................... M.S., Ph.D.

H. L. Dodds, Head

Professors:

Dodds, H. L., PE, Ph.D. .................... Tennessee
Mihalczko, J. T., Ph.D. .................... Tennessee
Miller, L. F., PE, Ph.D. .................... Texas A&M
Mynatt, F., Ph.D. ......................... Tennessee
Shannon, T. E., Ph.D. ..................... Tennessee

Uhrig, R. E. (Distinguished Prof.), PE, Ph.D. ................................ Iowa State
Upadhyaya, B. R., PE, Ph.D. ................ California

Associate Professors:

Groer, P. G., Ph.D. .......................... Vienna
Hines, J. W., Ph.D. .......................... Ohio State
Pevey, R. E., PE, Ph.D. .................... Tennessee
Ruggles, A. E., Ph.D. ...................... Rensselaer
Scott, T. H., PE, Ph.D. ..................... Florida
Townsend, L. W., Ph.D. .................... Idaho

The Department of Nuclear Engineering offers programs leading to the Master of Science and Doctor of Philosophy degrees. Students may elect a traditional nuclear engineering M.S. or Ph.D. program (focusing on fission energy or fusion energy) or a radiological engineering concentration at the master's level.

The radiological engineering concentration prepares students for careers in the radiation safety field (health physics). The program is designed for graduates of undergraduate programs in engineering, physics, biology and chemistry.

All entering students must have, as a minimum competency in mathematics through ordinary differential equations, competency in atomic and nuclear physics, and competency consistent with a course in introductory nuclear engineering. If these competencies do not exist, the student must take appropriate courses for undergraduate credit. The department head is the contact for all interested students, both those with nuclear engineering degrees and those from other disciplines.

THE MASTER'S PROGRAM

A graduate program leading to the Master of Science is available to graduates of recognized undergraduate curricula in engineering and physics. Each applicant will be advised as to the necessary prerequisite courses before he/she enters the program. The student must complete 24 semester hours of coursework approved by the student's advisory committee that includes the following:

1. A major consisting of a minimum of 12 semester hours of graduate courses in nuclear engineering. This must include at least one of the following sequences: 511, 512; 551, 552; 571, 572.

2. A minor of 6 semester hours of elective courses in mathematics, statistics or computer science.

3. Six semester hours in either nuclear engineering or a related field.

The M.S. candidate must also demonstrate research or design capability. This requirement may be satisfied by a thesis project or engineering practice projects as described below:

Thesis: The student performs independent research on a topic approved by the graduate committee. He/she submits a thesis on this research. The student then must pass an oral examination on the thesis and all graduate coursework. The student must enroll for six semester hours of NE 500 (Thesis).

Engineering Practice: The student performs independent research on two to four separate topics approved by his/her
graduate committee. Each project is similar to a thesis project but smaller in scope. He/She submits a report, in thesis format, on each project. The student must then pass an oral examination on his/her engineering practice reports and all graduate coursework. The student must enroll for six semester hours of NE 598 (Nuclear Engineering Practice).

**THE DOCTORAL PROGRAM**

Students in the field of nuclear engineering desiring to study for the Doctor of Philosophy must have a Bachelor of Science or Master of Science from a recognized university, with a major in engineering or physics. All candidates will be required to demonstrate general competence in a comprehensive examination in the areas of engineering science, mathematics, physics, and nuclear engineering.

Specific course requirements for the Ph.D. in Nuclear Engineering include:

1. A minimum of 48 semester hours beyond the Bachelor's degree, exclusive of credit for the M.S. thesis or Nuclear Engineering Practice.
2. A minimum of 24 semester hours in doctoral research, NE 600.
3. A minimum of 30 semester hours in nuclear engineering courses numbered 500 and above (or the equivalent), with at least 9 semester hours of 600-level courses. These are exclusive of thesis or dissertation credit.
4. A minimum of 12 semester hours in mathematics, computer science, or statistics courses beyond nuclear engineering undergraduate requirements numbered 400 or above.
5. A minimum of 6 semester hours in courses numbered 500 or above from a department other than nuclear engineering. The choice depends on the student's overall program and should expand his/her knowledge in a given field.
6. A reading knowledge of one foreign language may be specified by the student's doctoral committee.

The comprehensive examination is prepared by the nuclear engineering faculty and consists of 12 hours of written examinations. All past examinations are filed in the library, and students are encouraged to review them. Students are invited to take the comprehensive examination after completing approximately 30 semester hours of coursework. A student who fails the written part of the examination must take and pass the examination the next time it is offered to remain in the Ph.D. program. Registration for NE 600 is not permitted until the written examination is passed. The comprehensive examination is completed with a successful oral defense of the dissertation proposal. A candidate must successfully defend, in an oral examination, all work presented for the degree—all coursework and the dissertation.

**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 on an in-state tuition basis. The M.S. program in Nuclear Engineering is available to residents of the state of Mississippi. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Student Services.

**GRADUATE CREDIT FOR UNDERGRADUATE COURSES**

400-level courses in nuclear engineering may be used for graduate credit. However, students must meet 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 and Radiological Engineering Laboratory II (3) Cross section measurements, diffusion properties of neutron shielding, dynamics and controls, alpha and beta spectroscopy, radiation fields and dosimetry. Prereq: Nuclear and Radiological Engineering Laboratory.

404 Nuclear Fuel Cycle (3) Mining, milling, fabrication, in-core management, reprocessing, waste disposal, regulatory and radiation health issues and requirements. Prereq: 470 or equivalent.

406 Radiation Shielding (3) Types of radiation sources, fundamentals of gamma ray and neutron attenuation, biological effects, approximate methods of shield design, discrete ordinates, and Monte Carlo. Prereq: Physics 232.

421 Introduction to Nuclear Criticality Safety (3) Fundamentals of nuclear criticality safety; criticality accidents; safety standards; overview of experiments, computational methods and applications. Prereq: 301 Fundamentals of Nuclear/Radiological 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.

470 Nuclear Reactor Theory I (3) Fundamentals of reactor physics relative to cross sections, kinematics of elastic scattering, reactor kinetics, reactor systems and nuclear data, and numerical methods applicable to general criticality problems; eigenvalue searches, perturbation theory, and multigroup diffusion equations. Prereq: 501 Fundamentals of Nuclear/Radiological Engineering.

471 Nuclear Reactor Theory II (3) Thermal spectrum computational methods; heterogeneous effects in fast and thermal spectra; considerations in reactor core design; equations and approximations; neutronic and thermal and neutronic variables; power distribution calculations and reactivity control methods. Prereq: 470.

483 Introduction to Reliability Engineering (3) Probabilistic failure models, parameter estimation (maximum likelihood, Bayes techniques), model identification and comparison, accelerated life tests, failure prediction, system reliability, preventive maintenance and warranties. Prereq: Senior standing or consent of instructor.

484 Introduction to Maintenance Engineering (3) Principles of maintenance and reliability engineering, and maintenance management. Information extraction from machinery measurements, rotating machinery diagnostics, nondestructive testing, life prediction, failure models, lubrication oil analysis, establishing predictive maintenance programs, and computerized maintenance management systems. Prereq: Senior standing in engineering and consent of instructor. (Same as Mechanical Engineering 484.Industrial Engineering 481. Mechanical Engineering 484.)

494 Special Topics in Nuclear Engineering (3) Problems related to recent developments and practice. Prereq: Senior standing and consent of instructor. May be repeated. Maximum 12 hrs.

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 is using 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

511-12 Transport Processes in Nuclear Engineering (3.3) Theory of transport phenomena—newtonian fluids, integral and system conservation equations for single and multi-component fluids; in-depth development of differential conservation equations for mass, energy, and momentum; exact and approximate solutions of equations of motion; boundary layer analysis; numerical analysis of fluid flow and heat transfer.

521 Nuclear Systems Dynamics and Control (3) Introduction to state variable methods for system dynamics and control analysis and application of these methods to nuclear plant dynamics, simulation and control problems.


541 Reactor Fuel Management (3) Topics relative to in-core fuel management. Applicable topics in reactor physics, fuel depletion, isotopic inventories, reactivity control and numerical methods. Prereq: 470 or consent of instructor.


543 Selected Topics in Nuclear Criticality Safety (3) Criticality safety computational and experimental methods for enrichment, fabrication, storage, reprocessing and transport applications; overview of safety practices and regulatory requirements. Prereq: 421 or consent of instructor.

550 Radiation Measurements Laboratory (3) Physics and electronics associated with radiation detection and measurement, methods of data analysis. Applicability of particular detector measurements and fundamentals of radiation detection instrumentation operation. Prereq: 551.


552 Radiological Assessment and Dosimetry (3) Transport of radionuclides in environment, food chain pathways, internal dosimetry, external dosimetry, and biological effects of radiation. Introduction to time domain and frequency domain methods. Prereq: 551 or consent of instructor.

554 Radiation Risk Analysis (3) Methods for radiation risk prediction, survival analysis, parameter estimation, real data analysis, extrapolation techniques. Prereq: 552 or consent of instructor.


572 Nuclear System Design (3) Design and analysis of a nuclear system, interface with non-nuclear aspects of system design; system reliability and economics; class project. Prereq: Consent of instructor.

576 Expert Systems in Engineering (3) Application of expert systems to engineering: logic and rationale, developing expert systems, programming, advanced topics. Prereq: 570 or consent of instructor. (Same as Mechanical Engineering 576 and Engineering Science 576.)

577 Neural Networks in Engineering (3) Neural network technology for use in intelligent systems; rationales for neural computing, structure of neural networks, computing, programming. Prereq: Consen
of instructor. (Same as Mechanical Engineering 577 and Engineering Science 577.)

578 Fuzzy Systems in Engineering (3) Fuzzy numbers, fuzzy environment, uncertainty and randomness, approximate reasoning, fuzzy models and structures, decision process in fuzzy environment, fuzzy computing, fuzzy logic controllers, fuzzy expert systems and other engineering applications. (Same as Engineering Science 578.)

579 Advanced Monitoring and Diagnostic Techniques (3) Fundamentals of monitoring and diagnosis and application of advanced statistical and artificial intelligence based techniques such as ridge regression, principal component analysis (PCA), linear and non-linear partial least squares (PLS), neural networks, and fuzzy logic. Prereq: Graduate standing or consent of instructor.


582 Monte Carlo Analysis (3) Analysis of radiation transport problems in radiation shielding by Monte Carlo method, and MCNP code. Random sampling, evaluation of integrals, angular particle transport, techniques of variance reduction, forward and adjoint modes of analysis, importance function biasing, splitting/weight window biasing and contribution theory. Prereq: Consent of instructor.

585 Process System Reliability and Safety (3) Qualitative and quantitative techniques for assessing and improving process systems reliability and safety. Fault tree analysis and associated dependent failure analysis. Prereq: Consent of instructor. (Same as Chemical Engineering 565.)

597 Special Topics in Nuclear Engineering (3) Lectures and recitation on recent advances in nuclear engineering. Prereq: Consent of instructor. May be repeated with consent of department.

598 Nuclear Engineering Practice (3-9) Experience in solving and reporting on engineering problems. Prereq: Approval of department. May be repeated. Enrollment limited to alternative plan students. SINC 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.

653 Theory of Information Processing (3) Modern system theoretical methods for evaluating system performance from dynamic measurements. Prereq: 522 or equivalent.

671 Advanced Topics in Applied Artificial Intelligence (3) Recent advances in engineering applications of artificial intelligence. Prereq: 577. (Same as Mechanical Engineering 671 and Engineering Science 671.)

697 Special Topics in Nuclear Engineering (3) Investigation of new developments. Prereq: Consent of instructor.

Nursing
(College of Nursing)

MAJOR
Nursing ........................................ M.S.N., Ph.D.

Joan L. Crescia, Dean
Martha Alligood, Director of M.S.N. Program
Sandra Thomas, Director of Ph.D. Program

Professors:
Allgood, Martha R., Ph.D. ............... New York
Crescia, Joan L., Ph.D. ..................... Maryland
Droopman, Patricia G., Ph.D. .............. Tennessee
Farr, Glen, Ph.D. ............................... Tennessee
Groer, Maureen, Ph.D. .................... Illinois
Mozingo, Johnie N., Ph.D. .................. Idaho
Pierce, Jean O., Ph.D. ....................... Utah
Sevior, Carol, Ed.D. ......................... Massachusetts
Thomas, Sandra P., Ph.D. ................... Tennessee

Associate Professors:
Davis, Mitzi, Ph.D. .......................... Tennessee
Ellison, Kathy Jo, Ph.D. .................... Alabama (Birmingham)
Fenske, Mildred M., Ph.D. ................. Vanderbilt
Hall, Joanne, Ph.D. .......................... San Francisco
McGuire, Sandra, Ed.D. .................. Tennessee
Weir, Debra C., Ph.D. ...................... South Carolina

Assistant Professors:
Bell, Donald, M.S.N. ....................... Tennessee
Brown, Allie J., M.S.N. (Alabama (Birmingham)
Brown, Mary Lynn, Ph.D. ..................... Tennessee
Chen, Shu-li, Ph.D. ............................. Utah
Conlon, Kathleen P., M.S.N. .............. SUNY (Buffalo)
Dyas, Rachelle, M.S.N. ..................... Tennessee
Evans, Ginger W., M.S.N. ................. Tennessee
Fox, Marie X., M.S.N. ...................... Tennessee
Helton, Sally M., M.S.N. .................... Texas Women's Kollar, Mary, Ph.D. ................. Tennessee
Narlo, Maureen, Ph.D. ...................... Tennessee
Pierce, Margaret, M.S.N. ................. Tennessee
Preston, John, M.S.N. ...................... Tennessee

THE MASTER'S PROGRAM

The College of Nursing offers the Master of Science in Nursing degree with concentrations in adult health nursing, family nurse practitioner, mental health nursing, nurse anesthesia, nursing administration, and nursing of women and children. The program is accredited by the National League for Nursing Accrediting Commission and is unconditionally approved by the Tennessee Board of Nursing.

The purpose of the Master's program in nursing is to prepare leaders, managers, and practitioners who facilitate achievement of optimal health in the dynamic healthcare system. The program prepares advanced practice nurses for a career in adult health nursing, nursing of women and children, mental health nursing, and nurse anesthesia as well as role preparation as nurse practitioners, clinical nurse specialists or nursing administrators. Advanced practice nursing involves the delivery of care, management of resources, interdisciplinary collaboration, and application of technology, information systems, knowledge, and critical thinking.

Admission Requirements
1. Meet requirements for admission to The Graduate School.
2. Achieve a score of 500 or above on the verbal and on the quantitative portions of the Graduate Record Examination.
3. Achieve a TOEFL score of 500 or above if native language is not English.
4. Applicants for nurse anesthesia require an interview.

5. Hold a Bachelor's degree in Nursing (BN) from a National League for Nursing accredited program.
   a. Hold or be eligible for licensure to practice nursing in Tennessee.
   b. Have an undergraduate GPA of 3.0 or higher on a 4-point scale or a GPA of 3.3 for courses in the undergraduate majors.
   c. Have completed a health assessment and physiology course within the past five years.
   d. Have completed 3 hours of graduate level statistics.
   OR
   Hold a bachelor's degree in a discipline other than nursing (master's entry student or RN) from an accredited college or university.
   a. Have a cumulative undergraduate GPA of at least 3.0 on a 4-point scale.
   b. Have satisfactorily completed the following prerequisite courses: chemistry (8 hrs); microbiology (including lab); anatomy and physiology (6-8 hrs); nutrition (covering lifespan in health and illness); behavioral sciences (12 hrs in sociology, anthropology, growth and development, and at least one general psychology course); undergraduate research course or equivalent; 3 hours of graduate level statistics prior to enrollment in graduate research course.
   c. This option not available to nurse anesthesia or nurse administration students.
   d. 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 from full-time BSN and master's entry students for fall admission must be received by February 1. Part-time and post-master's applications must be received by October 1.

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.
6. Contact student services for more detailed information about the application process: Student Services/MSN Program, UT College of Nursing, 1200 Volunteer Blvd., Knoxville, TN 37996-4180; phone: 865 974-7606.

Thesis and Non-Thesis Options
The thesis option is available for interested students and is especially encouraged for those who are considering pursuit of doctoral degrees sometime in the future. Students who choose the non-thesis option must register for 582 Scholarly Inquiry for Advanced Practice Nursing.
Program Requirements

All students must complete a minimum of 33 semester hours distributed as follows:

Core (9 credits)
503 Health Promotion in Advanced Practice Nursing 3
510 Theoretical Foundations of Nursing 3
520 Advanced Practice Nursing and Health Delivery Systems 3

Advanced Practice Core (9 credits) *
504 Advanced Health/Physical Assessment 3
505 Advanced Clinical Pharmacology 3
515 Advanced Pathophysiology for Nursing Practice (not required for nurse anesthesia students) 3

Required for nurse anesthesia students:
506 Advanced Anesthesia Pharmacology 3
516 Advanced Pathophysiology: Neurological and Cardiovascular with Anesthesia Implications 2
517 Advanced Pathophysiology: Respiratory/Renal with Anesthesia Implications 2
518 Advanced Pathophysiology: Obstetrics/Regional Anesthesia 2
521 Basics of Nurse Anesthesia 6
522 Integrated Health Science for Anesthesia 3
523 Advanced Principles of Nurse Anesthesia Practice 2

Research (6-9 credits)
501 Nursing Research: Methods, Design & Analysis 3
500 Thesis 3
OR 582 Scholarly Inquiry for Advanced Practice Nursing 3

Concentration (12-17 credits)—choose one:
530-31 Adult Health Nursing I, II 12
544-45-46 Clinical Nurse Anesthesia 12
47-48-49 Practicum/Seminar I, II, III, IV, V, VI 40
550-51 Nursing of Women and Children I, II 16
560-61 Mental Health Nursing I, II 12
570-71-72 Family Nurse Practitioner I, II, III 17
590-91 Nursing Administration I, II 12

Elective (6 credits)—Required for students in nursing administration concentration only.
311 Foundations of Professional Nursing Practice 6
319 Pathophysiology of Health Deviations I 4
333 Health Assessment 3
341 Health Promotion 3
351 Pharmacology I 2
361 Health Maintenance & Restoration across the Life Span 5
381 Professional Leadership Issues I 2
392 Health Promotion & Maintenance in the Community 4
406 Pharmacology II 2

Registered nurses whose bachelor's degrees are not in nursing must have completed coursework in chemistry, nutrition, microbiology, anatomy, and physiology plus 12 hours of behavioral science courses. They must also complete 305, 382, 452, 482 and 490 and complete or successfully challenge the following:

311 Foundations of Professional Nursing Practice 5
319 Pathophysiology of Health Deviations I 4
333 Health Assessment 3
351 Pharmacology I 2
361 Health Maintenance & Restoration across the Life Span 5
403 Health Promotion & Maintenance in Childbearing Families 5
406 Pharmacology II 2
421 Health Maintenance & Restoration in Mental Health 4
451 Professional Leadership Issues II 2
461 Health Restoration across the Life Span 5

A total of 10 credits can be obtained by successful completion of the NLN ACE Examination. See undergraduate catalog for other challenge options. RNs who are in the process of completing a BSN at UT with the intent of enrolling in the MSN program follow the same plan with the addition of 417.

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 dangerous 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, Memphis, College of Nursing. Students may complete all or part of the program at either site. The dissertation must be completed in its entirety at one site. The doctoral program prepares nursing scholars capable of integrating research, theory, and practice into their roles as researchers, educators, and/or administrators. Specifically, the graduate of this program should be able to:

1. Analyze, test, refine, extend, 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 graduate grade-point average of 3.3 on a 4.0 scale for previous college work.

4. Have a combined 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 college level instructors and/or nurses and administrators 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 November 1 of the year prior to fall admission.

12. Schedule a personal interview with the College of Nursing PhD Student Admissions Committee prior to March 15 of the year preceding Fall admission. International applicants may be interviewed by telephone or teleconferencing at the discretion of the admissions committee.
The following courses are required for all students:

620 Directed Research 3
601-02 Theory Analysis & Construction I, II 6
605-06 Nursing Research Seminar 4
607 Qualitative Nursing Research 3
608 Quantitative Nursing Research 3
609 Research Practicum* 4
610 Nursing Science Seminar 2
611 Advanced Nursing Seminar 2
612 Health and Nursing Policy/Planning 3
614 Nursing Preceptorship 3
Statistics 6
Economics 6
Elections 3
600 Dissertation 24
TOTAL 72

*Note: A minimum of 1 hour per semester must be taken for 4 semesters.

Possible cognate areas include, but are not limited to, anthropology, child and family studies, psychology, education, management, medical ethics, public health, social work, philosophy, and statistics.

Doctoral Committee
Early in the student's program, a nursing faculty advisor will be selected by the student in consultation with the program director. The student's comprehensive examination committee consists of the faculty teaching core courses and one representative from the cognate area. The student then selects the dissertation committee. Four faculty holding the rank of assistant professor or above comprise the committee, three of whom (including the chair) must be approved by the Graduate Council to direct doctoral dissertations. At least one member of the committee must be from an academic unit other than nursing.

Special Policies
1. A maximum of 6 graduate hours taken before acceptance into the doctoral program may be applied toward the degree.
2. Minimum grades of B in all nursing doctoral courses and a 3.0 cumulative GPA are required for continuation in the program.

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 and skills pertinent to aging in an academic setting with his/her major concentration. Please refer to Human Ecology for specific requirements.

POST-MASTER'S CERTIFICATE IN ADULT HEALTH NURSING
The College of Nursing offers a post-master's certificate program for nurses who need additional training in adult health nursing. Required for admission is a master's degree in nursing.

Course requirements are 530, 531, and 583, plus additional hours as determined by the college. The total hours will vary depending on the student's academic record, clinical experience and objectives. Students must complete a minimum of 12 credits. Typically students will complete 16-20 hours of course credit.

POST-MASTER'S CERTIFICATE IN NURSING OF WOMEN AND CHILDREN
The College of Nursing offers a post-master's certificate program for nurses who need additional training in nursing of women and children. Required for admission is a master's degree in nursing.

Course requirements are 550 and 551, plus additional hours as determined by the college. The total hours will vary depending on the student's academic record, clinical experience and objectives. Students must complete a minimum of 12 credits. Typically students will complete 16-20 hours of course credit.

POST-MASTER'S CERTIFICATE IN MENTAL HEALTH NURSING
The College of Nursing offers a post-master's certificate program for nurses who need additional training in mental health nursing. Required for admission is a master's degree in nursing.

Course requirements are 560 and 561, plus additional hours as determined by the college. The total hours will vary depending on the student's academic record, clinical experience and objectives. Students must complete a minimum of 12 credits. Typically students will complete 16-20 hours of course credit.

POST-MASTER'S CERTIFICATE IN FAMILY NURSE PRACTITIONER
The College of Nursing offers a post-master's certificate program for nurses who need additional training in family nurse practice. Required for admission is a master's degree in nursing.

Course requirements are 570, 571, and 572, plus additional hours as determined by the college. The total hours will vary depending on the student's academic record, clinical experience and objectives. Students must complete a minimum of 12 credits. Typically students will complete 16-20 hours of course credit.

POST-MASTER'S CERTIFICATE IN NURSING ADMINISTRATION
The College of Nursing offers a post-master's certificate program for nurses who need additional training in nursing administration. Required for admission is a master's degree in nursing.

Course requirements are 590 and 591, plus additional hours as determined by the college. The total hours will vary depending on the student's academic record, clinical experience and objectives. Students must complete a minimum of 12 credits. Typically students will complete 16-20 hours of course credit.

ACADEMIC MARKET
An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT on an in-state tuition basis. The M.S.N. program in Nursing is available to residents of the state of Oklahoma (concentration in nursing of women and children). Additional information may be obtained from the Admissions Specialist in the Office of Graduate Student Services.

GRADUATE COURSES
500 Thesis (1-15) P/NP only. E
501 Nursing Research: Methods, Design, and Analysis (3) Basic principles of research process in application to clinical questions; critical evaluation of nursing and health-related research. Prereq or coreq: 510, graduate level statistics. F,Sp
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
503 Health Promotion In Advanced Practice Nurs- ing (3) Principles of health promotion, education, and innovative strategies for achieving wellness of individuals, families, groups, and communities.
504 Advanced Health/Physical Assessment (3) Development of advanced clinical reasoning and assessment skills to determine client health status and needs. Application of physiological, pathophysiological, and psychological concepts with implications for advanced practice nursing. Didactic (2.5) and lab (5).
505 Advanced Clinical Pharmacology (3) Pharmacological agents utilized to treat common, recurrent health problems; indications, contraindications, side and interactive effects of commonly prescribed drugs. Prereq: 301 or equivalent or consent of instructor. F
509 Graduate Seminar in Public Health (1) (Same as Public Health 509, Exercise Science 508, Nutrition 509, and Social Work 508.)
510 Theoretical Foundations of Nursing (3) Historical evolution of nursing science; nursings' metaparadigm and selected philosophies, conceptual models and theories as structures which guide critical thinking, reasoning, and decision making for advanced practice nursing. F,Sp
511 Statistical Applications to Nursing Research (3) Descriptive and inferential statistics; statistical concepts and applications to clinical settings and their application to advanced practice nursing.
515 Advanced Pathophysiology for Nursing Practice (3) Advanced physiologic and pathophysiologic concepts, principles, and theories applied to deviations of human systems. Sp
516 Advanced Pathophysiology: Neurological/Coronaryvascular with Anesthesia Implications (2) Review of anatomy and physiology and integration of pathophysiology involved in patients requiring anesthetic care for cardiac surgical procedures (both children and adults) with and without cardiopulmonary bypass, intercranial surgical procedures for vascular and mass occupying lesions, patients requiring somato-sensory evoked potential monitoring, and patients requiring anesthesia for noncardiac and non-physiologic procedures who present with either neurological and/or cardiovascular comorbidity.
517 Advanced Pathophysiology: Respiratory/Re nal with Anesthesia Implications (2) Review of anatomy and physiology and integration of pathophysiology involved in administration of anesthesia for patients who present with renal or respiratory pathology. Pathological implications of acute and chronic renal failure, renal transplantation, pulmonary disease states: obstructive and restrictive diseases, one lung ventilation, and acute pulmonary disease states and their management.
519 Advanced Pathophysiology: Obstetrics/Regional Anesthesia (2) Examination of anatomy and physiology and integration of pathophysiology involved in administration of regional blockade of upper and lower extremities. Local anesthetic pharmacology, indication for regional anesthesia, contraindications to specific blockade, and techniques for clinical administration of regional blockade. Regional anesthetic considerations for obstetric patient.

520 Advanced Practice Nursing and Health Delivery Systems (3) Nursing's role in dynamic health care system: health policy and organizational, social, ethical, political, economic and technological factors which impact advanced practice nursing and delivery of health care. Sp

521 Basics of Nurse Anesthesia (6) Comprehensive orientation to principles and practice of anesthesia. Elementary and comprehensive approaches to clinical and professional practice of nurse anesthetist. Basic knowledge and guidelines necessary to administer anesthesia.

522 Integrated Health Science for Anesthesia (3) Fundamental principles of chemistry and physics related to practice of nurse anesthetist. Consolation of principles to clinical anesthesia practice.


530 Adult Health Nursing I (6) Advanced nursing practice for health promotion, restoration, and maintenance of young, middle-aged, and older adults. Theories and research to advanced practice with clinical clients in variety of settings. Prereq: 504. Prereq or coreq: 501. Coreq: 520. Didactic (2) and practicum (4). Sp

531 Adult Health Nursing II (6) Continuation of 530. Delivery, education, and management of health care for adult groups and communities. Prereq: 530. Didactic (2) and practicum (4). F

543 Nurse Practitioner (9) Exploration and application of holistic nursing concepts to nursing management of common and chronic health problems. Role refinement and exploration of major issues in delivery of holistic primary nursing care. Clinical experiences vary depending on student's intent to pursue certification as family or adult nurse practitioner. Prereq: MSN in clinical concentration, 505 or equivalent, and consent of instructor. 3 hrs and 6 labs. Su

544-45-46-47-48-49 Clinical Nurse Anesthesia Practicum/Se minar I, II, III, IV, V, VI (2-11) Integration and application of concepts learned in the development of clinical skills in nurse anesthesia practice under supervision of Certified Registered Nurse Anesthetist (CRNA) and/or anesthesiologist. Must be taken in sequence.

550 Nursing of Women and Children I (8) Advanced practice nursing for women and children: clinical experience in role of nurse practitioner or clinical nurse specialist in variety of settings. Health promotion and nursing interventions for actual or potential health problems of women, children, and families. Prereq: 504. Prereq or coreq: 501. Coreq: 520. Didactic (3) and practicum (5). F

551 Nursing of Women and Children II (8) Continuation of 550. Role refinement of nurse practitioner or clinical specialist in health maintenance and restoration for women and children. Prereq: 550. Didactic (3) and practicum (5). F

552 Parent Child Nursing Field Work and Seminar (5) Seminar and intensive clinical practicum designed to facilitate further development of specialized knowledge and skills utilized for advanced parent-child nursing practice. Prereq or coreq: 551. 1 hr and 4 labs. Sp

557 Nurse Midwifery Seminar I (1) Exploration of art and science of midwifery, nature and scope of midwifery practice, professional and ethical issues in advanced practice midwifery. Prereq or coreq: 501. 510. F


559 Nurse Midwifery Seminar III (1) Exploration of state of science in nurse midwifery, innovative practice options, and related researchable problems in nurse-midwifery practice. Prereq: 570, 571. Coreq: 500, 580 or 582. F

560 Mental Health Nursing I (6) Theories of advanced therapeutic interventions for clients experiencing actual and potential mental health problems; advanced practice in specialty of mental health; clinical practice with clients of various ages in acute care and community settings. Prereq: 504. Prereq or coreq: 501. Coreq: 520. Didactic (2) and practicum (4). F

561 Mental Health Nursing II (6) Continuation of 560. Advanced practice nursing in community settings for families and groups with actual and potential mental health problems. Prereq: 560. Didactic (2) and practicum (4). F

565 Teaching Practicum (1-6) Individually designed teaching experience in collegiate nursing program or nursing practice setting. Objectives to be developed collaboratively by student and faculty. Prereq or coreq: 564 and consent of instructor. SINC or letter grade. Sp

566 Educational Principles and Strategies (3) Exploration and analyses of selected education, curriculum, teaching-learning, measurement, and evaluation principles and techniques as applied to instruction of undergraduate nursing students, staff development, and patient education. Prereq: Consent of Instructor. Su

570 Family Nurse Practitioner I (4) Application of advanced health/physical assessment and diagnostic reasoning in nursing management and primary care and of individuals and their families with actual and potential acute health problems: clinical experience in role of family nurse practitioner in variety of settings. Prereq: 504, 515. Coreq: 520. Didactic (2) and practicum (2). Sp

571 Family Nurse Practitioner II (5) Continuation of 570. Nursing management and primary care of individual and families in all developmental life stages; clinical experience in variety of settings. Prereq: 540. Prereq or coreq: 501. Didactic (2) and practicum (3). F

572 Family Nurse Practitioner III (7) Continuation of 571. Nursing management of chronic health problems of individuals and families in all developmental life stages; role refinement and exploration of major issues of family nurse practitioner; clinical experience in role of family nurse practitioner in variety of settings. Prereq: 571. Didactic (2) and practicum (5). Sp

577 Special Topics (1-3) Topic is determined by faculty and student interest. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

582 Scholarly Inquiry for Advanced Practice Nursing (3) Utilization of research process through experiential learning or critical evaluation of science in area of interest. Conducted under faculty guidance and culminating in scholarly paper. Coreq: 501. May be repeated. Maximum 6 hrs. E

583 Directed Clinical Practice (1-9) Additional opportunities for advanced practice 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. SINC or letter grade. E


590 Nursing Administration I (6) Exploration, application of selected organizational management and leadership theories and financial principles to delivery of nursing services. Structure, functions, organization, behavior, and professional processes of health care organizations. Prereq: 504 or coreq: 501, 520. 2 hrs and 4 labs. Sp

591 Nursing Administration II (6) Continuation of 590. Utilization of human and financial resources, conflict resolution, and organizational development with application 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 instructor. 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 development; analysis of existing health and nursing theories; theory building from existing knowledge. Prereq: 510 or equivalent or consent of instructor. F,Sp

605-06 Nursing Research Seminar I, II (3,3) Selected topics pertaining to proposal development and research experiences. F,Sp

607 Qualitative Nursing Research (3) Exploration and analysis of philosophical bases, theoretical implications, methods, and data analyses of qualitative research. Sp

608 Quantitative Nursing Research (3) Exploration and analysis of philosophical bases, theoretical implications, methods, and data analyses of quantitative nursing research. Prereq or coreq: Graduate level statistics course. F

609 Research Practicum (1-3) Supervised individual or group research experience. Undergraduate research projects. Prereq or coreq: Consent of instructor. May be repeated. Maximum 12 hrs. SINC 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. F

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) Contemporary organizational and management theories and techniques needed for effective administrative leadership in nursing education, practice, research, and entrepreneurship. Sp

614 Nursing Preceptorship (3) Individually-designed practicum, field, or internship experiences in variety of administrative, educational, research, or clinical practice settings. Prereq: 601, 602, F,Su

615 Nursing Management of Complex Systems: Academic Institutions (3) Contemporary structure and dynamics of leadership in nursing education: application of management and nursing theories in academia, faculty practice models, research and publication issues, promotion and tenure, faculty governance, and administrative responsibilities and strategies. Prereq: 586 or equivalent.

620 Directed Research (3) Exploration of theoretical considerations and research methodologies in nursing research. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. Sp

Nutrition
(Proteins of Human Ecology)

MAJORS

DEGREES

Human Ecology ..................................................Ph.D.

Nutrition ..........................................................M.S., M.S.M.P.H.

Michael B. Zemel, Head

Professors: Beauchene, Roy E. (Emeritus).
Ph.D. ..................................................Kansas State
The Master of Science program is available in Nutrition, with a concentration in nutrition science or public health nutrition. A graduate degree combined with a Dietetic Internship (D.I.) beyond the baccalaureate degree qualifies the graduate to apply for the Registration Examination to become a Registered Dietitian (R.D.). Students may request more information from the department about the D.I. program. The Dietetic Internship is currently granted accreditation by the Commission on Accreditation for Dietetics Education of The American Dietetic Association, 216 W. Jackson Blvd., Chicago, IL 60606-6995, Tel: 312 899-5400. Students may also select an interdisciplinary minor in gerontology.

ADMISSION REQUIREMENTS

A complete file for review includes the Graduate School application file, completed departmental application form, Graduate Record Examination (GRE) scores for the general section, and three Graduate School Rating Forms completed by individuals who can attest to the applicant's potential for graduate education. Forms may be obtained from the Departmental Office, 229 Jessie Harris Building, University of Tennessee, Knoxville, 37996-1900. Forms may also be obtained from the Department's website at http://nutrition.utk.edu/.

Admission into the graduate program in the department is dependent on completion of undergraduate courses that give the necessary background for successful advancement in the graduate program. Required undergraduate courses include: general and organic chemistry, physiological chemistry/biochemistry, physiology, nutrition, statistics, and advanced nutrition. Admission to the Ph.D. program in Human Ecology with a concentration in Nutrition Science requires a master's degree. Applicants to all programs with related experience may be given preference.

THE MASTER'S PROGRAM

Students may choose a thesis or non-thesis option in Nutrition. Attendance at Nutrition 540 is required every semester. 

Thesis Option: The program consists of a minimum of 33 hours with at least 16 hours of coursework in the department. NTR 511, 512, 540, 541 and 3 hours of graduate level statistics are required. Students in public health nutrition must take 511, 512, 513, 514, 515, 541 and the minor in public health. Six hours of Thesis 590, and 8 hours outside the department are required. A minimum of 22 hours at the 500 or 600 level is required. An oral comprehensive examination is required upon completion of the thesis.

Non-Thesis Option: The program consists of a minimum of 38 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 and the minor in public health. Six hours in one area outside the department are required. A minimum of 24 hours at the 500 and 600 level is required. A written comprehensive examination is required for completion of the program.

DUAL M.S.-M.P.H. PROGRAM

The College of Human Ecology offers a coordinated dual program leading to the conferral of both the Master of Science with a major in Nutrition (public health nutrition concentration) and the Master of Public Health. The dual program allows students to complete both degrees in less time than would be required to earn both degrees independently.

The program is designed to meet the needs of students who are interested in the benefits of majors in both nutrition and public health. Therefore, it accommodates the needs of students who: 1) plan a career in public health nutrition and want to acquire the knowledge and skills of the nutritionist and public health professional; 2) plan a career in nutrition and want to acquire the knowledge and skills and the perspective of the public health professional; or 3) plan a career in public health and want to acquire the knowledge, skills and perspective of the nutritionist.

Admission Requirements

Applicants for the M.S.-M.P.H. program must make separate application to, and be competitively and independently accepted by, the Department of Nutrition for the M.S., Department of Health and Safety Sciences for the M.P.H., and the Public Health Academic Program committee.

Students who have been accepted by both departments may apply for approval to pursue the dual program anytime prior to, or after, matriculation in either or both departments. Such approval will be granted, provided that dual program studies be started prior to entry into the fourth semester of the M.S. and M.P.H. programs.

Curriculum

A dual degree candidate must satisfy the requirements for both the M.S. (public health nutrition concentration) and the M.P.H. degrees, as well as the requirements for the dual program. All candidates for the dual degree must successfully complete Health and Society (PH 555), two credits of Seminar in Public Health (PH 509), and a minimum of 60 credits. The Department of Nutrition will award a maximum of 9 semester hours of credit toward the M.S. degree for successful completion of approved graduate level courses offered in the Department of Health and Safety Sciences. The Department of Health and Safety Sciences will award a maximum of 11 semester hours of credit toward the M.P.H. degree for successful completion of approved courses offered in the Department of Nutrition. All courses for which such cross-credit is awarded must be approved by the Public Health Academic Program Committee and the student's graduate committee. A single block field experience (public health internship) is required of all students and the analytical field paper incorporates public health nutrition and the student's public health concentration.

Dual degree students who withdraw from the program before completion of the requirements for both degrees will not receive credit towards the M.S. or M.P.H. degree for courses taken in the other program, except as such courses qualify for credit with regard to the dual program.

Approved Dual Credit

M.S. courses to be counted toward the M.P.H. program must include 10 semester hours of Field Study in Community Nutrition (NTR 515) and 1 semester hour of Graduate Seminar in Public Health (NTR 509). M.P.H. courses to be counted toward the M.S. include Public Health Administration (PH 520), Biostatistics (PH 550), and Epidemiology (PH 540).

THE PH.D. CONCENTRATION

The nutrition science concentration enables students to study the science of nutrition from the cellular level to the application of nutritional principles by people in a changing environment.

The doctoral program emphasizes cellular/molecular nutrition, human nutrition, nutritional epidemiology, and experimental nutrition. Cognate areas may include anthroplogy, biochemistry, chemistry, communications, education, food technology, human development, physiology, public health, sociology, statistics, and/or toxicology.

Minimum requirements include:

1. Sixteen hours in nutrition including 4 hours at the 600 level (exclusive of dissertation);
2. NTR 511, 512, 541, and 2 hours from either 542-544;
3. Four hours of NTR 540, attendance required every semester;
4. Six hours of statistics;
5. Six hours in a cognate area;
6. Nine hours at the 600 level;
7. Students without college teaching experience are required to take the fall semester teaching seminar for GTAs and NTR 548 comprising a faculty-supervised problem in college teaching.

GRADUATE COURSES

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 faculty time before degree is completed. May not be used toward degree requirements. May be repeated. SHC only. E
588 Culture, Food, and Nutrition (3) Food-related behavior of individuals and groups in United States. Sociocultural, economic, and technological influences. Nutrition and food surveys. Public policy. Prereq: Advanced Nutrition or consent of instructor. F,A
509 Graduate Seminar in Public Health (1) (Same as Public Health 509, Exercise Science 509, Nursing 509 and Social Work 509).

511 Advanced Physiological Chemistry (4) Bioenergetics, flux control and hormonal interrelationships. Prereq: Advanced Nutrition or equivalent. F


513 Community Nutrition I (3) Orientation to community; assessment of nutrition problems, needs, and resources; functional roles of public health nutritionist. Concurrent field experiences. Prereq: Advanced Nutrition or consent of instructor. F

514 Community Nutrition II (3) Planning, implementation, and evaluation of public health nutrition programs. Concurrent field experiences. Prereq: 513 or consent of instructor. Sp

515 Field Study in Community Nutrition (1-12) Personal participation in and analysis of state or regional community nutrition program. Location of indepth study to be selected in consultation with instructor. Prereq: 513, 514 and consent of instructor. SNC only. Su

516 Maternal and Child Nutrition (3) Nutrition principles related to growth and development during pregnancy, infancy, and childhood to age 5, high risk conditions. Prereq: Advanced Nutrition or consent of instructor. F

517 Childhood and Adolescent Nutrition (3) Application of nutrition principles to school age children; effects of diseases on growth and health maintenance; nutritional assessment and counseling for nutrition. Prereq: Advanced Nutrition or consent of instructor. Sp

518 Nutrition and Aging (3) Nutritional problems of adults; nutritional requirements, dietary intakes; effects of nutrition on biological aging. Prereq: Advanced Nutrition or consent of instructor. Su

520 Nutritional Ecology (2) Examination of issues in natural, political, physical, and social environments that impact availability of food and nutrients in U.S. food supply. F

521 Physiological Basis for Diet and Disease (2) Altered nutrient needs as result of metabolic changes that occur in selected disease states. Prereq: Nutrition in Disease or consent of instructor. Sp

522 Nutrition Counseling (2) Individual eating habits and disorders, evaluation strategies for effectiveness of helping process. Prereq: Nutrition in Disease or consent of instructor. F,A

524 Nutrition Education: Principles, Implementation, and Evaluation (3) Conceptual models, principles, application, and evaluation models in nutrition education research. Prereq: 508 or consent of instructor. Su,A

530 Molecular Application in Nutrient-Gene Interaction (1) Theories and applications of gene regulation methodologies. Experimentation with DNA and RNA. RNA and DNA isolation and analysis to illustrate nutrient regulation of gene expression. Combination of lab/lecture.

540 Seminar in Nutrition (1) May be repeated. S/NC only. E

541 Research Methods I (3) Basic principles of planning, conducting, and interpreting nutrition and foodservice systems administration research. Prereq: 6 graduate hrs in nutrition and food system administration and statistics. Sp

542 Advanced Experimental Nutrition (2) Application of research principles to individual project using experimental animals. Prereq or coreq: 541. Sp

544 Survey Methods in Food and Nutrition (2) Application of survey research methods to nutrition projects: assessment of food consumption, nutrient intake, nutritional status, sociocultural-economic parameters, food production and service. Prereq or coreq: 541. Sp

547 Field Experience (3-9) Experience in food-related industry or agency under supervision of faculty member. Prereq: Consent of instructor. SNC only. E

548 Directed Study in Nutrition (1-3) Advanced study in nutrition. Prereq: Consent of instructor. May be repeated. Maximum 5 hrs. E

549 Special Topics (1-3) Recent advances in nutrition or food systems administration. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

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

602 Advanced Topics in Nutrition Science (1-3) Comprehensive individual study and group discussion of topics related to current problems in nutrition. Prereq: 512 or consent of instructor. May be repeated. F

603 Current Trends in Food and Sociocultural Change (2) Critical evaluation of research. Prereq: 508 or consent of instructor. F,A

Ornamental Horticulture and Landscape Design

(College of Agricultural Sciences and Natural Resources)

MAJOR

DEGREE

Robert N. Trigiano, Interim Head

Graduate Program in Horticulture and Landscape Design

Graduate Liaison: Professor<br>
Robert N. Trigiano, Interim Head

Requirements: 36 semester hours of graduate credit, which must include 6 hours of thesis proposal and its oral defense to the master's committee. All course work must be completed within five years of matriculation. (Students in this program are not eligible for Ph.D. credit.)

Thesis Option:

1. Satisfactory preparation of a written thesis proposal and its oral defense to the student's committee, prior to enrolling in 500.
2. Successful completion of 30 hours of graduate credit, which must include 6 hours of 500. At least 14 of these hours must be at the 500 level or above.

Non-Thesis Option:

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

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 ornamentals. Prereq: 220, 330, and Plant and Soil Science 210, or consent of instructor. 2 hrs and 1 lab. Sp

428 Public Horticulture (2) In-depth study of public horticulture industry. Diversity of public horticulture
429 Field Study of Public Horticulture Institutions (3) Extended 10-12 day field study of various public horticulture institutions, botanical gardens, arboretums, historical gardens, zoos, conservatories, cemeteries, and nature preserves. Travel journal and course portfolio required. Prereq: 428. Application and travel fee required. Sp

440 Advanced Turfgrass Management (4) Principles and scientific basis of turfgrass culture: adaptation, ecology, physiology, soil fertility, and grass nutrition. Climatic influence on turfgrass culture; physiology of clipping and water 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.) Principles of plant tissue culture: growth requirements, methods of multiplication, and factors affecting growth. Prereq: 450 or equivalent. 3 hrs. F

460 Professional Practices in Landscape Construction and Management (2) Professionalism, salesmanship, proposals, bidding, estimating, specification, and contract administration. Supplemental handbooks in landscape services industry. Interaction with industry representatives through special presentations. Prereq: 350 or consent of instructor. F


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 (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. 15 hrs. Non-credit. E

503 Non-Thesis Project (1-2) Library, field, or laboratory project under supervision of faculty member. Not for thesis candidates. May be repeated. Maximum 4 hrs. E

507 Professional Development Seminar (1) (Same as Agriculture and Natural Resources 507.) Animal Science 507, Biosystems Engineering 507, Biosystems Engineering Technology 507, Food Science and Technology 507, and Plant and Soil Sciences 507 only. 1 hr only. F

509 Thesis Proposal Preparation (1) (Same as Agriculture and Natural Resources 509, Animal Science 509, Food Science and Technology 509, and Plant and Soil Sciences 509.) 1 hr only. F

511 Plant Disease Fungi (4) (Same as Entomology and Plant Pathology 510.)
significant body of philosophical literature. (In special circumstances, enrollment in the area of dissertation research; the Graduate Committee may approve a language not satisfying these conditions.) This may be done by passing the doctoral language examination given by the appropriate department, if available, or by passing French 302 or German 332 with a B or better. Bi- or multilingual (normally, foreign) students, whose native language (other than English) is one in which there is a significant body of philosophical literature, are exempted from the foreign language requirement. Students receiving the Ph.D. with concentration in medical ethics are also exempted.

CONCENTRATIONS

Medical Ethics
The department has an M.A. and Ph.D. program of graduate study with a concentration in medical ethics. Detailed information concerning the program may be obtained from either the Director of Graduate Studies in Philosophy or the Director of the Medical Ethics Program.

Religious Studies
The department has an M.A. program of graduate study with a concentration in religious studies. Details concerning the program may be obtained from the Director of Graduate Studies in 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 on an in-state tuition basis. The M.A. and Ph.D. programs in Philosophy are available to residents of the states of Alabama, Kentucky, or Texas; the Ph.D. program to residents of Louisiana, Mississippi, Virginia or West Virginia; and the M.A. program to residents of Delaware or Oklahoma. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Student Services.

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.)
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.
435 Intermediate Formal Logic (3) Metatheory of formal logic and philosophy of logic. Prereq: Consent of instructor.
440 Contemporary Ethical Theory (3) Topics in metaethics or ethics. Prereq: 6 hrs of philosophy or consent of instructor.
446 Theoretical Issues in Medical Ethics (3) Prereq: 242 or 345 or consent of instructor.
472 Philosophy of Language (3) Problems of meaning, reference and truth. Relation between words and world. How sentences manage to be about the world. What is true? Prereq: 3 philosophy courses 200 level or above.
473 Philosophy of Mind (3) Problems of mind and body in relation to consciousness and personal identity. Prereq: 6 hrs of philosophy or consent of instructor.
479 Studies in Recent Continental Philosophy (3) Selected thinkers or topics: existentialism, phenomenology, hermeneutics, structuralism, post-structuralism. Prereq: 6 hrs of philosophy or consent of instructor. May be repeated when topic varies. Maximum 6 hrs.
500 Thesis (1-15) P/NP only. E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only.
510 Philosophical Research (3) Paper workshop (writing, revising papers, getting papers ready to publish). Does not count toward hours required for degree. May be repeated. S/NC only.
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 psychiatry, competence, 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.
575 Topics in Metaphysics and Epistemology (3) May be repeated. Maximum 6 hrs.
577 Topics in Philosophy of Mind (3) Relation of mental to physical and of role of words in discourse for mental activities, thinking and feeling. May be repeated. Maximum 9 hrs.
585 Special Topics (3) May be repeated. Maximum 9 hrs.
587 Advanced Clinical Medical Ethics (3) Critical concepts in medical ethics, relationship of theory to practice, and professional roles and responsibilities for health care ethics consultant. Open only to Ph.D. students concentrating in medical ethics. Prereq: Consent of Medical Ethics Committee.
588 Ph.D. Clinical Practicum (9) Series of clinical rotations at one or more local health care institutions. Open only to Ph.D. students concentrating in medical ethics. Prereq: Consent of Medical Ethics 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.
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
620 Topics in Ancient or Medieval Philosophy (3) May be repeated. Maximum 9 hrs.
622 Topics in Modern Philosophy (3) May be repeated. Maximum 9 hrs.
624 Topics in Contemporary Philosophy (3) May be repeated. Maximum 9 hrs.
640 Topics in Ethics or Value Theory (3) May be repeated. Maximum 9 hrs.
646 Topics in Applied Ethics (3) Prereq: Consent of Medical Ethics Committee. May be repeated. Maximum 9 hrs.

Physics and Astronomy

(College of Arts and Sciences)

MAJOR DEGREES

Physics ............................................. M.S., Ph.D.
Soren Sorensen, Head

Professors:
Barnes, F. E., Ph.D........................... California
Bingham, C. R., Ph.D....................... Tennessee
Bliss, W. E., Ph.D............................ Michigan State
Breinig, M., Ph.D................. Oregon
Bugg, W. M., Ph.D...................... Tennessee
Burdgoeder, J. (Distinguished Prof.), Ph.D............................. Freie Universitat Berlin
Callcott, T. A., Ph.D............... Purdue
Childers, R. W., Ph.D.................... Vanderbilt
Cramer, H. W. (UTSI), Ph.D.............. Yale
Eguluz, A. G., Ph.D.......................... Brown
Eiston, S. B., Ph.D....................... Massachusetts
Georgiou, S., Ph.D......................... Manchester
Guidry, M. W., Ph.D...................... Tennessee
Henderson, T., Ph.D..................... Rutgers
Hart, E. L., Ph.D.................... Cornell
Karnychkov, I., Ph.D...................... ITEP (Russia)
Lewis, J. W. L. (Distinguished Prof.) (UTSI), Ph.D................ Mississippi
Macek, J. (Distinguished Scientist), Ph.D......................................... Rensselaer
Mahan, G. D. (Distinguished Scientist), Ph.D.................. California
Nazarwicz, W., Ph.D..................... Warsaw
Painter, L. R., Ph.D..................... Tennessee
Pegg, D. J., Ph.D...................... New Hampshire
Plummer, E. W. (Distinguished Scientist), Ph.D................ Cornell
Quinn, J. J. (Willis Lincoln Chair of Excellence), Ph.D................ Maryland
Rieutort, E. L., Ph.D..................... Vanderbilt
Shih, C. C. (Liaison), Ph.D................ Cornell
Sorensen, S. P., Ph.D................ Copenhagen
Strayer, M. R., Ph.D..................... MT
physics during the fall semester registration period.

THE MASTER'S PROGRAM

Thesis Option

This program is designed primarily for students intending to go into industrial 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, or 571-72. Each candidate must present an acceptable thesis, 6 hours of Physics 500, and pass an oral examination on course material and thesis.

The department offers an M.S. thesis program with a concentration in geophysics. Program requirements are: 12 hours from Physics 531-32, 541-42, 571-72; a minimum of 12 additional hours in geology, geophysics, and/or physics, as approved by the student's committee; and the presentation of an acceptable thesis, 6 hours of Physics 500, and the passing of an oral examination on course material and thesis.

Non-Thesis Option

This program is 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, of which at least 12 semester hours are taken from Physics 431-32, 441-42, and 571-72; 6 semester hours in a minor field; and 6 semester hours from other courses numbered above 499 (preferably 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, 571-72, and 611. Physics 601-02 are normally required of students specializing in atomic physics; Physics 621-22 of students in nuclear physics; Physics 626-27 of students in elementary particle physics and/or Physics 613-14 for students specializing in theoretical high-energy physics; Physics 671-72 of students in condensed matter and surface physics; and Physics 681-82 of students specializing in molecular spectroscopy. Students specializing in chemical physics may substitute Chemistry 572 for Physics 551, and should complete at least 6 semester hours from Chemistry 650-670.

The courses Physics 531-32, 571-72, 521-22, 541-42 constitute the core curriculum. They are the usual basis for the departmental comprehensive examination which is normally taken by a well-prepared student after two years of graduate study. The dissertation topic will be chosen with reference to one of the fields in which research facilities can be made available either at The University of Tennessee laboratories in Knoxville; The University of Tennessee Space Institute at Tullahoma, Tennessee; the Oak Ridge National Laboratory, Oak Ridge, Tennessee; or at other research facilities used by the University faculty.

Astronomy

GRADUATE COURSES

411 Astrophysics (3) Development of analytical physical models of galactic structure of universe, stellar and interstellar matter, and planetary systems. Topical and interdisciplinary, consideration of quasars, pulsars, black holes and current developments in field. Acceptable for major credit in physics. Prereq: Physics 232 and consent of instructor.

490 Special Topics in Astronomy (1-3) Topics of current interest in astrophysics. Acceptable for graduate credit in physics with consent of department. May be repeated with consent of department. Maximum 6 hrs.

Physics

GRADUATE COURSES

411-12 Introduction to Quantum Mechanics (3,3) Fundamental principles of quantum mechanics and methods of calculation. Solution of Schrödinger equation for simple systems. Application to atomic, molecular, nuclear, and condensed matter physics. Must be taken in sequence. Prereq: Fundamentals of Physics or Modern Physics or equivalent, and instructor consent.

421 Modern Optics (3) Transmission of light in uniform, isotropic media; reflection and transmission at interfaces; mathematics of wave motion and interference effects. Rudiments of Fourier optics and holography. Prereq: 431, or Introduction to Physics for Physical Science and Mathematics Majors or Honors. Fundamentals of Physics for Physics Majors or Fundamentals of Physics: Wave Motion, Optics, and Modern Physics and consent of instructor. 3 hrs. and 3 labs.


461-62 Modern Physics Laboratory (3,3) 461 - Introduction to fundamental and modern techniques in experimental physics, and to theory and practice of measurement and data analysis. Selected experiments in nuclear, atomic, molecular and solid state physics, and modern optics. Prereq: Electronics Laboratory and either Fundamentals of Physics: Modern Physics or 411. 462 - Advanced experiments and experimental techniques in modern physics; experimental team work. Thorough quantum mechanical interpretation of results and preparation of scientific reports. Prereq: 461. 6 hrs lab per week.

490 Senior Seminar (1-3) Topic of current interest. May be repeated with consent of department. Maximum 6 hrs.

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

501 Graduate Research Participation (2) Advanced research techniques under supervision of staff research director whose research area coincides with interests of student. Open to all graduate students in good standing. Prereq: Consent of department and research director. May be repeated with consent of department. Maximum 16 hrs. S/N only. E

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

505 Physics of Fluids (3) Fluid physics, overview of fluid mechanics and associated computational tech-
niques; general description of laminar and turbulent flows; subsonic, supersonic, and hypersonic flows; continuum, transitional and free-molecular flows; pipe flow, nozzle flow and sonic orifice expansion flows; reading and correct nozzle; stethoscope physics, and introduction to methods of characteristics and Monte Carlo computational techniques.

506 Experimental Methods (3) Principles, real operational behavior, and hazards of laser types, radiation detectors, photomultipliers, image intensifiers, image converters, image dissectors, streak cameras, and fast-framing cameras; high-vacuum systems including cryogenic-based devices, data acquisition techniques, including autonomous detection, digital electronics methods and micro-computer data acquisition and registration methods.

507 Contemporary Optics (3) Topics in geometrical, physical, Fourier, and nonlinear optics and introductory laser physics. Experiments on the design and development of practical and sophisticated optical systems.

508 Laser Physics (3) Mode analysis, stable and unstable resonators; rate equations and population inversion, saturation, relaxation oscillations, fluctuations and noise, laser stability; quantum theory of laser, photon coherence; mode-locking, Q-switching and free-running lasers; specific laser types; semiconductor and solid-state, excimer, copper vapor and dye lasers.

511-12 Theoretical Physics (3,3) Classical theoretical physics, with limited use of mathematics. Prereq: 312, 432, advanced calculus, differential equations, and vector analysis.


532 Advanced Classical Mechanics (3) Canonical transformations, Hamilton-Jacobi theory and action-angle variables, KAM theorem and Hamiltonian chaos, dissipative chaos, relativistic kinematics, Minkowski spacetime, relativistic scattering and threshold problems. Prereq: 531.


555 Solid State Physics (3) Elementary solid state physics. Crystal structures, reciprocal lattice, bonding in solids, energy bands, semiconductors, phonons, free-electron-gas theory of metals, superconductivity, magnetism, and other forms of broken symmetry. Prereq: 552 or consent of instructor.

561 The Theory of Relativity (3) Geometry of space-time, relativity, electrodynamics, particle mechanics and continuum mechanics. Einstein's field equations, Schwarzschild solutions, the classical test of general relativity. Prereq or coreq: 531 and 542.

571-72 Mathematical Methods in Physics (3,3) Linear vector spaces, matrices, tensors, curvilinear coordinates, functions of a complex variable, partial differential equations and boundary value problems, Green's functions, integral transforms, integral equations, spherical harmonics, Bessel functions, calculus of variations, perturbation methods, path integrals; general quantization of gauge fields; applications in QED and in SU(2) x U(1) theory, quantum chromodynamics (QCD): the family of GUTS (grand unified theories), TOE's (theories of everything, including quantum gravity). Prereq: 522 or consent of instructor.

621-22 Nuclear Structure (3,3) General properties of nuclei; two-body scattering problems; saturation and symmetry properties of nuclear forces; theory of light nucleus, nuclear spectroscopy; special nuclear models; theory of nuclear reactions, theory of beta-decay. Prereq: 571-72.

626-27 Elementary Particle Physics (3,3) Survey in elementary particle physics covering experimental methods, conservation laws, invariance principles, and models of interactions. 627-Advanced topics: quark models, electroweak interactions and unification of elementary forces. Prereq: 522.

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: 532, 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 valence 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, astrophysics, boundary value problems in electromagnetism, atomic and nuclear structures, band structure in solid state physics, transport problems in statistical mechanics, Monte Carlo simulation of liquids, fitting and interpolation of data, correlation analysis, or optimization strategies. Prereq: 522, 531, 542, and 572.


Plant and Soil Sciences

(College of Agricultural Sciences and Natural Resources)

MAJOR

DEGREES

Plant and Soil Sciences ............... M.S., Ph.D.

Fred L. Allen, Head

Professors:

Allen, Fred L., Ph.D. .......... Minnesota
Ammons, J. Tom, Ph.D. .......... West Virginia
Ashburn, Elmer L., Ph.D. .......... Tennessee
Beals, Frank J. (Emeritus), Ph.D. .......... Iowa State
Burns, Joe D. (Emeritus), M.S. .......... Auburn
Coffey, David L., Ph.D. .......... Purdue
Conger, Bob V. (Distinguished Prof.), Ph.D. .......... Washington State
Denton, H. Paul, Ph.D. .......... NC State
Deyton, Dennis E., Ph.D. .......... NC State
Flinchum, Wayne T., Ph.D. .......... Louisiana State
Foss, John E. (Emeritus), Ph.D. .......... Minnesota
Fowles, Donald J., Ph.D. .......... Virginia Tech
Hayes, Robert M., Ph.D. .......... Illinois
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 a thesis, students are required to complete three hours of 593 for satisfactory participation in a single research project for a period of 12 weeks and the writing of an original, creative, and well-written report.

A graduate advisory committee will be assembled at the beginning of the student's program. The committee consists of the major professor, who acts as chair of the committee, and at least two other faculty members. This committee approves the student's plan of study and the participation and report on research activity from 593. In addition, this committee administers and evaluates a comprehensive written examination that serves to integrate the student's coursework.

In addition to three hours of 593, a minimum of 30 hours of graduate coursework is required. At least 20 hours must be taken in courses 501 or above. The student must also take at least 12 of the 30 hours in Plant and Soil Sciences courses, excluding Thesis 500. The student's committee may require additional coursework beyond the 30 hours if the student's progress or background indicates a need or deficiency. All students pursuing the M.S. degree must take the following courses: 500 Scientific Communication (1 hr), 502 Soil-Plant Relations (1 hr), 511 Soil-Plant Relations (3 hrs). The student must also present an exit seminar to the Department over the research project.

The Department of Plant and Soil Sciences offers graduate programs leading to the Master of Science and the Doctor of Philosophy. Concentrations for the graduate programs are offered in soil science, plant breeding and genetics, and crop physiology and ecology. For further information, contact the department head.

**THE MASTER'S PROGRAM**

**Thesis Option**

A written thesis based on original research is required. A graduate advisory committee will be assembled at the beginning of the student's program. The committee consists of the major professor, who acts as chair of the committee, and at least two other faculty members. Prior to conducting research, the student must develop a detailed written research proposal that shall be approved by the student's committee. Upon completion of the thesis, this committee will also conduct the final oral examination that integrates the thesis and coursework.

Six hours of 500 Thesis are required. In addition to the thesis hours, a minimum of 24 hours of graduate coursework is required. At least 14 of these hours must be taken in courses numbered 501 and above. The student must take at least 12 of the 24 hours in Plant and Soil Sciences courses, excluding 500. The student's committee may require additional coursework beyond the 24 hours if the student's progress or background indicates a need or deficiency. All students pursuing the M.S. degree must take the following courses: 500 Scientific Communication (1 hr), 502 Seminar (1 hr), 511 Soil-Plant Relations (3 hrs). The student must also present an exit seminar to the Department over the research project.

All students pursuing a concentration in soil science must also take at least three of the following courses: 512, 513, 514, and 516. All students pursuing a concentration in plant breeding and genetics or in crop physiology and ecology must take two of the following courses: 532, 551, and 553.

**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 28 hours must be completed in courses numbered above 500 exclusive of doctoral research and dissertation, of which 6 must be in courses numbered above 600. A minimum of 9 hours of graduate course work taken during the doctoral program must be outside the department in one or more cognate areas.

The student and the major professor identify a doctoral committee composed of at least four faculty members holding the rank of assistant professor or above, three of whom, including the chair, must be approved by the Graduate Council to direct doctoral research. At least one member must be from outside the department. The committee must approve all coursework applied toward the degree, certify the student's mastery of the major field and any cognate fields, direct the research, and recommend the dissertation for approval and acceptance by The Graduate School.

**GRADUATE COURSES**

412 Soil Genesis and Classification (3) Soil genesis and formation, recognizing and describing morphology of agricultural and forested soils, and the soil-plant-weather and physical properties, classification, 3 weekend field trips. Prereq: Soil Science. 2 hrs and 1 lab.

413 Environmental Soil Chemistry (3) Composition and chemical properties of soils and processes that govern fate and behavior of chemicals in soil environment: clay mineralogy; soil organic matter; mineral weathering and stability; aqueous speciation; surface chemistry; ion exchange, adsorption and molecular retention; oxidation-reduction; and soil acidity, alkalinity, and salinity. Prereq: Soil Science and Introduction to Organic and Biochemistry or Organic Chemistry or equivalent.


415 Soil Hydrology (3) Physical relationships among soil, liquid, and gaseous phases of soil system. Relationships of soil properties to processes governing transport of water, and chemicals in soil. Prereq: Soil Science. 2 hrs and 1 lab.

416 Soil Phosphorus and Nitrogen (3) Phosphorus and nitrogen relationships in soil and plant systems. Available, uptake, and management. Prereq: Soil Science. 3 hrs.

419 Soil Organic Matter (3) Soil organic matter and mineral matter interactions; humic substances and their role in soil fertility. Prereq: Soil Science. 3 hrs.


421 Soil Genesis and Classification (3) Soil genesis and formation, recognizing and describing morphology of agricultural and forested soils, and the soil-plant-weather and physical properties, classification, 3 weekend field trips. Prereq: Soil Science. 2 hrs and 1 lab.


423 Soil Genesis and Classification (3) Soil genesis and formation, recognizing and describing morphology of agricultural and forested soils, and the soil-plant-weather and physical properties, classification, 3 weekend field trips. Prereq: Soil Science. 2 hrs and 1 lab.

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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.

Applications 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 meet proficiency in the use of software applications for the personal computer. This requirement can be fulfilled by achieving a satisfactory grade in 105, a workshop in computer applications. Exceptions to this requirement will be considered on an individual basis.

The M.P.A. is a non-thesis program requiring 39 hours. Specific requirements include the following:

1. Core Curriculum (24 hours)
   a. General perspectives (9 hours) - 550 Public Administration; 552 Organization Theory; and one of the following: 539 State and Local Government; 540 Public Policy; 546 Law and the Administrative Process; 548 Public Policy Process; 558 Theory of the Politics of Administration; or 556 Ethics, Values, and Morality in Public Administration.
   b. Analytical skills (9 hours) - 512 Quantitative Political Analysis; 514 Research and Methodology in Public Administration.
   c. Management skills (9 hours) - 550 Public Budgeting and Finance; and any two of the following: 552 Public Management; 564 Human Resources Management; 566 Policy Analysis.
   d. Specialization (9 hours)

2. Internships are arranged in consultation with the coordinator of the M.P.A. degree program.
3. Final Examination
   A written final examination, which may be followed by an oral examination, is required.

DUAL J.D.-M.P.A. PROGRAM

The College of Law and the Department of Political Science 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 degree. In this program, a student may earn the M.P.A. and J.D. degrees in about four years rather than the five years that otherwise would be required. Students pursuing the dual degree program should plan to be enrolled in coursework or an internship for one summer term in addition to taking normal course loads for four academic years.

Admission

Applicants for the J.D.-M.P.A. program must have a minimum 3.0 GPA and have earned a composite score of at least 1100 on the verbal and quantitative parts of the GRE. A minimum LSAT score of 120 is normally required. Students are 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.

Curriculum

A dual degree candidate must satisfy the requirements for both the J.D. and the M.P.A. degrees, as well as the requirements for the dual program. The College of Law will award a maximum of 9 semester hours of credit toward the J.D. degree for successful completion of approved graduate level courses (500 or 600 level) offered in the Department of Political Science. The M.P.A. program will award a maximum of 9 semester hours of credit toward the M.P.A. degree for successful completion of approved courses offered in the College of Law. All courses for which such cross-credit is awarded must be approved by the J.D.-M.P.A. coordinators in the College of Law and the Department of Political Science. All candidates for the dual degree must successfully complete Administrative Law (582) and are encouraged to take Local Government (Law 824). An internship is strongly recommended for students in the dual degree program, as it is for all M.P.A. candidates, but an internship is not required.

In addition, students must satisfy a research tool requirement. Usually, students meet this requirement by completing 12 hours of coursework, 24 hours of coursework beyond, and a minimum 3.5 GPA and have earned a composite score of at least 1100 on the verbal and quantitative parts of the GRE.

Admission

Applicants for admission to the program must have completed a bachelor's degree in political science, with a 3.5 GPA and have earned a composite score of at least 1100 on the verbal and quantitative parts of the GRE.

Examinations

All students must complete an oral examination on the dissertation. In addition, students must meet the research tool requirement. Usually, students meet this requirement by completing 12 hours of coursework, 24 hours of coursework, and a minimum 3.5 GPA and have earned a composite score of at least 1100 on the verbal and quantitative parts of the GRE.

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MINOR IN ENVIRONMENTAL POLICY

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

GRADUATE COURSES

430 United States Constitutional Law: Sources of Power and Restraint (3) Analysis of judicial review, constitutional powers of President and Congress, federalism, sources of regulatory authority, and constitutional protection of political and economic rights. (Same as Legal Studies 430.)

431 U.S. Constitutional Law: Civil Rights and Liberties (3) Analysis of current issues in civil rights and liberties including: first amendment freedoms, equal protection, privacy and rights of accused. (Same as Legal Studies 431.)

435 Criminal Law and Procedure (3) Substantive and procedural law in criminal justice field: constitutional questions and public policy issues.


442 Administrative Law (3) Legal dimensions of administrative procedures and controls over administrators. (Same as Legal Studies 442.)

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.

456 Latin American Government and Politics (3) Political development of Latin America: contemporary politics. (Same as Latin American Studies 456.)

459 Government and Politics of 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 function. Compliance of international law in context of international conflict. (Same as Legal Studies 470.)

471 International Political Economy (3) Economic relations between countries: theoretical and case studies of efforts to construct multilateral international institutions. Topics: economic growth, international trade and investment, development and global equity.

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 before degree is completed. May not be used toward degree requirements. May be repeated. S/N/C 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 multivariate statistics.

513 Quantitative Political Analysis (3) Methods and techniques in quantitative political analysis: multivariate model building.

514 Research and Methodology in Public Administration (3) Basic assumptions and techniques of research in public administration; measurement, analysis, and reporting of data.

520 Political Theory (3) Survey of major ideas, thinkers and works of Western political theory.

522 American Political Thought (3) Systematic examination of the normative and empirical theories of leading American political thinkers from the colonial period to the present.

530 American Government and Politics (3) Survey of American politics, 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.

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 service.

553 Management of Information Systems (3) Theory, design, development, implementation and evaluation of information systems in public organizations. Data base systems, computer applications, and training for management information technology.

556 Policy Analysis (3) Strategies and techniques for identification and analysis of public problems and policy solutions. May be repeated with consent of department. Maximum 9 hrs.

558 The Politics of Administration (3) Examination of public administration in context of American political system, policy making and political roles of public administrators and agencies. May be repeated with consent of department. Maximum 9 hrs.

560 Public Financial Administration (3) Principles and techniques of public finance at state and local levels: budget preparation, execution and audit, risk management, capital planning, major tax structures, economic forecasting, cash management, and debt administration.

562 Public Management (3) Interpersonal and leadership skills, techniques and methods for planning, decision making, and implementation of management strategies in public sector. May be repeated with consent of department. Maximum 9 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/C only.

570 Comparative Government and Politics (3) Selected topics in modern governments. May be repeated with consent of department. Maximum 6 hrs.

572 The Politics of Development (3) Selected topics dealing with political problems of less developed countries. May be repeated with consent of department. Maximum 9 hrs.

574 Area Seminar in Comparative Government and Politics (3) Selected topics in area studies: African, Asia, Latin America, Middle East, Soviet Union and Eastern Europe or Western Europe. May be repeated with consent of department. Maximum 9 hrs.

580 International Politics (3) Survey of literature and major aspects of international politics. May be repeated with consent of department. Maximum 9 hrs.

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

592 Off-Campus Study (1-15) See College of Arts and Sciences.

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

594 College Teaching in Political Science (1) Instructional effectiveness, techniques, organization, materials for teaching political science at college level. Prereq: Consent of instructor. S/N/C only.

595 Readings and Special Problems in Political Science (1-3) Prereq: Consent of instructor. May be repeated. Maximum 15 hrs.

596 Workshops in Computer Applications (1) Training in software applications to support research and decision making tasks in public service. Successful completion certifies proficiency of MPA students in use of software applications for personal computer. S/N/C only.

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 application of formal political models, including game theory, rational choice theory, and public 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 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 published research and judicial decision: development of constitutional law as major component of public policy. May be repeated with consent of department. Maximum 9 hrs.
654 Contemporary Public Policies (3) Problems in one or more public policy areas from political and administrative perspectives. Topics selected by instructor. May be repeated with consent of department. Maximum 9 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.

668 Special Topics in Public Administration (3) Analysis of selected issues and problems in public administration. May be repeated. Maximum 9 hrs.

670 Special Topics in Comparative Government and Politics (3) Research into selected topics. May be repeated with consent of department. Maximum 9 hrs.

682 Theory and Analysis of U.S. Foreign Policy Processes (3) Theoretical approaches to decision making in foreign policy area and analysis of policymaking process. May be repeated with consent of department. Maximum 9 hrs.

688 Special Topics in International Politics (3) Selected issues and problems in international politics. Specific content determined by instructor. May be repeated with consent of instructor. Maximum 9 hrs.

THE DEGREES

Polymer Engineering
See Materials Science and Engineering

Psychology
(College of Arts and Sciences)

MAJOR

Psychology

DEGREES

M.A., Ph.D.

James E. Lawler, Head

Professors:
Burghardt, Gordon M. (Distinguished Prof.), Ph.D. ................. Chicago
Calhoun, William H., Ph.D. .............. California
Fine, Harold J. (Emeritus), Ph.D. .............. Syracuse
Handel, Stephen J., Ph.D. .............. Johns Hopkins
Handler, 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.  .............. North Carolina
Lounsbury, John W., Ph.D. .............. Michigan State
Lubar, Joel F., Ph.D. ................. Chicago
Malone, John C., Ph.D. ................. Duke
Newton, Kenneth R. (Emeritus), Ph.D.  .............. Tennessee
Pollio, Howard R. (Distinguished Prof.), Ph.D.  .............. Michigan
Samejima, Fumiko, Ph.D. .............. Kelo
Saudargas, Richard A., Ph.D. .............. Florida State
Shrader, Raymond R. (Emeritus), Ph.D. .............. Tennessee
Sundstrom, Eric D., Ph.D. .............. Utah
Travis, Cheryl B., Ph.D. .............. California (Davis)
Verplank, William S. (Emeritus), Ph.D. Brown
Wahler, Robert G., Ph.D. .............. Washington
Wiberley, J. Albert (Emeritus), Ph.D. Syracuse

Associate Professors:
Baldwin, Deborah R. (Liaison), Ph.D. ............. Kent State
Johnson, Michael G., Ph.D. ........ John Hopkins
Mchtyre, Anne, Ph.D. .............. Yale
Morgan, Wesley G., Ph.D. ............. Tennessee
Nash, Michael R., Ph.D. ........ Massachusetts

Assistant Professors:
Gordon, Kristina C., Ph.D. ............. North Carolina

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, or 565 or 420, or 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. All students must submit scores from the Graduate Record Examination (general and subject).

Experimental Psychology
The Ph.D. program in Psychology with a concentration in experimental psychology is designed to allow students to select from a variety of specializations oriented toward careers in research, teaching, and application of psychology in academic, institutional, or industrial settings. The program is flexible, individualized, and emphasizes a professional apprenticeship model of training.

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 507 or 571).
3. Six semester hours of research practicum (508).
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. Comprehensive examination, determined and evaluated by the student's doctoral committee. This examination is comprised of an integrative review or theoretical paper and an oral exam or additional questions.
9. Twenty-four hours of dissertation research (600).
10. An original piece of research in the form of a doctoral dissertation, proposed, conducted, and defended.

Clinical Psychology
This program is designed to lay the groundwork for a career as a clinical psychologist capable of working in both academic and applied settings. The program emphasizes the theoretical foundations of psychology as well as supervised experience oriented toward the development of practical skills. The program embodies a model of clinical psychology in which practice and research are integrated.

Clinical program students must complete a predissertation research project by the end of the second year.

After forming the doctoral committee, students must then pass a comprehensive examination administered and evaluated by the committee. The examination is comprised of two papers, one addressing a topic of the student's choice, and the second addressing an understanding of one individual's personality and cognitive functions. All doctoral students must complete a minimum of 78 hours of graduate level courses, including courses required by their program; at least 6 hours in courses outside of psychology; and at least 24 hours of dissertation research (Psychology 600). Finally, students must complete an acceptable doctoral dissertation and conduct a satisfactory oral defense of the dissertation.

Requirements 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. Supervised clinical placement two days (16 hours) each week during the second
year, and the following option during the third and fourth years:

a. continued two day clinical placement in the third and fourth years.
b. teaching assistantship in the department in either the third or fourth year and two day clinical placement in the other year.
c. satisfactory completion of listed courses (or equivalents) in the following sixteen categories:

1. Foundations of Psychology: Biological Factors, Perception, Learning, Thinking, Motivation (513);
2. Interviewing and Observation (558) and Laboratory (559);
3. Research Practicum (509) (4 hrs.);
4. Life-Span Development (512) or Developmental Psychology (511);
5. Personality: Theory and Research I and II (570-71);
6. History and Systems of Psychology (565);
7. Research Questions and Designs (580);
8. Psychological Assessment I and II (594-95) and Laboratory (596);
9. Empirical Methods in Psychology (504) and Research Design (505);
10. Social Psychology (550);
11. Field Placement in Clinical Psychology (695) (18 hrs.);
12. Dynamics of Psychopathology (573);
13. Psychometrics (555) or Applied Psychological Measurement (557);
14. Ethical, Legal, and Professional Issues in Psychology (523);
15. Psychiatric Psychotherapy I and II (670-71) and Laboratory (675) (4 hrs.);
16. Doctoral Research and Dissertation (600) (24 hrs.).

5. Satisfactory completion of a one-year clinical internship at a site approved by the program.
6. Students who choose a teaching assistantship in the third or fourth year must have satisfactorily completed 528 College Teaching in Psychology.
7. Satisfactory completion of at least 3 additional graduate-level courses in non-clinical psychology.
8. Satisfactory completion of a one-year clinical internship at a site approved by the program.

GRADUATE COURSES


409 Group Facilitation (3) Study of theory and techniques through supervised experience in small groups. Prereq: General Psychology or consent of instructor. May be repeated. Maximum 6 hrs.

410 Sensory Processes & Perception (3) Survey of physiological and psychological theories of perception. Audition and vision. Prereq: General Psychology or consent of instructor, Statistics in Psychology or Statistical Reasoning or Introduction to Statistics or graduate standing.

415 Psychology of Religion (3) History of psychology of religion: various philosophical and empirical orientations. Psychological function of religion for individuals and society. Prereq: General Psychology or consent of instructor.

420 History and Systems of Psychology (3) History of psychological thought. Classical approaches and recent developments. Prereq: General Psychology or consent of instructor or graduate standing.

424 Psychology and the Law (3) Psychological aspects of legal systems. Prereq: General Psychology or consent of instructor. (Same as Legal Studies 424.)

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: General Psychology or consent of instructor.

434 Psychology of Gender (3) Biological, psychological, and social factors in gender: importance, gender roles and stereotypes for behavior and experience. Prereq: General Psychology or consent of instructor. (Same as Women's Studies 434.)

440 Organizational Psychology (3) Social-psychological analysis of organizations, role-theory and systems theory. Prereq: General Psychology and Social Psychology or consent of instructor.


450 Comparative Animal Behavior (3) (Same as Ecology and Evolutionary Biology 450.)

459 Comparative Animal Behavior Laboratory (3) Coreq: 450. (Same as Ecology and Evolutionary Biology 450.)

461 Physiological Psychology (3) Nervous system and physiological correlates of behavior: Biological basis of emotion, learning, memory and stress. Prereq: General Psychology or consent of instructor and either Biodiversity and Organization and Function of the Cell, or Human Origins and Principles of Biological Anthropology.

470 Theories of Personality (3) Survey of major theories of human personality and their development. Prereq: General Psychology or consent of instructor.

475 Adolescent Development (3) Theoretical perspectives and empirical research findings pertinent to adolescent development. Prereq: General Psychology or consent of instructor. Sp

480 Theories of Learning (3) Classical and current approaches to learning and cognition. Prereq: General Psychology or consent of instructor.

482 Topics in Psychology (3) Intensive analysis of special topics: Afro-American psychology or evaluation of programs in community. Prereq: General Psychology or consent of instructor. May be repeated. Maximum 6 hrs.

488 Supervised Research (1-6) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs in 489, 491, 492, and 493 combined may apply toward undergraduate major.

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 summer session, 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.

503 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. Design of studies to maximize validity. Prereq: Consent of instructor. Sp

507 Foundations of Applied Psychology (3) Fundamental methods for application of psychology principles and techniques in community, organizational, and industrial settings, and related ethical and theoretical issues. Prereq: 505 and consent of instructor.

508 Readings and Special Issues in Psychology (1-3) Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E

509 Research Practicum (1-3) Required of first-year graduate students in psychology. May be repeated. Maximum 9 hrs. S/N 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, Thinking, Motivation (3) Intensive survey. Prereq: Consent of instructor.

515 Colloquium in Experimental Psychology (1) Research and practical issues in experimental psychology. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. S/N only, F,Sp

516 Colloquium in Ethology (1) Current research and theory. May be repeated. Maximum 9 hrs. (Same as Ecology and Evolutionary Biology 516.) S/N only. E

526 General Vertebrate Neuroanatomy (3) Lecture and laboratory. Structure and functioning of central and peripheral nervous system. Prereq: 461, 469, or equivalent and consent of instructor.

527 Behavioral Neurology (3) Disorders of nervous system, organic brain dysfunctions. Diagnosis and treatment. Prereq: Consent of instructor.

528 College Teaching in Psychology (3) Concepts, techniques, and materials for teaching psychology at college and/or university level. Prereq: Consent of instructor. S/N only.


545 Advanced Animal Behavior (3) (Same as Ecology and Evolutionary Biology 545.)

546 Ethological Psychology (3) Basic ethological concepts and methods in psychology of 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 Ecology and Evolutionary Biology 547.)

550 Social Psychology (3) Survey of theory and research concerning interpersonal interaction and individual behavior in social context. Prereq: Consent of instructor.

554 Laboratory in Psychometrics (3) Further learning about psychometrics: item response theory (modern item test theory), factor analysis, and applications of those methods using computer programs in simulated or empirical data. Prereq: 555. May be repeated. Maximum 6 hrs.

555 Psychometrics (3) Basic concepts: factor analysis, scale test theory, probability models and their applications, computerized adaptive testing and other topics. Prereq: Statistics 537-538 or equivalent. May be repeated. Maximum 6 hrs.

557 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 analyze of language content, style, and language. Explanation of important aspects of interviewee's life. Prereq: Admission to doctoral program in clinical psychology or consent of instructor. Coreq: 559.
Religious Studies

(College of Arts and Sciences)

Charles H. Reynolds, Head

Professors:
Dungan, David L., Th.D. ............... Harvard
Hackett, Rosalind J., Ph.D. .......... Aberdeen
Humphreys, W. Lee, Ph.D. ......... Union
Linge, David E., Ph.D. ............... Vanderbilt
Lusby, F., Stanley (Emeritus), M.Div. ................. Colgate
Norman, Ralph V., Jr., Ph.D. ........ Yale
Reynolds, Charles H., Ph.D. .......... Harvard
Schmidt, Gila G., Ph.D. ............... Pittsburgh

Associate Professors:
Fitzgerald, James L., Ph.D. .......... Chicago
Gwynne, Rosalind W., Ph.D. ....... Washington
Hodges, John O., Ph.D. ............. Chicago
Hulsether, Mark, Ph.D. ............. Minnesota
Levering, Miriam L., Ph.D. ......... Harvard

A master's degree in Philosophy with a concentration in religious studies is available. Contact the department for details of this program. Graduate courses in religious studies provide opportunity for students in a variety of disciplines to pursue work in religious studies as a graduate concentration.

GRADUATE COURSES

405 Modern Jewish Thought (3) History, culture, and geography of the now Israeli portion of Levant from 1850 to present. Founding of modern state of Israel in 1948 and political complexities of Middle East. Israeli culture and literature. Writing emphasis course. (Same as Judaic Studies 405.)

411 Modern Religious Philosophies (3) Religious implications of major Western thinkers and movements from Nietzsche to twentieth-century German idealists. (Same as Philosophy 411.)

Russian

See Modern Foreign Languages and Literatures
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.

Karen Sowers, Dean

Professors:
Bloch, Mary H. (Emeritus), M.S. ...... Ohio State
Cetinog, Muammer, Ph.D. ............... Washington (St. Louis)
Fayer, Gideon W. (Emeritus), Ed.D. .... Columbia
Glisson, Charles A., Ph.D. ............... Washington (St. Louis)
Granger, Ben P. (Emeritus), Ph.D. ...... Brandeis
Hirayama, Hisashi (Emeritus), D.D.S.W. ...... Tokyo

Associate Professors:
Bell, William J., Ph.D. ................. Tulane
Campbell, Paul M., D.S.W. .......... Alabama
Combs-Orme, Terri, Ph.D. ................ Tulane

Mullins, M. Kate (Emeritus), Ph.D. ...... Chicago
Noe, Roger M., Ph.D. ...................... Tulane
Orten, James D. (Emeritus), D.S.W. .... Alabama
Rubinslien, Hia (Emeritus), Ph.D. ...... Chicago
Shatz, Eunice (Emeritus), Ph.D. ....... Brandeis
Sowers, Karen, Ph.D. ..................... Florida State
Wodarski, John, Ph.D. Washington (St. Louis)

Assistants:
Bowie, Stan L., Ph.D. ................... Barry
Cummings, Sherry, Ph.D. ............... Georgia
Davis, Cindy, Ph.D. ....................... UCLA
DeCoster, Vaughn, Ph.D. ............... LSU
Dulmus, Catherine, Ph.D. ............... SUNY (Buffalo)
Ellis, Rodney, Ph.D. ...................... Florida International
Evans, Theora A., Ph.D. ................ Minnesota
MacMaster, Samuel A., Ph.D. .......... Case Western Reserve
Page, Timothy F., Ph.D. ............... Western Michigan
Rogge, Mary, Ph.D. ...................... Washington (St. Louis)
Staudt, Mary, Ph.D. Washington (St. Louis)

Clinical Associates/Field Practice
Coordinators:
Allen, Sandra (Memphis), M.S.S.W. ............. Tennessee
Bailes, Melinda (Nashville), M.S.S.W. ............ Texas (Arlington)
Betz, Phyllis (Knoxville), M.S.S.W. Tennessee

THE MASTER'S PROGRAM
The Master of Science in Social Work program prepares social workers to provide professional leadership in 1) clinical social work practice and 2) social work management and community practice. These objectives are met through a curriculum requiring of all students a professional foundation and a concentration in either clinical social work practice or social welfare management and community practice. The M.S.S.W. program is accredited by the Council on Social Work Education.

Admission Requirements
Admission to the master's program is based on the following requirements:
1. A Bachelor's degree from an accredited college or university with appropriate preparation in the social sciences. At least three-fourths of the applicant's undergraduate work should be in the social sciences, humanities, physical sciences, and other Arts and Sciences subjects. Applicants must have a course in human biology and demonstrate a liberal arts perspective through coursework in at least four of the following five areas: economics or mathematics, government, political science or history, sociology or anthropology, psychology, philosophy, literature, or the arts.
2. Applicants with other academic backgrounds may request consultation to discuss ways that they can meet the requirements.
3. A grade point of 2.7 or higher on a 4.0 scale. Applicants falling below this average may be considered for probationary admission on the basis of supplemental evidence of the ability to perform at a satisfactory level. The University requires a minimum GPA of 2.7 for admission to The Graduate School.
4. Personal qualifications acceptable for entrance into the professional practice of social work.
5. All applicants must submit up-to-date transcripts to the Graduate Record Examination (general). Preference is given to applicants with a GPA of 3.0 or above in their undergraduate work with substantial preparation in the social sciences.

Advanced Standing
The University of Tennessee College of Social Work has an advanced standing program. Admission to advanced standing requires: (1) a B.S.W. from an accredited program, (2) an overall undergraduate GPA of 3.0 or higher, and (3) personal qualifications acceptable for entrance into the professional practice of social work. Students admitted into advanced standing are required to complete a minimum of 36 hours of study in either of the college's concentrations clinical social work practice or social work management and community practice. These students will follow the curriculum plan and meet all requirements of the concentration during three semesters of study in the program.

Extended Study
Planned part-time programs are available in all three locations of the college. Admission requirements are the same as for full-time study. Coursework can be completed over a three-year period.

Financial Aid
Students may apply directly to the University's Financial Aid Office for assistance such as the National Direct Student Loan or the Work-Study Program. Information regarding scholarships administered by the College is made available after admission.

General Requirements
1. The program requires successful completion of a minimum total of 60 semester hours including completion of the foundation curriculum (30 hours) and 30 hours in one of the two concentrations (clinical social work practice or social welfare management and community practice).
2. Students may select a thesis or non-thesis option. Students pursuing the thesis option receive six credit hours for successful completion.
3. Students must successfully complete a comprehensive exam or thesis defense.
4. Students must have an overall GPA of 3.0 or better on all graded courses and satisfactory performance in field.

The Professional Foundation Curriculum
All students must complete 30 semester hours in the foundation curriculum consisting of 24 hours in foundation classroom courses and 6 hours in field practice. The foundation is the initial phase of the master's program. It contributes to the process of professional identification and presents a comprehensive, broad base of theory, knowledge and skills from which to practice. The foundation classroom courses include Foundations of Social Work Practice I, II and III; Human Behavior in the Social Environment I and II; Social Welfare Policy, Social Work Research, and Social Work and Oppression. Students also complete a two-semester field placement, Field Practice (6 hours). Upon successful completion of the foundation curriculum, all students must complete a minimum of 30 hours in the concentration curriculum including field practice (12 hours). Students select a concentration in clinical social work practice or social welfare management and community practice.

Clinical Social Work Practice: The clinical social work practice concentration focuses on students developing expertise in clinical social work practice with client systems including individuals and small groups, particularly with clients from high-risk and vulnerable groups. The concentration emphasizes theoretical and empirical knowledge and practice skills in differential assessment, clinical interventions and practice evaluation. The concentration also emphasizes knowledge and skills directed...
tional needs. The student actively participates in individual career interests and educational goals according to the student’s area of concentration.

Experiences are planned and designed within the placement, each student’s field plan. Students are in-field two days per week during the second year. First-year agency placements are general courses (6 hours). Advanced course electives as follows: One course in advanced policy (3 hours). Two courses from a pool of advanced courses approved by the Doctoral Program Chair.

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/societal 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.

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 welfare agencies and human service programs throughout Tennessee, the college is able to provide field placements in a variety of social work practice areas. The faculty works closely with the placement agencies and the field instructors to ensure that students have quality field practice experiences that meet the objectives of the core curriculum and the concentration.

The college uses a concurrent class and field plan. Students are in field two days per week during the first year and three days per week during the second year. First-year agency placements are selected to provide practice experiences related to the foundation curriculum content. Within the placement, each student’s experiences are planned and designed according to educational objectives. Second-year placements are selected according to the student’s area of concentration, individual career interests, and educational needs. The student actively participates with the field practice coordinator and the educational committee in selection of the second-year placement. The second-year field placement experience focuses on the integration of social work knowledge and values and emphasizes the acquisition and development of practice skills.

Students are responsible for meeting the requirements of their placement agencies in terms of office hours and workload coverage. This responsibility takes precedence over scheduled University breaks and may result in variations in holidays and office hours for the student.

Students receiving a grade of NC in field practice may not repeat the field practice.

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 by the dean. Transfer courses must be part of an otherwise satisfactory graduate program and be approved by the dean. This coursework must be completed within the six-year period prior to the receipt of the degree.

A maximum of six 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 curriculum of the Ph.D. program consists of foundation coursework, electives, and dissertation research. The foundation curriculum consists of 27 hours of coursework in the history and philosophy of social work, issues in direct service and administration and planning, areas of practice, and research methodology and statistics. Upon this foundation, students and their academic committees develop a plan of study consisting of coursework in Social Work and other departments of the University.

Typically, the 24 hours of foundation curriculum are completed and elective coursework begun during the first year of study, Social Work 670 and the elective requirement are completed and dissertation research begun in the second year of study, and dissertation research is continued in the third year of study. While it is generally expected that the coursework will be completed on a full-time basis, dissertation research can be completed on a planned part-time basis.

Specific courses required are 601, 602, 612, 613, 640, 650, 670, and Statistics 531 and 532 or any two graduate level statistics courses approved by the Doctoral Program Chair.

Examinations

All doctoral students are required to pass a qualifying examination and a comprehensive examination. The qualifying examination covers the foundation curriculum. The comprehensive examination is administered by members of the doctoral committee and is designed for the student to demonstrate...
comprehensive knowledge of the major and cognate areas and the dissertation topic. In case of failure of either examination, the student may request a retake. The result of the second examination is final.

Financial Aid

Financial aid is available to qualified students in the form of fellowships, scholarships, and teaching and research assistantships. Graduate assistantships and other forms of assistance are awarded on the basis of merit and interest to applicants who are accepted into the Ph.D. program.

MINOR IN GERONTOLOGY

Graduate students in the College of Social Work, at the Knoxville location, may pursue a special 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.

POST-MASTER'S CERTIFICATE IN MANAGEMENT AND COMMUNITY PRACTICE

The College of Social Work offers a 15-credit hour post-master's certificate program designed for social workers desiring supervisory, management, administration and community practice training and education to enhance career advancement or career redirection. Required for admission is a master's degree in social work or closely related field.

Course requirements are 541, 543, 547, and two courses selected from 550, 551, 552, 555.

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 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 Delaware, Oklahoma or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Student Services.

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, professional values and ethics, and methods particular to social work practice at various systems levels. Assessment, planning, communication, intervention, and evaluation skills.

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 Foundations of Social Work Practice II (3) Generalist practice with family and small group systems. Ecological understanding of such systems and their adaptation to environment. Various social work roles and intervention strategies pertaining to client systems.

504 Foundations of Social Work Practice III (3) Basic theory, methods, and strategies in implementing planned change within and among larger social systems: task groups, human service organizations, and community systems. Various practice roles: planner, program developer, supervisor, administrator, advocate and task group leader.

506 Social Work Research (3) Research methodologies with respect to evolution and application to social work theory and practice. History and philosophies of science; problem formulation; research design; ethics; instrumentation use and construction; data collection; analysis and reporting; and evaluation and utilization of research.

508 Practicum in Social Work Research (3-6) Supervised practice in application of research methods to social work. May be repeated. Maximum 6 hrs. S/NC only.

509 Graduate Seminar in Public Health (1) (Same as Public Health 509, Exercise Science 509, Nutrition 509, and Nursing 509).

514-15 Human Behavior in the Social Environment I, II (3,3) Major social science theories that inform social work professional's understanding of human behavior and social systems from ecological perspective. Interactions among biological, social, psychological, and cultural systems on development across life cycle. Effects of ethnic, racial, economic, gender, and sexual orientation variables. 514—Life cycle from infancy through adolescence. 515—From young adulthood through senescence.

516 Social Welfare Policy and Services (3) Development of contemporary social policy at local, state, national, and international levels. Contribution of social work professionals to formal policy-making process through which macrosocial change is effected and through which aggregate social welfare services are proposed, authorized, financed, and programmed. Theories of complex organizations applied to social welfare service delivery settings.

518 Social Work and Oppression (3) Sources, dynamics, and impact of oppression in U.S. society as manifested in both social/ecological/economic systems and personal experience. Connections among various forms of oppression: sexism, classism, and heterosexism, and forces that perpetuate such conditions.

521 Clinical Social Work Practice with Individuals (3) Theories, knowledge, and skills for clinical practice with individuals from psychological, sociopsychological, and sociocultural perspectives. Theoretical process and intervention strategies, incorporating content from psychodynamic and cognitive practice models, and specific client problems.

523 Clinical Social Work Practice with Families (3) Concepts related to understanding and analyzing family dynamics and interactional patterns from perspective of major family therapy models. Techniques of intervention in terms of application to families with varied system and individual problems and to families from varied social and cultural backgrounds.

525 Clinical Social Work Practice with Groups (3) Theoretical and historical approaches to social work with groups and clinical principles specifying specific types of group work used in clinical practice and associated leader interventions.

526 Evaluating Clinical Practice (3) History and philosophies, conceptual approaches, techniques and methods in the practice of clinical social work as applied to implementation and evaluation of direct services to clients.

530 Seminar in Clinical Social Work (2-3) Topics in theory and practice of clinical social work with individuals, couples, families and groups. May be repeated. Maximum 6 hrs.

532 Short-Term Interventions (3) Theory and practice of planned short-term, emergency, and crisis interventions.

533 Social Work Interventions with Couples (3) Theories regarding contemporary marital/partnering lifestyles, problems areas in relationships, methods and skills for problem resolution.

534 Social Work Interventions with Children and Adolescents (3) Various practice modalities for assessing and intervening with children and adolescents.

535 School Social Work (3) Place of school as community institution and resource. Methods, processes, and techniques employed in school social work.

541 Leadership and Management in Human Services (3) Management practices and leadership skills required in development and management of human service delivery systems. Issues regarding human resources management, resource allocation, strategic planning, and organizational dynamism.

543 Financial Management and Resource Development (3) Administrative decision-making related to financial planning and resources allocation in human service organizations. Knowledge and skills in budgeting, allocating, expenditure control, fundraising, grant writing, marketing, and evaluation.

547 Evaluation Research (3) History and philosophies of research design and current approaches and methodologies, and issues concerning research design and utilization of evaluation research as applied to development and evaluation of social work programs and new issues pertaining to strengths and limitations of various evaluation methods, microcomputer application of data, and measurement of program goals and objectives.


552 Community Organization (3) Locality development and planning and social action as practice models for development of resources to meet human needs.

555 Current Issues in Management and Community Practice (3) Major trends affecting delivery of human services and requisite knowledge and problem solving skills needed to address them: board/leadership development, coalition building, conflict management, and team development.

561 Supervision and Consultation in Social Work (3) Roles, techniques, and practices of social work supervision and consultation.

564 Substance Abuse (3) Survey and analysis of social, cultural, medical and psychological factors underlying alcoholism and drug abuse, including dependency; treatment and prevention; recent research and practice innovations.

566 Social Gerontology (3) Physical, psychological and social aspects of aging, and major social policies and programs.

580 Field Practice (3) Instruction and supervision in social work practice. S/NC only.

581 Field Practice (3) Instruction and supervision in social work practice. S/NC only.

582 Field Practice (6) Instruction and supervision in clinical social work practice or management and community practice. S/NC only.

583 Field Practice (6) Instruction and supervision in clinical social work practice or management and community practice. S/NC only.

584 Field Practice (2-6) Instruction and supervision in social work practice. May be repeated. S/NC only. E


586 Independent Study (1-6) Individualized study, student selects, designs, and completes examination of special issue or problem. May be repeated. Maximum 6 hrs.
THE DOCTORAL PROGRAM

Coursework

Twenty-four hours of coursework beyond the master's degree are required. 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 522, 534, 633, or 636; and Statistics 532 or another advanced course in statistics. Completion of 9 hours in each of two concentrations is encouraged. A student who cannot achieve a 3.0 or higher in one of the concentrations may construct an individualized course of study subject to the approval of the student's doctoral committee and the Programs and Curriculum Committee. Sociology courses at the 400 level may not be taken without the consent of the student's advisor and the Programs and Curriculum Committee. Six hours may be taken in related fields without petitioning the Programs and Curriculum 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 colateralist) 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 title and methodology related to the research. In accordance with the deadlines specified by The Graduate School.

MINOR IN ENVIRONMENTAL POLICY

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

Graduate students in the Department of Sociology may pursue a specialized minor in gerontology. This interdisciplinary/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 work allows residents of legal residents of some states to enroll in certain programs at UT on an in-state tuition basis. The M.A. program in Sociology is available to residents of the state of Virginia (concentration in criminology only); the Ph.D. to residents of Florida (concentration in criminology only), or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Student Services.

GRADUATE COURSES

405 Sociology of Sport (3) Social meaning, organization, and process of sport. Prereg: 291 or consent of instructor.
414 Sociology of Health Care (3) Organization of health care facilities, professional 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 older people in society.
451 Criminal Justice (3) Critical assessment of criminal justice apparatus and its components. Brief examination of police; criminal courts and institutions, and prisons; prison problems, and parole. Analysis of their operation and impacts. Recommended prereq: 350. (Same as Legal Studies 451.)
455 Society and Law (3) How laws and legal processes are affected by social change; social impact of legal sanctions and legal frameworks. (Same as Legal Studies 445.)
459 White-Collar Crime (3) Distinctive nature and dynamics of white-collar crime, victims and costs of white-collar crime, organizations as white-collar offenders, causal theories, and dynamics of responses to white-collar crime by private and public parties.
462 Population (3) Demographic factors and social structure; trends in fertility, mortality, population growth, migration, distribution, and composition; population policy.
464 Urban Ecology (3) Relation of humans to their urban environment: conservation and use of appropriate technology. (Same as Urban Studies 464.)
465 Social Values and the Environment (3) Human dimensions of ecosystem management and public policy. Applied focus on social values activated within specific biological and social settings. Prereg: 110 Social Problems and Social Change or 120 General Sociology or consent of instructor.
471 Sociolinguistics (3) (Same as English 471 and Linguistics 471.)
500 Thesis (1-15) S/NC only. E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
504 Sociological Foundations of Political Economy (3) Survey of contemporary sociological theories of political economy, sources of political and economic power and conflict.
505 Foundations of Criminology (3) Critical overview of contemporary developments in criminology, theories of crime causation and theories of responses to crime. Prereg: 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 curriculum considerations through teaching techniques. May be repeated. Maximum 6 hrs.
521 Sociological Theory I (3) Assessment of what sociological theory is, its major figures and their approaches to understanding society.
531 Research Methods in Sociology (3) Research design, measurement, sampling, quantitative and qualitative data collection techniques, data, reduction, and analysis.
534 Advanced Sociological Analysis (3) Underlying assumptions and logical procedures used by sociologists in formulating explanations, foundations of sociological research strategies and techniques.
540 Occupations (3) Occupations in relation to individuals and society, economic stratification, and social organizations.
541 Collective Behavior, Social Movements, Social Change (3) Basic theory and research on the impact of social unrest in human collectivities and efforts of collectives to change existing society.
543 Sociology of Development (3) Sociological theories and studies of development: modernization, colonialism, dependency, comparative impact of various development paths upon selected aspects of social structure and change.
551 Delinquency and the Social Structure (3) How study of delinquency and juvenile justice is affected by changing structures of childhood and adolescence, changing demographic and institutional influences, and changing views about responsibility and punishment.
560 Environmental Sociology (3) Systematic treatment of current research in environmental sociology. Social impact analysis and conflicts over environmental issues.
563 Demographic Techniques (3) Standard rates and measures of demographic variables, life table analysis, increment-decrement models, and survey techniques of population analysis.
580 Advanced Rural Sociology (3) (Same as Rural Sociology 580.)
591 Foreign Study (1-15) See College of Arts and Sciences.
592 Off-Campus Study (1-15) See College of Arts and Sciences.
593 Independent Study (1-15) See College of Arts and Sciences.
599 Readings (3) Selected topics. May be repeated. Maximum 6 hrs.
600 Doctoral Research and Dissertation (3-15) Prereg: 599 only. E
622 Sociological Theory II (3) Distinctive schools of sociological thought and contributions of their principal exponents. Prereg: 521 or consent of instructor.
633 Survey Design and Analysis (3) Systematic exploration of survey problems through student participation in design and analysis of survey. Prereg: 531 or consent of instructor. (Same as Child and Family Studies 633.)
636 Field Research (3) Research experience in selected field sites using techniques of interviewing, participant observation, and other methods of field research. Prereg: 531 or consent of instructor.
639 Supplementary Readings in Methodology (3) Individual guidance. Preparation for comprehensive examination. Prereg: Consent of department. S/NC only.
644 Political Sociology (3) Critical examination of theories of state and political processes.
645 Advanced Studies In Political Economy (3) Topical seminar. Prereg: 504 or consent of instructor. May be repeated. Maximum 6 hrs.
649 Supplementary Readings (3) Prereg: Consent of department. May be repeated. Maximum 6 hrs. S/NC only.
653 Sociology of Law (3) Intensive examination of selected topics in sociology of law. Prereg: 505 or consent of instructor.
655 Advanced Studies in Criminology (3) Intensive examination of selected topics in criminology. Recommended prereq: 505. May be repeated. Maximum 6 hrs.
661 Theory and Methods of Human Ecology (3) Historical and contemporary studies of interaction between humans and their environment. Prereg: 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) Topical seminar covering particular lines of research and theory within area. Prereg: Consent of instructor. May be repeated. Maximum 6 hrs.
679 Advanced Studies in Social Psychology (3) Selected contemporary research issues related to social psychological theories. Prereg: 541 or consent of instructor. May be repeated. Maximum 6 hrs.
695 Advanced Special Topics (3) Topic of special interest or student-initiated courses that will not be regularly offered. Prereg: Consent of department. May be repeated. Maximum 6 hrs.

Spanish

See Modern Foreign Languages and Literatures

Speech Communication

(College of Communications)

MAJORS

Spanish

DEGREES

Speech Communication

MAJOR

Communications

M.S., Ph.D.

John W. Haas, Head

Professors:

Julian, Faye D. (Liaison), Ph.D. ...... Tennessee

Lester, Lorayne W., Ed.D. ...... Tennessee

Higdon, Robert E. ...... Tennessee

Romney, L. ....... Tennessee

Yeamans, G. Allan (Emeritus), Ph.D. ...... Tennessee

Associate Professors:

Amster, M. L., Ph.D. ...... Ohio
The Department of Speech Communication offers a concentration area for the master's degree with a major in Communications and participates in the interdisciplinary doctoral program. See Communications for additional information.

Graduate courses in Speech Communication also provide opportunities for students in a variety of disciplines to investigate how oral language can effect changes in the knowledge, the understanding, the ideas, the attitudes, or the behavior of other human beings.

**GRADUATE COURSES**

466 Rhetoric of the Woman's Rights Movement to 1920 (3) Historical and critical study of rhetoric 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 Movement (3) Historical and critical study of rhetoric in campaign for women's rights in United States from 1940's to present. (Same as Women's Studies 476.)

505 Research Methods (3) Understanding of wide array of data collection and analysis procedures used in speech communication research. Development of project thesis proposal.

510 Orientation to Teaching Assistantship (1) Curriculum, classroom management, and other issues associated with teaching at college level. For departmental GTAs.

525 Seminar in Interpersonal Health Communication (3) Current research in health communication. Support groups, medical ethics, medical narratives, doctor-patient communication, or interpersonal communication theories and perspectives in medicine.

550 Organizational Culture (3) Clarification of complex nature of organizational culture to communicate meaning and its usefulness to organizational effectiveness: challenges created by today’s changing organizations and coworkers.

560 Special Topics in Speech Communication (3) Contemporary topics. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

580 Contemporary Rhetorical Theory (3) Current theoretical contributions to rhetorical: Burke, Perelman, Weaver, feminist and critical scholars.

590 Directed Reading and Research (3) May be repeated. Maximum 6 hrs.

591 Foreign Study (1-15) Independent study outside U.S. Prior to departure student must have plan of study approved by department head and supervising faculty member. Credit given only upon fulfilling all requirements set by department. May be repeated. Maximum 15 hrs.

592 Off-Campus Study Internship (1-6) Independent study outside traditional classroom setting: community involvement and/or work experiences. Credit given only upon fulfilling all requirements set by department. May be repeated. Maximum 6 hrs.

593 Independent Study (1-6) Independent study by individual under direction of faculty member. Must obtain approval of faculty member and department prior to study.

**Statistics**

(College of Business Administration and Intercollegiate Program)

<table>
<thead>
<tr>
<th>MAJORS</th>
<th>DEGREES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistics</td>
<td>M.S.</td>
</tr>
<tr>
<td>Business Administration</td>
<td>Ph.D.</td>
</tr>
</tbody>
</table>

Robert W. Mee, Head

**Professors:**

Bozdogan, Hamparsum, Ph.D. ......... Illinois
Guess, Frank M., Ph.D. ............ Florida State
McLean, Robert A. (Emeritus), Ph.D. ....... Purdue
Mee, Robert W., Ph.D. ......... Iowa State
Parr, William C., Ph.D. ......... Southern Methodist
Philpot, John W. (Retired), Ph.D. ......... VPI
Sanders, Richard D. (Emeritus), Ph.D. ......... Texas
Sylwester, David L. (Emeritus), Ph.D. ......... Florida
Thigpen, Charles C. (Emeritus), Ph.D. ......... VPI

**Associate Professors:**

Leitnaker, Mary G., Ph.D. ......... Kentucky
Leon, Ramon V., Ph.D. ............ Florida State
Seaver, William L., Ph.D. ......... Texas A&M
Walker, Estaban, Ph.D. ......... VPI
Younger, M. S. (Liaison), Ph.D. ......... VPI

**Assistant Professor:**

Bensmail, Halima, Ph.D. ......... Paris

**Additional Intercollegiate Program Faculty:**

Aikens, Charles, Engineering; Bates, Ben, Communications; Bunting, Dewey, Arts and Sciences; Chang, Hui, Business Administration; Chatterjee, Arun, Engineering; Dessart, Don, Education; Eastwood, David, Agricultural Sciences and Natural Resources; Fribourg, Henry, Agricultural Sciences and Natural Resources; Gant, Michael, Arts and Sciences; Glisson, Charles, Social Work; Gross, Louis, Arts and Sciences; Huck, Schuyler, Education; James, Lawrence, Business Administration; Ladd, R. T., Business Administration; Lounsberry, John, Arts and Sciences; Lyons, William, Arts and Sciences; McLemore, Dan, Agricultural Sciences and Natural Resources; Miller, Mark, Communications; Orme, John, Social Work; Rajput, Balram, Arts and Sciences; Richardson, J., Lillard, Arts and Sciences; Rosinski, Jan, Arts and Sciences; Samejima, Fukum, Arts and Sciences; Saxton, Arnold, Agricultural Sciences and Natural Resources; Singletary, Michael, Communications; Smith, Julius, Arts and Sciences; Wagner, Carl, Arts and Sciences; Wallace, Debra, Nursing; Xiong, Jie, Arts and Sciences; Zemel, Paula, Human Ecology.

**Admission Requirements**

General admission requirements for The Graduate School are stated beginning on page 12. Applicants for Statistics must submit results of the Graduate Record Examination (GRE) general portion, although GMAT exam scores may be substituted. Applicants for the statistics program must have completed at least two years of college-level mathematics, including the calculus of several variables and matrix algebra, and be proficient in a computer language. Applicants whose native language is other than English must submit results of the Test of English as a Foreign Language (TOEFL).

**Curriculum**

A minimum of 33 credit hours must be completed for the master's degree. Required of all students are 6 hours in statistical methods, 6 hours in statistical theory and 1 hour in statistical computing. Students must complete a minimum of 21 hours in approved statistics courses, exclusive of consulting, internship, independent study, or thesis.

**Thesis or Independent Study**

The thesis option for the master’s degree requires the student to complete 6 hours for the thesis. Alternatively, the non-thesis option requires a minimum of 3 hours for an independent study project.

**Comprehensive Examination**

Students must pass a two-part written comprehensive examination covering 1) theory and 2) methods. Upon failing either part of the examination, the student may retake it. The result of the second examination is final. For students writing a thesis, this examination must be passed before the thesis is defended.
Statistics 187

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 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 Examination Committee. No formal comprehensive examination is required of students earning a Statistics minor along with a master’s in another field beyond questions which the home department wishes to include as part of the comprehensive examination for the master’s degree.

General Admissions and Degree Requirements
1. The student’s home department must have approved a program of courses with the Executive Committee. That program will specify the sequences of statistics courses, chosen from the IGSP approved list, that are considered appropriate by the home department. Students who wish to participate in this program should contact their college representative or the Chair of IGSP in the Department of Statistics.
2. The student’s graduate committee must include a member of the IGSP faculty. For students seeking doctoral degrees or the M.S. in Statistics, the committee member must be a faculty member in the Statistics Department.

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 “Statistics Courses Required for the Minor or M.S. in Statistics.” Should the student not decide to apply for admission to the program until after completion of some of the courses, the student’s major professor should file a program change with the cooperating departments and assist the student in obtaining a Department of Statistics 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 requirements of the minor or M.S. will still receive academic credit for the statistics courses they have successfully completed.

For information contact maysyungar@utk.edu or http://bus.utk.edu/stat/igsp.

BUSINESS ADMINISTRATION CONCENTRATION

For complete listing of program requirements, see Business Administration.

Ph.D. Concentration: Statistics

This degree provides students with a broad knowledge of the field of statistics, the ability to apply statistics in practical situations to problems of business and industry and the ability to develop new statistical methods; all of which takes place while students are exposed to coursework in the basic functional areas of business.

Minimum course requirements are: 673, 666, 651, and 592.

CERTIFICATE IN APPLIED STATISTICAL STRATEGIES

The Department of Statistics offers a certificate program in applied statistical strategies. The program is designed for the part-time student, and several of the courses are offered through distance education.

The 12-credit certificate is available by completing two required courses, 571-72, and two electives selected from the following: 573, 575, 579, and 585 or 566 or other graduate statistics courses as approved by the Statistics Graduate Program Committee chair.

ACADEMIC STANDARDS

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

GRADUATE COURSES


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

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when 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


531 Survey of Statistical Methods I (3) Univariate and bivariate data collection and organization, statistical estimation and hypothesis testing; analysis relationships for categorical and numerical data, including Chi-square tests and simple linear and quadratic regression. Use of computing facilities required. Credit not given for both 521 and 537. Prereq: 1 yr. college mathematics. F

532 Survey of Statistical Methods II (3) Multiple linear regression, including use of dummy variables, single and multiple factor analysis of variance and covariance; issues in experimental design and analysis. Use of computing facilities required. Prereq: 531. Sp

537 Statistics for Research I (3) Principles and application of statistical methodology, integrated with considerations of major statistical computing systems, Probability and probability distributions, forming and testing hypotheses using parametric and nonparametric inference methods. Matrix-based simple linear regression and correlation. Credit not given for both 531 and 537. Prereq: 1 yr. undergraduate mathematics and 1 undergraduate statistics course. F

538 Statistics for Research II (3) General linear model as applied to multiple regression and analysis of variance. Diagnostic and influence techniques. One-way, factorial, blocking, and nested designs, planned versus post hoc contrasts, trend factors and repeated measures. Prereq: 537 or 532. Sp

561 Introduction to Computing for Data Management and Analysis (1) UT computing environment for beginning statistics graduate students. Use of operating system commands, introduction to data entry and editing, file management and statistical analysis. Use of U.T.C. computing facilities required. Coreq: 531, 537 or 571, or consent of instructor. F

563 Introduction to Mathematical Statistics (3) Basic probability models and theory of distributions of random variables. Prereq: Mathematics 241. F

564 Theory of Statistical Inference (3) Introductory theory underlying common statistical procedures of hypothesis testing and estimation. Prereq: 563. Sp

566 Statistical Techniques in Industrial Processes (3) Applications of control charts, process capability analysis, acceptance sampling, and other statistical techniques in industrial setting. Attributes and variables control charts, process capability analysis, attributes sampling, statistical analysis of variance components, problems of measurement, special industrial applications. Prereq: 571 or equivalent. F


Su

573 Design of Experiments (3) One-way ANOVA, multiple range tests, equal and unequal variances, transformations; factorial experiments, completely randomized designs, analysis of covariance, split-plot and nested designs, fractional factorial, sequential designs. Prereq.: 571. Sp

575 Applied Time Series (3) Fundamental concepts of time series analysis: Box-Jenkins approach, stationary and nonstationary processes, forecasting, model identification, seasonal models, transfer functions, and spectral theory. Prereq.: 538 or 572 or consent of instructor. Sp

578 Catagorical Data Analysis (3) Log-linear analysis of multidimensional contingency tables. Logistic regression. Theory, applications, and use of statistical software. Prereq.: 1 yr graduate-level statistics, regression analysis and analysis of variance, or consent of instructor. Sp


583 Special Topics in Applied Statistics (1-3) May be repeated. Maximum 9 hrs.


587 Graduate Seminar (1) Directed readings and active participation in colloquium program of Department of Statistics and of student's minor program. Prereq.: Consent of department head.

592 Internship (1-6) Supervised off-campus experience in application of statistical principles and methods in business, industry, or government. Written and oral report. Prereq.: 4 courses in graduate-level statistics or consent of statistics department director of graduate studies. May be repeated. Maximum 2 hrs. S/NC only. F

593 Independent Study (2-6) Faculty directed readings and investigation of specified topic in probability or statistics. Written and oral presentation. Prereq.: 2 courses in statistics and oral presentation. Prereq.: Consent of statistics department director of graduate studies. May be repeated. Maximum 6 hrs. S/NC only.

595 Statistical Consulting Practicum (1-6) Supervised experiential learning on-campus researchers plan, manage data, and develop and perform analyses specific to designs and hypotheses. Discussion of activities in regular seminar meetings. Final written reports and/or data analysis. Prereq.: 572 or 538. May be repeated. Maximum 6 hrs.

662 Computational Methods in Statistics (3) Up-to-date computational methods in statistics: open architecture interactive computational languages supplemented by other statistical packages with graphical capabilities. Statistical computing, numerical methods for linear models and generalized linear models, nonlinear statistical methods, matrix computations and special matrices, essentials of Monte Carlo simulation, and resampling techniques. Prereq.: Knowledge of programming language and 572 or consent of instructor.


664 Advanced Statistics Theory II (3) Testing statistical hypotheses, Bayesian methods and estimation, linear model theory and model selection. Prereq.: 663.


673 Advanced Topics in Design of Experiments and Linear Models (3) Experimentation for product and process improvement: response surface methodology and robust design methods; mixture experiments; optimal design topics; distribution theory and inference for linear models. Prereq.: 573 or consent of instructor.

677 Statistical Modeling (3) Modern techniques of statistical modeling: predictive, likelihood, Bayesian, and information-based model selection and evaluation paradigms. Application of techniques in various types of models for both continuous and discrete data modeling problems. Interactive computational tools. Prereq.: 564 and 572 or 538, or consent of instructor.

679 Multivariate Statistical Modeling (3) Modern information based techniques and model selection in multivariate analysis, informational tests of significance, bootstrap analysis of variance, multivariate regression and variable selection, multivariate cluster analysis, common principal component analysis, factor analysis, matrix algebra and covariance and correlation, structural models with latent variables, mixture-model cluster analysis. Prereq.: Matrix algebra and 538, or matrix-based linear models with experience in interactive computing, or consent of instructor.

683 Special Topics in Statistics (1-3) Presentation of specialized topics in statistics. May be repeated. Maximum 6 hrs.

691 Graduate Seminar in Applied Statistics (3) Reading of literature and discussion of open problems of importance to industry: design of experiments, model selection, process control, reliability, and computational methods in statistics. Prereq.: Consent of instructor. S/NC or letter grade.

693 Graduate Seminar in Applied Statistics (3) Reading of literature and discussion of open problems of significance to industry: design of experiments, model selection, process control, reliability, and computational methods in statistics. Prereq.: Consent of instructor. S/NC or letter grade.

The Department of Theatre offers the Master of Fine Arts degree with a major in Theatre, which is normally to be completed in three consecutive years of full time residence. Theatre 501 is required the first year of residence. Three additional hours at the 500 level are required from history, literature, or dramaturgy. Students in the M.F.A. degree program are evaluated annually by juried performances or portfolio submission. Continuing in the program is with the approval of the faculty committee for the M.F.A. degree program. Theatre 599, Projects in Lieu of Thesis, and an oral defense of the project must be completed satisfactorily before the degree is conferred.

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

**Design/Technical Production**

Required courses are at least 12 hours of Theatre 580, Design and Technical Production Seminar, and at least 6 hours in the projects courses. Theatre 401, Principles of Design is required in the first year of residence.

**Performance**

At least 12 hours each of 520 Master Class in Performance: Acting; 523 Master Class in Performance: Movement; and 525 Master Class in Performance: Voice. Coursework in this concentration is conducted in a conservatory environment. In the third year, students are expected to intern with either the resident professional Clarence Brown Theatre Company or another regional professional theatre.

**REQUIREMENTS FOR 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.

GRADUATE COURSES

401 Principles of Theatrical Design (3) Fundamental principles of design, visual and structural relationships. Projects assigned to develop understanding and perception.

409 Stage Make-up (3) Study and problems in make-up design and application; character analysis. Prereq: Introduction to Theatre.

420 Special Studies in Acting (3) Content varies. Exercises in selected concentrated areas such as styles, techniques, approaches, e.g., Shakespeare, movement, vocal work. Prereq: Advanced Acting and consent of instructor. May be repeated. Maximum 9 hrs.

425 Selected Musical Theatre Techniques (2) Study and practice of musical theatre material: dance and vocal work. Prereq: Theatre Dance or consent of instructor. May be repeated. Maximum 4 hrs.


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. Costume and study of historic patterns. Prereq: 346 or consent of instructor.

450 Advanced Scenery Technology I (3) Study and practice of theatre woodwork; production participation required. Prereq: 250. Graduate credit to theatre M.F.A. students only.

451 Advanced Scenery Technology II (3) Study and practice of metalworking and plastics for theatrical productions; production participation required. Prereq: 250. Graduate credit to theatre M.F.A. students only.

452 Advanced Scenery Technology III (3) Study and practice of stage rigging for theatrical productions; production participation required. Prereq: 250. Graduate credit to theatre M.F.A. students only.

454 Scenery Painting (2) Introduction to materials, 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: 362 or consent of instructor.

464 Computer Assisted Design for Theatre (3) Advanced techniques in computer assisted design for theatre. Work with CAD, Computer drawing, Graphics, and/or 3D Modeling software for preparation of theatrical designs. Specific content varies with semester. Admission by consent of instructor only. May be repeated. Maximum 9 hrs.

470 Playwriting (3) Advanced instruction in writing plays. Prereq: Consent of instructor.

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

492 Off-Campus Study (1-15) See College of Arts and Sciences.

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

501 Introduction to Graduate Research in Theatre (3) Research tools and methods for theatre artist and scholar.

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

510 Studies in Theatre History (3) Intensive study of selected topics in theatre history. May be repeated. Maximum 9 hrs.

512 Dramatic Literature Analysis (3) Dramaturgical strategies of major playwrights, using variety of analytical approaches from Aristotelian to deconstruction.

520 Master Class in Performance: Acting (3) Master class in acting techniques. Theatre MFA students only. May be repeated. Maximum 18 hrs.

523 Master Class in Performance: Movement (3) Master class in movement techniques. Theatre MFA students only. May be repeated. Maximum 16 hrs.

525 Master Class in Performance: Voice (3) Master class in voice and speech techniques. Theatre MFA students only. May be repeated. Maximum 18 hrs.

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. May be repeated. Maximum 9 hrs.


551-552 Structural Design for Stage (3,3) Application of advanced theatre technology and analysis of common building materials to design of safe stage scenery. Must be taken in sequence.

553 Projects in Scenic Design (1-3) Conception and completion of major projects, both theatrical and actual, in scene design. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

554 Studies in Scenic Design (3) Advanced scene design techniques and approaches to design for complex dramas and varied dramatic forms. May be repeated. Maximum 9 hrs.

555 Model Building (3) Techniques of model building for scenic designer. Theatre MFA students only. Prereq: 401 and one semester of 580.

556 Drafting (3) Drafting techniques for scenic designer. Theatre MFA students only.

560 Projects in Lighting Design (1-3) Conception and completion of major projects, both theatrical and actual. In lighting design. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

562 Special Problems in Lighting Design (3) Advanced problems in lighting design and theory. Problems in Broadway production and touring. Prereq: Advanced Lighting Design and consent of instructor.

580 Design and Technical Production Seminar (1-6) Selected aspects of design and technical production. Prereq: Consent of instructor. May be repeated. Maximum 18 hrs.

581 Technical Design (3) Technical problems and solutions in scenery construction using traditional and modern techniques with application of unusual materials, consideration of budgeting, safety, and structural integrity.

582 Production Planning (3) Theatre management techniques useful in structuring orderly, effective production: survey of applicable computer programs.

583 Stage Machinery (3) Design of safe, effective machinery for movement of stage scenery. Prereq: 551-552.

585 Production Workshops (1-6) Directed experience in production collaborations. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

599 Project in Lieu of Thesis (1-6) Available to theatre MFA students only. Prereq: Minimum of 30 hrs toward MFA degree and consent of advisor. May be repeated. Maximum 9 hrs.

Theory and Practice in Teacher Education

(College of Education)

MAJORS

DEGREES

Education .................. M.S., Ed.S., Ed.D., Ph.D.

L. Knight, Head

Professors:

Alexander, J. Estill. (Emeritus), Ed.D. ....................... Kentucky

Benner, Susan M., Ed.D. ........................................... Columbia

Brozo, William G., Ph.D. ........................................ South Carolina

Christensen, Mark A. (Emeritus), Ph.D. ................... Kansas

Coleman, Laurence J., Ph.D. ................................... Kent State

Davis, A. R., Ph.D. ................................................... Ohio State

Davis-Wiley, Patricia, Ed.D. ....................................... Houston

Hargis, Charles H. (Liaison), Ed.D. ......................... Colorado State

Harris, G. A., Jr. (Emeritus), Ph.D. ...................... Michigan

Hatch, J. Amos, Ph.D. .............................................. Florida

Huff, P. (Emeritus), Ph.D. ........................................... Ohio State

Hull, Howard N. (Emeritus), Ed.S. ................................ Peabody

Jost, Karl J., Ed.D. .................................................... Oklahoma

Knight, Lester N., Ph.D. ............................................ Texas

Lindsey, LaVerne B., Ed.D. ........................................ Mississippi State

Long, Vena M., Ph.D. ................................................. Missouri (Columbia)

Rowell, C. Glennon, Ed.D. ........................................ George Peabody

Schindler, W. Jean, Ph.D. ........................................... Kent State

Turner, T. N., Ed.D. .................................................... Penn State

Watts, J. Paul (Emeritus), M.S. .................................. Tennessee

Associate Professors:

Barclay, McLaughlin, Ph.D. ........................................... Michigan

Cagle, Lynn C., Ed.D. ................................................. Georgia

Chance, Charles A., Ph.D. ........................................... Ohio State

Gilrane, Colleen P., Ph.D. ........................................... Illinois

Hannum, Michael C., Ph.D. ........................................ Northern Colorado

Hodge, R. L., Ph.D. ...................................................... Texas

Judge, Sharon L., Ph.D. .............................................. California (Santa Barbara)

Melear, Claudia T., Ph.D. ............................................. Ohio State

Puckett, Kathleen S., Ph.D. ........................................ Tennessee

Assistant Professors:

Bell, Sherry M., Ph.D. ................................................ Tennessee
The Department of Theory and Practice in Teacher Education offers graduate programs leading to degrees, majors, and concentrations in:

**Master of Science**

**Education**
- Track 1-elementary education
- Track 1-English education
- Track 1-foreign language/ESL education
- Track 1-mathematics education
- Track 1-modified and comprehensive special education
- Track 1-reading education
- Track 1-science education
- Track 1-social science education
- Track 1-special education: early childhood
- Track 2-elementary education
- Track 2-early childhood
- Track 2-modified and comprehensive special education
- Track 2-secondary education
- Track 2-special education: early childhood

**Education Specialist**

- Elementary education
- English education
- Foreign language/ESL education
- Mathematics education
- Reading education
- Science education
- Social science education

**Doctor of Education**

- Literacy, language education, and ESL education
- Teacher education

**Doctor of Philosophy**

- Early childhood education
- Literacy, language education, and ESL education
- Teacher education

See Education under Fields of Instruction for full description of all degree requirements. The department also houses programs for students seeking licensure in early childhood, primary, and middle school education (grades K-8 and K-6), reading endorsement, special education licensure, and secondary social studies. Early childhood licensure and degree programs are also available through the College of Human Ecology. The department houses three areas of interest: holistic teaching/learning, early childhood education, and secondary content teaching.

The holistic teaching/learning area's central emphasis is on holistic, integrative, and interdisciplinary teaching/learning as opposed to teaching disciplinary content (e.g., science, mathematics, language arts) as separate entities. The focus on integration is similar to how children learn and how language is central to the teaching/learning process. The faculty believe that students should be prepared as teachers who can facilitate learning rather than merely dispense content. Central to the philosophy of holistic teaching and learning is knowing each individual child's learning style, abilities, and interests.

The early childhood education area is focused on the preparation of teachers for the education of all young children in inclusive settings. The context in which children live (i.e., urban, rural) influences their development and learning. Young children are defined as children from birth to age eight, including children living in poverty, those of color, with disabilities, with advanced development, and typically developing children.

The secondary content teaching area's mission is the preparation of teachers for instruction in art, ESL, English, foreign language, mathematics, social science, and science. The emphasis is on how these disciplines are taught in context of different cultures.

**Art Education**

**GRADUATE COURSES**

- 510 History and Philosophy of Art Education (3) United States from 1860's to present. Prereq: Consent of instructor.
- 520 Studies in Art Education (3) Issues and topics current to the field of art education. Prereq: Consent of instructor.
- 530 Production and Critical Analysis of Art (3) Relationship of production and critical analysis of works of art to 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, audiocassettes, slides, charts, and learning packs.

**Early Childhood Education**

**GRADUATE COURSES**

- 471 Early Childhood Special Education (6) Assessment, curriculum planning and development and teaching approaches used in early childhood special education. Prereq: Admission to teacher education.
- 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/N C only.
- 554 Assessment in Early Childhood Special Education (3) Development of knowledge and skills in appropriate formal and informal assessment of handicapped infants and young children: screening, identification, diagnosis, placement and programming assessment issues. Prereq: 553 or consent of instructor.
- 556 Curriculum for Early Childhood Education (K-3) (3) Theoretical concepts and current research in content and skill areas of curriculum for kindergarten-grade 3, application to local school setting. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.
- 587 Application of Theory in Early Childhood Education (K-3) (3) Principles and practices from selected theoretical orientations. Prereq: Course in early childhood education or consent of instructor. May be repeated. Maximum 6 hrs.
English Education

GRADUATE COURSES


460 Teaching Reading and Literature in the Secondary School (3) Approaches for teaching basic reading skills and ways of teaching literature. Sp

461 Developing Reading Skills in Content Fields (3) Techniques for teaching reading and study skills in content areas of school program. Extensive assessment of textbooks. Middle school and high school. E

507 Teaching Poetry Grades 7-12 (3) Research and theory in application to teaching of poetry. Design of strategies for teaching and composing poetry. Prerequisites for teaching and reading of poetry. Review of tests and materials. F

508 Teaching Composition in the Secondary School (3) Teaching narration, description, exposition, and argumentation; writing process and marking of student papers. Sp

509 Teaching Fiction in the Secondary School (3) Teaching of novels and short stories. F

521 Interdisciplinary Aesthetics (3) Discussions, visual and audio presentations concerned with aesthetic considerations of areas of study: geography, history, physics, literature, languages, music, visual arts and drama.

533 Reading in Community College: Research and Theory (3) Analysis of components of effective community college reading programs. Attention to research and theoretical bases. Prereq: Course in reading education or consent of instructor. Su

590 Seminar in Teaching English in Secondary Schools (3) Content varies. Theoretical and practical approaches to teaching English in secondary school. May be repeated. Su

592 Linguistics and the Teaching of English (3) Grammar, usage, semantics, dialectology, history of language, and lexicography. Su

597 Teaching Drama Grades 7-12 (3) Strategies and materials for teaching creative dramatics, enacting and writing of plays, reading of scripts. Sp

598 Developing Speaking and Listening Skills, Grades 7-12 (3) Teaching approaches to nonverbal language and speech. Prereq: Consent of instructor. Su

601 Studies in English Education (3) Issues and research in teaching of English. Su

602 Organizing and Administering Reading Programs (3) Analyzing and synthesizing instructional, learning, and materials components into classroom school and system programs. Prereq: 2 500-level courses in reading education or consent of instructor. Su

Foreign Language/ESL 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 languages and Latin. Prereq: Completion or near completion of foreign language hours for certification and Admission to teacher education. Sp

555 Foreign Language in the Elementary Schools Practicum (3) Experiences designing, implementing and assessing second language instruction in elementary school setting. Prereq: 557 or consent of instructor.

556 English as a Second Language Practicum (3) Experiences designing, implementing and assessing English instruction to non-native English speakers. Required courses 557 and 558. Prereq: 576 or consent of instructor.

575 Teaching English as a Second Language (3) Instructional methods; utilization of assessment procedures to diagnose English linguistic proficiency; materials for non-native speakers. Prereq: Consent of instructor. F


577 Developing Speaking and Listening Skills, Grades 7-12 (3) Teaching approaches to nonverbal language and speech. Prereq: Consent of instructor. Sp


590 Seminar in Teaching English in Secondary Schools (3) Content varies. Theoretical and practical approaches to teaching English in secondary school. May be repeated. Su

592 Linguistics and the Teaching of English (3) Grammar, usage, semantics, dialectology, history of language, and lexicography. Su

597 Teaching Drama Grades 7-12 (3) Strategies and materials for teaching creative dramatics, enacting and writing of plays, reading of scripts. Sp

598 Developing Speaking and Listening Skills, Grades 7-12 (3) Teaching approaches to nonverbal language and speech. Prereq: Consent of instructor. Su

601 Studies in English Education (3) Issues and research in teaching of English. Su

602 Organizing and Administering Reading Programs (3) Analyzing and synthesizing instructional, learning, and materials components into classroom school and system programs. Prereq: 2 500-level courses in reading education or consent of instructor. Su

Mathematics Education

GRADUATE COURSES

485 Teaching Mathematics, Grades 7-12 (3) Preparation of teaching plans, evaluation, materials for teaching mathematics; teaching simulation and directed observation in schools. Prereq: Admission to teacher education.

522 Programs and Materials in Elementary School Mathematics (3) Examination, development and use of materials for creating an active learning environment for learning mathematics in elementary and middle schools. Prereq: 530, 543, or equivalent. Su

530 Teaching Mathematics to Young Children: K-4 (3) Unit planning, daily planning, grouping and other strategies of teaching mathematics. For those with little preparation in teaching elementary school mathematics. F

543 Teaching Mathematics in Middle School: 5-8 (3) Unit planning, daily planning, grouping and other strategies of teaching mathematics. For those with little preparation in teaching middle school mathematics. Sp

581 Seminar 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: 485 or equivalent. F

582 Teaching Enrichment Mathematics in Middle and Junior High Schools (3) Topics to enrich middle and junior high mathematics. Geometrical, laboratory, and problem-solving activities. Special attention to metric system. Opportunities for individual projects. Prereq: 485 or equivalent.

583 Teaching Mathematics in Senior High Schools and Community Colleges (3) Topics appropriate for high school and community/junior college mathematics curriculum. Special problems related to enrichment, problem solving, and use of microcomputer. Opportunities for special projects. Prereq: 485 or equivalent.

586 Teaching Probability & Statistics (3) Teaching of probability and statistics in schools, elementary through college. Probabilities and statistical experiments, demonstrations, and applications. Prereq: 485 or equivalent.

593 Practicum in Remediation of Reading Problems (2-3) 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

630 Seminar in Reading Education (1-6) May be repeated. Maximum 6 hrs. E

632 Psychology of Reading (3) Reading act, relationship between learning theory and reading, role or reading in child's overall intellectual development. Affective and cultural factors. Prereq: 500-level course in reading education or consent of instructor. F

637 Diagnosis and Correction of Classroom Reading Difficulties (3) Theoretical and practical applications of specific reading diagnostic instruments; testing of elementary and/or secondary school students, preparing case study reports, and concluding parent conferences. Prereq: Course in diagnosis and correction of classroom reading problems or consent of instructor. Sp

639 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 remediation of reading problems or consent of instructor. Sp

654 Developmental Reading Practicum (2) Diagnosis and teaching children having developmental and corrective reading needs. Prereq: Course in diagnosis and correction of remedial reading problems or consent of instructor. May be repeated. Maximum 4 hrs. Su

602 Seminar in Reading Education (1-6) May be repeated. Maximum 6 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

Science Education

GRADUATE COURSES

496 Teaching Science Grades 7-12 (3) Methods, materials, recent trends in science and environmental education programs for secondary schools. Prereq: Admission to teacher education. F

508 Science Education Studies in Natural Environments (3) Systematic study of nature for K-16; inquiry-based instruction in off campus natural setting. Group and individual observational and empirical studies. Web-based lesson plans designed upon return to campus. F

531 Teaching 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. Su,F

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.

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. Su

525 Strategies, Programs and Materials for Teaching Elementary Social Studies (3) Analysis of new and innovative sociocultural 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

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

599 Seminar in Social Studies Education (3) Research, trends, and issues in secondary social studies. Su

621 Seminar in Social Studies Research and Theory (3) Status of research and theory. Needed research, related research from other fields, and application of research. Prereq; Recency in teaching of social studies or consent of instructor. E

419 Psychology and Education of Students with Mild Disabilities (6) Nature and characteristics of persons with mild handicaps and educational strategies appropriate for these persons. Prereq; Special Education Principles, Special Education Strategies, and admission to teacher education program. Coreq; 420. F

420 Field Experience in Modified Programs (3) Practicum in teaching in modified programs; planning, developing, implementing and evaluating instruction. Prereq; Special Education Principles, Special Education Strategies, and admission to teacher education program. Coreq; 420. S/NCR only. F

431 Field Experience in Comprehensive Programs (3) Prereq; Special Education Principles, Special Education Strategies, and admission to teacher education program. Coreq; 430. S/NCR 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, Special Education Strategies, and admission to teacher education program.

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

456 Speech and Language Basis of Learning Disabilities in the Classroom (3) Normal communication development; understanding of speech and language impairments in school-age students; integration of evaluation into daily skills into existing curriculum, especially for high incidence special education students.

470 Psychology of the Exceptional Child (3) Varieties of exceptional children; general characteristics and educational approaches. Prereq; 3-5, 3-9. Advanced level field experiences under supervision of practitioner. Prereq; Consent of instructor. May be repeated. Maximum 9 hrs. S/NCR only.

504 Clinical Experience in Teaching and Supervision of Exceptional Children (3-9) Placement in educational settings. May be repeated. Maximum 9 hrs. S/NCR or letter grade. (Same as Rehabilitation and Deafness 504.)

506 internships in Teaching in Special Education and Rehabilitation (3-9) Placement in public schools or agencies under supervision of master practitioners. Enrollment limited to those in fifth-year program. S/NCR only.

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.

555 Characteristics of Affective/Motivational Functioning in Children with Disabilities (3) Definition, methods, identification and symptoms of children with affective/motivational problems. Comparison to normal development and that of children labeled disturbed or behavior disordered.

556 Instructional Systems for Affective/Motivational Education for Children with Disabilities (3) Educational strategies and models of instruction; simulation, demonstration, and media. Teaching techniques, materials, and teacher/pupil/family interactions. Therapeutic forms of education through art, music, role play, puppetry, biography, and group interactions. Prereq or coreq; 555 or consent of instructor.

557 Positive Preventive Discipline (3) instructional, classroom-based preventative strategies for use in classroom which positively affects efficiency of classroom. Research on how curriculum can encourage appropriate interactions of children and youth. Prereq; Admission to master's program.

558 Neuromuscular and Health Disorders: Educational Implications (3) Neuromotor impairments, physical disabilities and special health conditions, autism. Investigation of instructional techniques and adaptations.

564 Psychosocial Development of Gifted and Talented Children (3) Phenomena of talent development in context of home, school, and society. Implications of misjudgment. Practices for promoting social and emotional development. Prereq; 451 and 452 or equivalent or consent of instructor.

565 Instructional Systems for the Gifted and Talented (3) Instructional methods and systems evaluated in terms of effectiveness in various educational environments. Prereq or coreq; 554 or consent of instructor.

575 Creative Problem-Solving Strategies for Special Educators (3) Techniques for solving problems encountered by special educators in any setting.

586 Seminar in Research Techniques in Special Education (3) Evaluation of appropriate research methodologies with handicapped populations.

587 Seminar: Issues and Theories in the Education of the Exceptional Child (3) Analysis of timely research and theoretical issues. Prereq; Research course or consent of instructor.

590 Application of Microcomputer Technology in Social Education and Vocational Rehabilitation (3) Application of microcomputer technology with all categories of exceptionalities and across all chronological and functioning age ranges. Microcomputer adaptive software, special software accessed, authoring systems, telecommunication, and strategies for cognitive development.

620 Internship in Research in Special Education and Rehabilitation (3-9) Placement with professional engaged in theoretical research: public school, institutions, agencies or university settings. Prereq; 9 hrs. in statistical and research methods. May be repeated. Maximum 9 hrs. S/NCR only.

630 Internship in Institutional Leadership in Special Education and Rehabilitation (3-9) Advanced level internship experiences in public schools or agencies under supervision of master practitioners. Prereq; Consent of instructor. May be repeated. Maximum 9 hrs. S/NCR only.

Theory and Practice in Teacher Education

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 count toward degree requirements. May be repeated. S/NCR only. E


517 Seminar in Theory and Practice in Teacher Education (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/NCR or letter grade. E

518 Educational Specialist Research and Thesis (3) May be repeated. P/NP only. E

526 Drama and Story Telling in Teaching (3) Use of techniques of drama and storytelling to improve impact of teaching and to teach more effectively. Prereq; Classroom experience or admission to teacher education program.

550 Action Research and Practical Inquiry in Education (3) Principles of action research and practical inquiry for practitioners in early childhood and school settings and methods for conducting such inquiries in professional role. Prereq; Admission to graduate program.

563 Independent Study (1-3) May be repeated. S/NCR or letter grade. E

594 Supervised Readings (1-3) May be repeated. S/NCR or letter grade. E

596 Clinical Experience in Assessment and Instruction (3) Academic remediation applied in field settings; tasks related to teaching: assessment, prepara-
Transportation
See Marketing, Logistics and Transportation

Urban and Regional Planning
(College of Arts and Sciences)

MAJOR
Planning ........................................... M.S.P.

C. W. Minkel, Head

Professors:
Johnson, David A. (Emeritus), Ph.D. ... Cornell
Kenney, Kenneth B. (Emeritus),
Ph.D. ........................., North Carolina
Minkel, C. W., Ph.D. ................. Syracuse
Piochakia, J. M. (Emeritus),
M.U.P. ...................., Michigan State
Shouse, Walter L. (Emeritus), M.C.P. Harvard
Spencer, James A. (Liaison),
M.C.P. ............... Ohio State

Associate Professors:
Bowen, George E., M.A. George Washington
Tonn, Bruce, Ph.D. .................. Northwestern

Assistent Professors:
Shupp, Teresa, M.S.P. .......... Tennessee
Zanetta, Maria C., Ph.D. ........... Ohio State

The Department of Urban and Regional 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 fields. Graduates are candidates for positions in regional, city, county, and metropolitan planning agencies; in local, state, and federal agencies concerned with physical, economic, and administrative planning; in private business and organizations dealing with development problems; and in private consulting.

The 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, and two letters of reference from faculty familiar with their prior academic work and a statement describing personal career objectives directly to the department. 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.

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, 515, 520, 521, 530, 531, 532, 538 and 540.

Students should plan to enter the program in the fall term to take 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 courses from a prescribed set in the subject area. Further enhancement of the concentration is gained by focusing the thesis or major study on the subject.

Degree requirements for the M.S.P. vary among states and universities. The above requirements are based on the American Institute of Certified Planners certification requirements. Successful completion of a comprehensive examination is required before graduation. The exam will normally be taken after completion of the core requirements in the second year. Based on the material generally used by the American Institute of Certified Planners (AICP), this requirement provides an additional capstone experience as well as preparation for meeting AICP professional certification requirements.

Student academic progress is monitored by the faculty. A student failing to maintain an acceptable grade-point average may be placed on probation or dismissed from the program.

MINOR IN ENVIRONMENTAL POLICY
An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT on an in-state tuition basis. The M.S.P. program is available to residents of the states of Arkansas, Virginia, or West Virginia. Additional information may be obtained from the Graduate Admissions Specialist in the Office of Graduate Student Services.

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.)


446 Housing (3) Nature and demand for housing in U.S. and abroad. U.S. experience in urban and regional planning or related fields. 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 student uses University facilities and/or faculty time before degree is completed. May be used toward degree requirements. May be repeated. S/NC only. E

510 Fundamentals of Planning (3) History of planning, structure and development of urban areas, operations of contemporary planning, trends and issues.

515 Theory of Planning (3) Analysis of nature and objectives of planning processes; role of planner and planning function in public decision-making. Prereq: 510 or consent of instructor.

520 Planning Research Methods (3) Overall structuring of social science research in planning practice; familiarity with structure of planning literature information sources, systematic research techniques, processes and tools, practice in posing research questions relevant to planning.

521 Information Systems and Networks in Planning (3) Use and impact of computer-based information systems and global networks in planning and public
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 prevetinary course requirements listed below. These may be completed at any accredited college or university that offers courses equivalent to those at The University of Tennessee.

Prevetinary course requirements must be completed by the end of spring term of the year in which the student intends to enroll. Biochemistry requirements must have been satisfactorily completed within five years of the time the applicant wishes to enter the program.

Subject Area Semester Hours

English 6

Humanities and Social Sciences* 8

Physics 8

General Chemistry 8

Organic Chemistry 8

Biology** 4

General Biology 8

Genetics 3

Cellular Biology*** 3

TOTAL 66

*May include, for example, courses in English literature, speech, music, art, philosophy, religion, language, history, economics, anthropology, political science, psychology, sociology and geography.

**Exclusive of laboratory.

***It is expected that this requirement will be fulfilled by a course in cellular or molecular biology.

Admission Procedures

Admission of new students is for the fall semester, with first priority given to residents of Tennessee.

The College of Veterinary Medicine utilizes the Veterinary Medical College Application Service (VMCAS) for all applicants. Forms and instructions for making application for admission may be obtained beginning June 1, 2001 from the Office of the Associate Dean, The University of Tennessee, College of Veterinary Medicine, P.O. Box 1071, Knoxville, TN 37901-1071.

Note: The deadline for receipt of the completed application materials is November 1. NON-TENNESSEE APPLICANTS MUST HAVE A MINIMUM CUMULATIVE GRADE-POINT AVERAGE OF 3.2 ON A 4.0 SCALE FOR APPLICATION TO BE CONSIDERED.

Applications are accepted only from U.S. citizens or permanent residents of the U.S.

D.V.M. Curriculun

The curriculum of the College of Veterinary Medicine is a nine-semester, four-year program. Each class begins in August and graduates four years later in May. The first three years generally follow the traditional fall and spring semesters with the summer break following. The final year of the professional curriculum begins immediately following semester six and is a continuous clinical rotation extending over 54 weeks.

Development of a strong basic science foundation is emphasized in the first year. Courses consist mostly of preclinical subjects of anatomy (gross and microscopic), physiology, immunology, bacteriology, virology and parasitology. Also included in the first year are clinical subjects of physical diagnosis and epidemiology.

Considerable integration of subject matter is incorporated during this year.

The second and third years include the study of diseases, their causes, diagnosis, treatment and prevention, and courses team-taught on an organ system basis.

The final year (three semesters) is devoted to intensive education in solving animal disease problems involving extensive clinical experience in the Veterinary Teaching Hospital. Each student will participate exclusively in clinical rotations in the Veterinary Teaching Hospital and in required externships (preferably off-campus).

Innovative features of this curriculum include: eight weeks of student centered, small group, applied learning exercises in semesters one through six; three weeks of directed clinical experiences in the Veterinary Teaching Hospital in semesters three through five; and a planned experience in animal disease problems involving extensive clinical experience in the Veterinary Teaching Hospital. Each student will participate exclusively in clinical rotations in the Veterinary Teaching Hospital and in required externships (preferably off-campus).

In addition to the knowledge and skills of the previous years, the student will develop an educational/career goals. Students enrolled in the D.V.M. program may register for up to 10 credit hours of graduate courses without credit at the D.V.M. degree. Elective study offers a unique educational alternative for students in the DVM and one intended to enhance professional growth, concentration in an area of interest and career opportunities.

In addition to the knowledge and skills of the previous years, the student will develop an educational/career goals. Students enrolled in the D.V.M. program may register for up to 10 credit hours of graduate courses without credit at the D.V.M. degree. Elective study offers a unique educational alternative for students in the DVM and one intended to enhance professional growth, concentration in an area of interest and career opportunities.
animal behavior, medical communication, professional ethics, jurisprudence, economics, and practice management.

The curriculum requires successful completion of 163 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 institutional units, including Animal Science (nutrition, physiology, genetics and animal management), Microbiology (bacteriology, virology and immunology), Ecology and Evolutionary Biology (environmental toxicology), Public Health, and Comparative and Experimental Medicine. (Refer to other sections of this catalog for a full description of these programs.) The majority of the graduate students and graduate faculty of the College of Veterinary Medicine are involved in the Comparative and Experimental Medicine program. This program provides a wide spectrum of interdisciplinary training that prepares graduates for teaching and/or research careers in the health sciences.

PROFESSIONAL COURSES

801-02-03 Application Based Learning Exercise (ABLE) I, II, III (2,2,1) Small group, student-centered learning facilitated by self discovery of new information. Week-long sessions based on specific clinical case or problem, and integration of basic science and clinical material. S/NC only.

804-05-06 Application Based Learning Exercise (ABLE) II and Clinical Exposure I, II, III (2,2,2) Week-long small group, student-centered learning sessions with faculty facilitator for self discovery of new information based on specific clinical case or problem; integration of basic science and clinical material. One week of clinical experience through participation in specific clinical rotations in Veterinary Teaching Hospital. S/NC only.

811 Infection and Immunity II—Bacteriology and Mycology (3) Fundamental aspects of microbiology and cell biology relative to pathogenesis of bacterial and fungal diseases of animals: antimicrobial actions and mechanisms of bacterial resistance. General approaches to diagnosis, treatment and prevention.

813 Infection and Immunity III—Immunology (2) Basic biology and practical aspects of immunology: cells of immune system, immune function and dysfunction, immunopathology, diagnosis testing and specific diseases involving immune system.

814-16 Clinical Correlations and Ethics I, II, I, II (1,2) Correlations between basic science material from concurrent courses and ethics of veterinary medicine. Thought-provoking spectrum of current veterinary ethical issues. 816—Student-led discussions follow faculty presentations.


821-22 Veterinary Anatomy I, II (6,6) Integrated approach to study of developmental, macroscopic ( gross), and microscopic anatomy of common domestic animals. Dissections of embalmed specimens of common domestic species for comparative purposes. Microscopy relates structure with function. Study of developmental anatomy related to normal anatomy to inherited anomalies.

823-24 Physiology I, II (4,4) Introduction to concepts and problems in physiology which form basis for clinical applications and for formal training in pharma-
Clinical Rotations in Small Animal Clinical Sciences II (4) Clinical training in medicine, surgery and specialty disciplines for companion animals. Direct responsibility for diagnosis, care, and treatment of clinical patients.

Clinical Rotations in Small Animal Clinical Sciences III (4) Clinical training in medicine, surgery and specialty disciplines for companion animals. Direct responsibility for diagnosis, care, and treatment of clinical patients.

Clinical Rotation in Radiology and Pathology I, II (4,4) Two weeks in each discipline. Clinical training in radiographic techniques and interpretation, including ultrasonography. Post-mortem examination and laboratory diagnostics: clinical pathology and introductory histopathology of biopsy specimens.

Clinical Rotations in Large Animal Clinical Sciences I (4) Clinical training in medicine, surgery, specialty disciplines and herd health of food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

Clinical Rotations in Large Animal Clinical Sciences II (4) Clinical training in medicine, surgery, specialty disciplines and herd health of food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

Special Problems in Small Animal Clinical Sciences (1-8) Extramural and specially designed study for students interested in select topics in medicine, surgery, anesthesiology, radiology and medical specialties of small (companion) animals.

Transition and Accreditation Seminars (2) Discussion of USDA, state, and local animal laws and regulations: preparation of animal movement forms, veterinary ethics, jurisprudence, basic practice management, and other topics involved in practice of veterinary medicine.

Clinical Rotations in Large Animal Clinical Sciences III (4) Clinical training in medicine, surgery, specialty disciplines and herd health of food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

Special Problems in Large Animal Clinical Sciences (1-8) Extramural and specially designed study for students interested in select topics in medicine, surgery, herd health, reproduction, radiology and medical specialties of large animals.

Externship I, II (2,2) Educational experiences in private practice, research facility, zoological preserve, aquarium, or other veterinary-related facility outside Veterinary Teaching Hospital to provide experiences not frequently available in large referral veterinary teaching hospitals.
FACILITIES FOR RESEARCH AND SERVICE
Facilities for Research and Service

Bureau of Evaluation, Research, and Service
(College of Education)

Ian R. H. Rockett, Director

The Bureau is responsible for the coordination of research and evaluation activities and for the development of college research and service activities based on external funding. In addition, it may be called upon to provide brokering services to connect faculty expertise with needs for consultant services, technical assistance, and possible professional development activities. The Bureau directly coordinates select development of research proposals, as well as college grant and contract review, administration, and fiscal processes. The Bureau also provides the administrative home for the Appalachian Rural Systemic Initiative, Center for Literary Studies, Center on Deafness, Institute for Assessment and Evaluation, LRE for Life Project, Off-campus Program, Regional Rehabilitation Continuing Education Program, Southeastern High School Equivalency Program (Migrant Education), and Teacher Internship Program.

Center for Business and Economic Research
(College of Business Administration)

William Fox, Director

In its economic research endeavors, CBER today has the same basic mission determined at its inception over 60 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 and the biennial 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 areas of research, information technology and information dissemination, CBER is located at 100 Glocker.

Center for Executive Education
(College of Business Administration)

John E. Riblett, Director

The College of Business Administration’s executive/management education efforts are facilitated through the Center for Executive Education, 708 Stokely Management Center. The Center is a major outreach activity of the University of Tennessee and a key link between the business community and the College of Business Administration. Through short- and long-term business relationships, the Center partners with companies to provide continuing education for managers, carry out research, and exchange leading edge ideas.

The non-degree programs provided to the business community include general management programs, programs for process improvement, programs in lean enterprise practices and programs in supply chain management. They range in length from one week to four weeks.

A prominent feature of the programs is their applied nature. Through projects, assignments and workshops, participants use courses to analyze their organizations and implement immediate changes.

Much of the Center's work is customized to the needs of individual companies and provided at their sites in the U.S. or abroad. These custom programs range from a few days to extensive assistance with on-site change implementation that is structured over many months.

Additional information about the Center for Executive Education can be found at http://TheCenter.utk.edu.

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, and business and industry. Projects have ranged from strategic planning efforts to information system and service evaluations, to modeling of scientific and technical communication. Staff of the Center have been actively involved in proposal development and project performance with faculty and staff in other centers and departments at the University.

Areas of interest to the Center include information systems design, information organization and retrieval in very large databases, directories and locator tools in a networked environment, design of regional library and information system networks, new technology applications, information system support for educational reform, modeling of information processes, development of measures and methods for evaluating information system performance and effectiveness.
Center for Literacy Studies
(College of Education)

The Center for Literacy Studies was founded in 1988. The Center's purpose is to integrate scientific research, education, and practical applications of exercise and health science in a manner that enhances health, fitness, performance, and quality of life. The Center is a service-oriented organization designed to educate the University and Knoxvill communities about the benefits of regular physical activity as well as warn about the serious potential health outcomes of leading a sedentary existence.

The Center focuses its efforts in four main areas: training future leaders in exercise promotion, providing exercise opportunities for members of the UT community, promoting exercise within the UT and Knoxvill communities, and providing exercise testing and assessment.

For additional information about services, contact Dr. Dixie L. Thompson at (865) 974-1271 or via e-mail at dixielee@utk.edu.

Center for Physical Activity and Health
(College of Education)

The mission of the Center for Physical Activity and Health is to integrate scientific research, education, and practical applications of exercise and health science in a manner that enhances health, fitness, performance, and quality of life. The Center is a service-oriented organization designed to educate the UT and Knoxvill communities about the benefits of regular physical activity as well as warn about the serious potential health outcomes of leading a sedentary existence.

The Center focuses its efforts in four main areas: training future leaders in exercise promotion, providing exercise opportunities for members of the UT community, promoting exercise within the UT and Knoxvill communities, and providing exercise testing and assessment.

For additional information about services, contact Dr. Dixie L. Thompson at (865) 974-1271 or via e-mail at dixielee@utk.edu.

Center for Transportation Research
(Office of Research)

Stephen H. Richards, Executive Director

The Center for Transportation Research, formerly the Transportation Center, was created in 1970 to foster and facilitate interdisciplinary research, public service, and outreach in the field of transportation through small-scale and full-scale projects. The Center was renamed the Center for Transportation Research in 1970. It began operating full-time in 1972 and since then has contributed greatly to the overall research program of the University.

The Center, 600 Henley St., Suite 309, is a University-level organization administratively positioned within the Office of Research at UT. The Center's multidisciplinary staff includes over 120 full-time researchers and technicians augmented with numerous faculty and students. The Center is presently organized into four major divisions: Infrastructure and Environment; Safety and Traffic Operations; and Mobility Services and Policy.

The Center has three goals. The first is to conduct research programs in transportation that are recognized for their 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 in the various departments and colleges of UT. The third goal is to provide transportation research, service, and training needs of state and local government, business, and industry in Tennessee, the southeast region, and the nation.

Center for 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 interdisciplinary 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 industry. A major aspect of the Center is student participation in industry-sponsored research programs.

The Center is located at 513 East Stadium Hall, 974-0816. For further information, contact Dr. C. J. McHargue, 974-7680.

Centers and Chairs of Excellence

The Centers of Excellence grew out of Tennessee's Better Schools Program, an initiative to upgrade state-funded education at all levels. State officials and legislators wanted to give a few outstanding academic programs in state-funded universities a special push toward prominence, well beyond the regular annual increases for all programs.

In 1984, the General Assembly appropriated $11 million for the first Centers of Excellence throughout the state. The public colleges and universities submitted their proposals for Centers of Excellence to the Tennessee Higher Education Commission, which made the final determinations. Now four of the University's ten Centers of Excellence are sponsored by UT 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:

Knoxville
Bernadette E. Schmitt Chair of Excellence in History
Bernard Blasingame Chair of Excellence in Agricultural Policy
Chair of Excellence in Science, Technology and Medical Writing
Clayton Homes Chair of Excellence in Finance
College of Business Administration Chair of Excellence in Policy Studies
Condra Chair of Excellence in Computer Integrated Engineering and Manufacturing
Condra Chair of Excellence in Power Electronics Applications
Goodrich Chair of Excellence in Waste Management and Environmental Engineering
Hodges Chair of Excellence in English
J. Fred Holly Chair of Excellence in Political Economy
Nancy Gore Hunger Chair of Excellence in Environmental Studies
UT Willis Lincoln Chair of Excellence in Physics
Pilot Chair of Excellence in Management
Ivan Racheff Chair of Excellence in Ornamental Horticulture
Ivan Racheff Chair of Excellence in Materials Science and Engineering
Forrest & Patsy Shumway Chair of Excellence in Romance Languages

Memphis
Maury W. Bronstein Chair of Excellence in Cardiovascular Physiology
Crippled Children's Hospital Foundation Chair of Excellence in Biomedical Engineering
William and Dorothy Dunavant Chair of Excellence in Pediatrics
Faculty Chair of Excellence in Obstetrics and Gynecology
Federal Express Chair of Excellence in Pediatrics
First Tennessee Chair of Excellence in Clinical Pharmacy
Thomas A. Gerwin Chair of Excellence in Physiology
Goodman Chair of Excellence in Medicine
J. R. Hyde Chair of Excellence in Rehabilitation Engineering
Le Bonheur Chair of Excellence in Pediatrics
Plough Foundation Chair of Excellence in Pediatrics
Second Le Bonheur Chair of Excellence in Pediatrics
Sammes-Murphey Chair of Excellence in Neurology
Mark S. Sorway Chair of Excellence in Urology
Harriet S. Van Vleet Chair of Excellence in Biochemistry
Harriet S. Van Vleet Chair of Excellence in Microbiology and Immunology
Harriet S. Van Vleet Chair of Excellence in Pathology
Harriet S. Van Vleet Chair of Excellence in Pharmacology
Harriet S. Van Vleet Chair of Excellence in Virology
UTSI
Arnold Chair of Excellence in Computational Mechanics
Boling Chair of Excellence in Space Propulsion

The combination of the Centers of Excellence and Chairs of Excellence adds a dimension to The University of Tennessee that is not easily equaled by other institutions. UT's reputation as the premiere university in the state and as a regional and national leader in instruction, research, and public service is enhanced as a result of the infusion of these special funds.

For information concerning the individual centers sponsored by UT, contact:

Center for Laser Applications
Dr. J.W.L. Lewis, Director
Space Institute
B. H. Goethert Pkwy
Tullahoma, TN 37388-8977
(931) 362-7474
(jlewis@utsi.edu)

Center for Excellence for Computer Applications (CECA)
Dr. Clinton Smullen, Director
UT Chattanooga
124 Grote Hall
Chattanooga, TN 37403
(423) 755-4778
(csmullen@cecasun.utc.edu)

Center for Excellence for Materials Processing
Dr. Carl McHargue, Director
University of Tennessee
513 East Stadium Hall
Knoxville, TN 37996-2351
(865) 974-9570
(oovgs@utk.edu)

Center for Excellence for Livestock Diseases and Human Health
Dr. Leon Polgaieger, Director
UT College of Veterinary Medicine
Veterinary Teaching Hospital
Knoxville, TN 37996
(865) 974-5616
(crf@utk.edu)

Center of Excellence for Neurosciences
Dr. Stephen Kitai, Director
UT Health Science Center
855 Monroe Avenue
Memphis, TN 38163
(901) 448-5957
(skitai@utmem.edu)

Center of Excellence for Pharmacokinetics and Therapeutics
Dr. Richard A. Helms, Director
UT Health Science Center
800 Madison Avenue
Memphis, TN 38163
(901) 448-6034
(rhelms@utmem.edu)

Center of Excellence for Science and Mathematics Education
Dr. Preston Prather, Director
UT Martin
205G Gooch Hall
Martin, TN 38238
(901) 597-7163
(jprather@utm.edu)

Molecular Resource Center of Excellence
Dr. Michael E. Dockter, Director
UT Health Science Center
62 S. Dunlap, Suite 400
Memphis, TN 38163
(901) 448-7105
(mdockter@utmem.edu)

The Science Alliance
Dr. Jesse Poore, Director
University of Tennessee
101 South College
Knoxville, TN 37996
(865) 974-6800
(jpoore@utk.edu)

Waste Management Research and Education Institute
Dr. Gary Sayler, Director
University of Tennessee
676 Dabney Buehler
Knoxville, TN 37996
(865) 974-9080
(sayler@utk.edu)

Child Development Laboratories
(College of Human Ecology)
Anne Miller Stott, Director
The Child Development Laboratories, operated by the Child and Family Studies department within the College of Human Ecology since 1927, currently offer early education programs for young children ages six weeks to five years. The Child Development Laboratories serve three purposes: to promote observation, participation, and research activities of the department and other university faculty and students; to prepare undergraduate and graduate child development professionals for working effectively with young children; and to provide a model early childhood education program for children, families and early childhood professionals.

The programs are equipped with videotaping capabilities in all classrooms, small group research rooms, and observation booths that facilitate teacher preparation and research. A variety of research projects (such as the development of creativity in young children, emergent literacy, children's political socialization, mainstreaming, and peer interactions) involves students and faculty in the college and many departments on campus. Graduate Assistants in the Laboratories participate in teaching, assessment, administrative, supervisory and research activities while working with children and families under the guidance of faculty and staff. The Child Development Laboratories are accredited by the National Academy of Early Childhood Programs, a division of the National Association for the Education of Young Children.

For more information, check Web site at http://web.utk.edu/~utkcdl/.

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.

Division of Information Infrastructure

The Division of Information Infrastructure provides computing and telecommunications resources and services for students, faculty, and staff. DII consists of three operating units: Computing and Network Services, Customer Technology Support, and Telephone Services. Information about DII is available on the DII web site http://dii.utk.edu.

DII provides the core information technology infrastructure for The University of Tennessee. DII provides public-access computer labs, central computing, administrative information systems and network services, as well as information security for UT.

Individual computer accounts are provided at no charge for all UT students. These accounts may be used for e-mail, course work, research, and personal Web pages. Information and on-line registration for computer accounts are available at http://dii.utk.edu/accounts.html. Students are also encouraged to download Norton AntiVirus software from http://nav.utk.edu. The AntiVirus is also provided at no cost to students.

Students on the Knoxville campus may access the Internet through direct Ethernet or dial-up accounts. For on-campus students, each dorm room is provided with two switched 10 Mbit Ethernet ports. For off-campus students, the Enhanced Remote Access (ERA) pool is sustained by 756 modems supporting 56 Kbps analog and 64Kbps/128Kbps ISDN connections.

To provide access to computing facilities on campus, DII maintains seven staffed computing labs, 15 unstaffed labs, and supports computing installations in residence halls. The computing labs are equipped with more than 300 microcomputers including current models of Apple, Dell, and Gateway machines. In addition, there are laser printers, scanners, CD-Writers and zip drives available. A variety of industry standard software applications are available for use on the machines in the computing laboratories. Please refer to http://www.dii.utk.edu/labs.html for more information.

DII HELP DESK

DII provides the telephone Help Desk as a centralized source of information and service
for the computer and network resources managed by DII. Help Desk services are available to all UT students. Questions about your UNIX account, ERA account setup and billing, desktop hardware and software, e-mail, Internet usage and Web page design, and domain connectivity all can be handled by the Help Desk staff. Call 974-9600 for help. Send e-mail to helpdesk@utk.edu (UNIX, Internet, e-mail, or general) or era@utk.edu (connectivity problems or questions).

DII CUSTOMER SERVICE CENTER

DII maintains a Customer Service Center that centrally locates all contact points for walk-in computer support. When students need to get an Internet account, get an Ethernet card installed, register for an e-mail account, have their password reset, retrieve portions of a research paper from a virus-infected diskette, learn how to construct Web pages, or learn how to transfer files across the network, they can come to Aconda Court at the corner of Volunteer and Cumberland.

WALK-IN CONSULTING

The walk-in consulting center (Aconda Court 104) devotes its time to solving problems and teaching. Assistance is given on Web page construction, the use of scanner hardware and software, and uploading files and scanned images to a Web page. Students can come to the consulting center to register for an e-mail account or to get assistance with password problems. Users are taught how to Telnet, how to download and use virus protection programs, how to use WebMail and Lotus Notes, how to surf the Internet on both Netscape and Microsoft Explorer, and how to access the campus computer system through a modem.

ENHANCED REMOTE ACCESS (ERA) AND SUPPORT

DII supports approximately 6,000 users of ERA. Currently DII provides up to 128K ISDN connections and 56K analog connections. Any UT student, staff, or faculty member can obtain an ERA account that will give them access to the UT computer network, computer resources, and Internet access, all from home. The Enhanced Remote Access office is located in room 103 of Aconda Court at the corner of Volunteer and Cumberland. The ERA office personnel will help you set up your account as well as provide technical assistance either over the phone or for walk-in customers.

COMMUNICATIONS SOFTWARE DISTRIBUTION

DII distributes communications software to students through the Enhanced Remote Access office located in room 103 of Aconda Court. This software is free of charge. The software can be used to access the resources on the UT network and the Internet. Programs are provided for both PC and Macintosh computers and are available on CD. These software packages will allow students to check e-mail, surf the Web and transfer files.

DORM ETHERNET CARD INSTALLATION

DII has wired every dorm room on campus for network access. Each network port in the room is a 10Mbps dedicated Ethernet connection. Students living in the dorms with network-capable computers will be connected free of charge. Students with computers that do not have network cards installed may obtain a network card at a reduced price. Technicians are available to install the network card and communications software free of charge.

TECHNOLOGY TRAINING

Several courses are offered aimed at improving skills with the technology available at UT. Life Preserver: An Introduction to UT Computing is offered several times each semester on supported application software and operating systems. Other courses include those about MS Office products, Dreamweaver, JavaScript, using the Internet and search engines, and Web Page Essentials, which offers four levels of HTML training. There is also a series of courses on Adobe Photoshop. Please refer to http://web.utk.edu/~train for more information.

COMPUTER-BASED TRAINING

Computer-Based Training (CBT) is a self-paced series of interactive, WEB delivered, learn-as-you-go courses offered on many computing topics. CBT offers courses for Microsoft products (Word, Excel, etc.), Internet topics (Internet basics, How to create a Web page, etc.), and more advanced topics, such as JavaScript, Visual Basic, object-oriented techniques, and open systems. There are over 600 courses available. This training is free to UTK students. For registration and access to the CBT courses on the WEB go to http://dii.utk.edu/ and click on CBT.

STATISTICAL AND COMPUTATIONAL CONSULTING CENTER

The mission of the Center is to enhance the quality of research by effectively applying statistical and computing techniques. UT students, faculty and staff, as well as other organizations and individuals are assisted. The Technology Fee covers the cost of our services for up to two hours per month (10 hours per semester). Beyond that, the fee provides a subsidized rate of $20 per hour.

DII WEB SITE AND DOCUMENTATION

The DII WEB site is located at http://dii.utk.edu/. The DII WEB page provides you with access to information about, and access to, the many DII technology services that are available. On-line and printed documents describe use of resources available to students, faculty, and staff. This documentation includes The Life Preserver, a manual to help you get started using your UNIX account and sending/receiving e-mail, quick reference guides, and frequently-asked-questions (FAQ) Web pages.

CAMPUS PHONE AND CABLE TV

DII provides telephone services for students living on-campus in residence halls and off-campus in University resident apartments. DII also offers on-campus students full cable TV service at an affordable price. Cable TV service provides more than 30 channels, including ESPN, MTV, BET, History, VTV-33 Movies, showing new releases, movie classics, and much more. Please refer to http://dii.utk.edu/students/telephone for more information.

Energy, Environment, and Resources Center

(Office of Research)

Jack N. Barkenbus, Executive Director

The Energy, Environment, and Resources Center, 600 Henley Street, Suite 311, was created in 1973 to encourage interdisciplinary research directed at solutions to problems related to energy and the environment. The Center involves faculty and students in research and public service projects, manages research and development projects that involve several disciplines, and assists government and industry in specific problems related to energy, environmental, resource, and technology policy issues. The Center has a close working relationship with the Joint Institute for Energy and Environment, and Oak Ridge organizations. Sponsors include federal and state agencies, industry, and foundations. Current research includes solid and hazardous waste management, information systems, environmental education, global environmental problems, and pollution prevention. The Center operates the Waste Management Research and Education Institute, the Center for Clean Products and Clean Technologies, the Water Resource Research Center, the Center for Geography and Environmental Education, and the System Development Institute. Current grants and contracts are approximately seven million dollars per year.

Institute of Agriculture

Jack H. Britt, 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 mechanic arts for the first time. Since 1869, agricultural programs at the University have been expanded to include research for the development of new knowledge and extension for dissemination of such knowledge to rural people. Thus the Institute of Agriculture has come to include the work of four main divisions: Agricultural Experiment Station, Agricultural Extension Service, College of Agricultural Sciences and Natural Resources, and College of Veterinary Medicine.
The Agricultural Experiment Station was established by the U.S. Congress in 1882, five years before the passage of the Hatch Experiment Station Act by the U.S. Congress. The University of Tennessee was one of the first five institutions in the U.S. to establish an Agricultural Experiment Station. Since its beginning, the Station has given special 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 affect the quality of rural life. (d) Understanding the impact of food and fiber resources and the chemicals used in their production on people's well-being and the quality of life. Applied research utilizes these understandings to formulate effective programs that address the development of a physical and economic environment that provides for the needs of rural, farm, and urban citizens.

The investigations of the Station follow a systematic method of gaining and applying knowledge efficiently to the biological, physical, and economic phases of producing, processing, and distributing farm and forest products; to the social and economic aspects of rural living; and to consumer health and nutrition. Both farm and urban populations gain from the accomplishments of the Agricultural Experiment Station. Examples of some of these accomplishments are new and improved varieties of crops, new and better methods of controlling crop and livestock pests, more efficient production of crops and pasture through improved fertilization and mechanization, and more efficient feeding and management of livestock.

The program is designed and administered through ten subject matter departments located at Knoxville. A majority of the faculty have teaching responsibilities in addition to their research. To assist in the research program, the Station supports over 100 graduate students. To serve Tennessee's diverse agriculture, branch stations are operated at Crossville, Grand Junction, Greeneville, Jackson, Knoxville, Lewisburg, Martin, Milan, Oak Ridge (forestry), Springfield and Spring Hill. Professional and technical staff are in residence at these locations.

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 programs are 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 the Institutes 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.

Libraries, The University of Tennessee

Barbara I. Dewey, Dean
Aubrey H. Mitchell, Associate Dean

Professors:
Bayne, Pauline S., M.S.L.S. ....... North Carolina
Britten, William A., M.S.L.S. .... Clarion
Crowther, Karmen N.T., M.Ln. .... Emory
Dewey, Barbara I., M.A.L.S. .... Minnesota
Felder-Hoehn, Felicia H., M.S.L.S. .... Atlanta
Lloyd, James B., Ph.D. ......... Mississippi
Miller, Tamara J., M.S.L.S. .... Kentucky
Phillips, Linda L., M.S.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
Dixon, Lana, M.S.L.S. ......... Tennessee
Garrett, Marie A., M.L.S. ...... Vanderbilt
Haris, Steven, M.L.S. ........... Arizona
Kauf, Margaret, M.L.S. ......... Indiana
Kealy, Jillian M., M.L.S. ....... Tennessee
Kim, Sook-Hyun, M.A.L.S. .... Indiana
Leach, Sandra S., M.Ln. ......... Emory
Mack, Thura, M.S.L.S. .......... Tennessee
Minton, James O., M.S.L.S. .... Tennessee
Mitchell, Aubrey H., M.S.L.S. .... Tennessee
Prescod, Janette, M.S.L.S. .... Western Michigan
Row, Jane S., M.S.L.S. ......... Tennessee
Royse, Molly, M.S.L.S. ......... northern Carolina
Sammataro, Linda, M.L.S. ....... Southern Connecticut State
Shrode, Flora G., M.L.I.S. ....... Texas
Smith, Rita H., M.L.S. ......... Illinois
Thomas, Deborah L., M.L.S. .... George Peabody
Thomas, Steve, M.S.L.S. ......... Tennessee
Thompson-Wise, Deborah A., M.Ln. .... South Carolina
Viera, Ann R., M.L.I.S. ......... California, Berkeley
Wallace, Alan, M.Ln. .......... Washington
Williams, Sara, M.S.L.I.S. ......... Simms
Wise, Norman K., M.S.L.S. .... Tennessee

Assistant Professors:
Atkins, David P., M.A.L.I.S. .......... Wisconsin
Behrend, Linda, M.S.L.S. .... Tennessee
Berry, Teresa, M.S.L.S. .... Tennessee
Johnson, Kay C., M.L.S. .... Pittsburgh
Kracker, Jacqueline, M.S. .... Tennessee
Manoff, Maribeth, M.L.I.S. .... South Carolina
Mellinger, Margaret, M.S. .... Tennessee
Purcell, Aaron, M.L.S. ........... Maryland
Ratledge, David, M.S.L.S. .... Tennessee
Read, Eleanor, M.S. ............ Tennessee
Smith, Anthony D., M.S. ......... Tennessee
Weber, Mary Ellen, M.L.I.S. .... Kentucky

The University of Tennessee Libraries own approximately 2.1 million volumes and subscribe to more than 15,400 periodicals and 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 Libraries consists of the main library (John C. Hodges Library) and four branches on the Knoxville campus (Agriculture-Veterinary Medicine Library, Map Library, Music Library, and Special Collections), and the Social Work Library in Nashville.

Research assistance is available at the reference desk in each library. Free self-searching of selected databases is also available in the reference area and remotely, through the World Wide Web.

Users can search the catalog of holdings at any library branch or via the UT Libraries' Web site at www.lib.utk.edu. Materials that are not available in the UT Libraries can be requested through Interlibrary Services.

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 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 over 300 graduate student carrels, 200 faculty studies, and comfortable study space for more than 2,000 people.

The Agriculture-Veterinary Medicine Library (Room A-113, Veterinary Teaching Hospital) has a strong collection in agriculture, veterinary, comparative and human medical sciences, and related biological sciences. Most of the publications of the U.S. Department of Agriculture and the State Agricultural Experiment Stations and Extension Services are collected.

The Map Library (Room 15, basement of the Hoskins Library, Cumberland Ave. & 15th St.) maintains and distributes a collection of sheet maps, atlases, journals, and books related to cartography. Materials in print, film, and digital formats are acquired from commercial sources as well as the Government Depository program.

The Music Library (301 Music Bldg.) has a comprehensive collection of music and music
Measurement and Control Engineering Center

(College of Engineering)

Bill Snyder, Interim Director

The Measurement and Control Engineering Center, 512 East Stadium Hall, is sponsored by the College of Engineering, the Oak Ridge National Laboratory, and the National Science Foundation. The Center's program combines education, research, and technology transfer. Graduate assistantships are available 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.

The Measurement and Control Engineering Center sponsored research is carried out in the fields of process control, signal and image processing, and sensor development. Research in process control concentrates in the areas of process analysis, process modeling, control system design, and real-time expert systems. Fiber optic sensor systems development is underway for monitoring and control of chemical processes.

Nutrition Institute

(College of Human Ecology)

Michael B. Zamel, Director
Thomas C. Namer, Associate Director

The Nutrition Institute is a system wide, multidisciplinary consortium of faculty who are engaged in clinical and experimental nutrition research, teaching and service. Its expertise and resources are multifaceted including tools and techniques used in cell biology, epidemiology, metabolism and clinical training.

The multidisciplinary nature of nutrition has created a situation where nutrition research and teaching is dispersed among a number of academic units, including the Department of Nutrition in the College of Human Ecology as well as in several departments in the colleges of Agricultural Sciences and Natural Resources, Arts and Sciences, Medicine, and Veterinary Medicine. The Institute provides a communication link among all efforts in nutrition sciences, coordinates collaborative research programs in nutrition and provides a unified forum for exchange and interactions with the national and international nutrition community. In addition, by creating formal ties among the units within the University that are involved in undergraduate, graduate and professional education in nutrition, teaching resources may be pooled to strengthen nutrition-related instruction in these units.
fellowship, scholarship, and research appointments; and to organize research alliances among its members.

Through the Oak Ridge Institute for Science and Education (ORISE), the DOE facility that ORAU operates, undergraduates, graduates, postgraduates, 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, geological sciences, pharmacology, ocean sciences, biomedical sciences, nuclear chemistry, and mathematics. Appointment length and duration range from one month to four years. Many of these programs are especially designed to help 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 ORISE Catalog of Education and Training Programs, which is available at http://www.orau.gov/orise/resgd.htm.

ORAU's Office of Partnership Development seeks opportunities for partnerships and alliances among ORAU's members, private industry, and major federal facilities. Activities include faculty development programs, such as the Ralph E. Powe Junior Faculty Enhancement Awards, the Visiting Industrial Scholars Program, and various services to chief research officers. For more information about ORAU and its programs, contact Dr. Thomas W. Kerlin, Jr., (865) 974-9627; Ms. Monnie E. Champion, (865) 579-3306; or visit the ORAU website at http://www.orau.org.

2. SURA is a nonprofit consortium of 41 universities in thirteen Southeastern states and the District of Columbia. SURA's goals are to foster excellence in scientific research, to strengthen the scientific and technical capabilities of the nation and the Southeast, and to provide outstanding training opportunities for the next generation of scientists and engineers. The SURA-Oak Ridge National Laboratory (ORNL) Summer Cooperative Research Program in Materials Science and Engineering was established in 1989 to promote collaborations between individual university investigators and ORNL researchers. The SURA Continuous Electron Beam Accelerator Facility (CEBAF) Graduate Fellowship Program offers awards to promising graduate students enrolled or enrolling in master's or doctoral programs at SURA member institutions and whose research interests correspond to research activities to be conducted at CEBAF (i.e., nuclear and related particle physics, accelerator physics, and associated scientific and engineering fields).

3. URA, Inc. is a nonprofit corporation consisting of 86 major research-oriented institutions located in the United States, Canada, and Japan and is a management operating contractor for the U.S. Department of Energy (DOE) for the design, construction, and operation of the Fermi National Accelerator Laboratory (Fermilab) located near Batavia, Illinois. URA provides its laboratories with support courses for graduate students at Fermilab. Member institutions have graduate study programs in science and are active in particle physics and astrophysics.

For more information about ORAU and its programs, SURA, and URA, Inc., contact Dr. Anne Mayhew, Office of the Provost and ORAU Council member at 865-974-3265 or mayhew@utk.edu or contact Monnie E. Champion, ORAU Corporate Secretary at 865-576-3306. Additional information may also be found on World Wide Web sites at http://www.orau.gov and http://cebaaf.gov/sura.

Textiles and Nonwovens Development Center

(College of Human Ecology)

Billie J. Collier, Interim Director of Operations and Resources

Larry C. Wadsworth, Senior Executive for Marketing and Technology

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. Nonwoven research programs at UT include structure-property-process relationships in melt blowing, critical properties of melt blown webs; electrical measurement of fiber alignment and bonding in nonwoven webs; thermal bonding and characterization of cotton/synthetic fiber nonwovens; computational analysis of heat transfer behavior in thermal calendering; study of protective apparel for agricultural, industrial, medical uses; and finishing of nonwovens. In addition to the basic research, technology transfer has been accomplished during the past several years by assisting companies in applied projects, primarily in the melt blowing area. Collaboration is ongoing with faculty in the College of Engineering.

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 by industrial companies. The nonwovens laboratory hosts numerous guests from industry and academic, and the facilities are planned to meet their needs, while safeguarding research confidentiality.

Tourism Institute

(College of Human Ecology)

Nancy Fair, Director

The Tourism Institute at UT uses a systems approach to enhance economic development in Tennessee and the Southeast Region. Centered in the Department of Consumer and Industry Services Management, the Institute integrates faculty expertise from the hotel and restaurant administration program, the recreation and tourism management program, and the retail and consumer sciences program to address emerging issues and needs. The Institute is also supported by the Graduate School of Planning and the College of Agricultural Sciences and Natural Resources.

Successful tourism requires attractions to draw tourists and supporting businesses that provide high quality food, lodging and related consumer goods and services. The mission is to deliver research, development, and training projects that will promote sustainable tourism in Tennessee and the Southeast Region. The Institute pursues research studies to better understand the needs of the state's and region's tourist customers to enable the industry to provide the goods and services that will increase and diversify the tourist flow. It works with agencies and businesses to develop strategies for creating and expanding tourism enterprises. It also provides management level personnel to the tourism industry through the degree programs in the department and assists the industry in workforce training.

University of Tennessee Space Institute

T. Dwayne McCoy, Senior Vice President for Research and Information Technology

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 a nationally 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. The more than 40 faculty members of the Institute carry out these accredited academic programs through classroom teaching, informal seminars, active research, and directing the research of their students in an environment of creative work and advanced study.

Programs are available to students devoting full-time or part-time effort toward M.S. and Ph.D. degrees, those interested in continuing education for updating and broadening knowledge, and those who wish to pursue post-doctoral research.

Graduate degree programs are available with majors in Aerospace Engineering, Aviation Systems, Chemical Engineering, Computer Science, Electrical Engineering, Engineering Science, Industrial Engineering (engineering management concentration), Mathematics, Mechanical Engineering, Metallurgical Engineering, and Physics. In addition to the fundamental studies charac-
tastic of each discipline, research opportunities are available in many areas including aerodynamics, fluid mechanics, advanced space propulsion, neural networks, energy conversion processes, superconducting materials, thermal sciences, coal combustion, magnetohydrodynamics, plasma physics, space systems, propulsion, computational fluid dynamics, and other aspects of atmospheric and space flight.

The Institute has an established Center of Excellence in Laser Applications and offers graduate studies and research opportunities in laser diagnostics, laser materials interactions, pico-second processes, and coherent and non-linear optics.

The Institute was established in part to increase the research and engineering resources of Tennessee through education and practice in relevant scientific and technical areas and in part to interface University faculty and student research with the Air Force Arnold Engineering Development Center. The faculty, research activities, and facilities of the Institute, and those available at Arnold Center through appropriate contractual arrangements, provide students an unusual opportunity for significant research in these areas. Students who enroll at UT are admitted to the Graduate School. The University of Tennessee, Graduate Research Assistantships are available for qualified students. Further information may be obtained from the Dean for Academic Affairs, The University of Tennessee Space Institute, Tullahoma, Tennessee 37388.

University Outreach and Continuing Education

Robert Leiter, Dean
Norvel L. Burkett, Associate Dean of Non-Credit Programs
Gayle Cooper, Assistant Dean of New College
Robert Jackson, Assistant Dean for Technology and Development
M.K. Warden, Assistant Dean for Credit Programs

The University of Tennessee is committed to its land-grant mission of public service. The institution meets that mission by extending its continuing education services and programming resources through outreach initiatives. University Outreach and Continuing Education works with UT academic departments to offer courses, educational services and programs to students, teachers and faculty. The division offers programs using a variety of modes, helping people of all ages achieve degrees and certificates, accomplish professional development goals, and pursue recreational and intellectual interests.

Programs and courses are based upon student needs and desires, whether for self-motivated learning; for leisure and recreational programs; or for professional promotion, certification, licensure, relicensure, or mid-career changes. The Division provides these opportunities through program coordination and development of the seven departments: Department of Confer-

ences, Department of Distance Education and Independent Study, English Language Institute, University Evening School, UT New College, Summer School and Special Programs, and UT Professional and Personal Development.

For more information, contact: University Outreach and Continuing Education, 1534 White Avenue, Knoxville, TN 37996-1526, Phone: (865) 974-3161, FAX: (865) 974-6629, E-mail: outreach@utk.edu, Website: www.outreach.utk.edu.

DEPARTMENT OF CONFERENCES

Norvel Burkett, Associate Dean and Director
Robert Gibbs, Assistant Director

UT Conferences, housed in the Conference Center Building in downtown Knoxville, offers quality meeting facilities and service in its conference center to various UT units and other organizations. In addition, the department provides management services to UT departments and faculty or outside groups that desire to hold an educational meeting anywhere in Tennessee or across the United States.

UT Conferences assists organizations in designing and managing programs to meet the needs of attendees. The staff provides professional guidance and management for small group meetings as well as for major conventions of several thousand delegates. Consulting and support services can include planning and budgeting, registration, lodging, food services, promotional materials, meeting-site management and all details to ensure a successful event. Some programs qualify for Continuing Education Units (CEUs), which become a permanent record maintained by the Division.

Professional groups and interested individuals can request interactive videoconferencing to locations worldwide. Arrangements can also be made to receive (downlink) programming or transmit (uplink) programming via satellite.

Additional information may be obtained from: UT Conferences, P.O. Box 2648, Knoxville, TN 37901; Phone: (865) 974-0250, FAX: (865) 974-0264. E-mail: conferences@utk.edu, Website: www.outreach.utk.edu/conferences.

ENGLISH LANGUAGE INSTITUTE

Dale A. Myers, Director
Jan G. Hitt, Assistant Director

The English Language Institute (ELI) offers a non-credit language-study program. It is designed to assist students in their pursuit of career goals or educational objectives in the United States. The courses emphasize development of communicative ability in listening, speaking, reading, and writing. Faculty members are trained in teaching English to speakers of other languages and different national backgrounds, with varying proficiency in English.

The curriculum consists of eight proficiency levels: 101-108, Introductory through Pre-Academic.

Classes meet 3-5 periods each day with emphasis on English Structure (Grammar); Listening Comprehension, Writing/Composition (Rhetoric); Conversation Practice for Communicative Purposes, Reading and Vocabulary.

Classes also assist students in pronunciation, test-taking strategies, U.S. culture orientation, and university study skills.

Additional information may be obtained from: English Language Institute, 907 Mountainview Street, Knoxville, Tennessee 37996-3505, Phone: (865) 974-3404, FAX: (865) 974-6383, E-mail: eli@utk.edu, Website: www.outreach.utk.edu/ELI.

UT PROFESSIONAL AND PERSONAL DEVELOPMENT

Norvel Burkett, Acting Director
Nissa Dahlin-Brown, Assistant Director

UT Professional and Personal Development provides a comprehensive array of non-credit courses, certificates, and seminars designed to serve the needs of individuals and businesses in Knoxville and surrounding communities. Courses are offered on the University campus, at off-campus locations, and on-line. They are taught by University faculty, staff, and community experts. Courses also are delivered "on-site" for business clients, with instructional services tailored to the needs of each group.

Business topics include professional development, career planning, computer training, and small business development. Personal interest topics range from business and computers to art, dance, gardening, music, and sports. There are also courses that meet requirements of the state or other agencies for certification in real estate and financial planning.

Special programming also includes Kids U, providing summer hands-on workshops for elementary and secondary education students; Seniors for Creative Learning, a membership-based program focuses on issues and courses for senior adults; and the Smoky Mountain Field School program co-sponsored with The Great Smoky Mountains National Park.

For further information or to register, contact: UT Professional & Personal Development, 105 Conference Center Bldg., Knoxville, TN 37996-4110, Phone: (865) 974-0150, FAX: (865) 974-0164, E-mail: ProfessionalPrograms@utk.edu, Website: www.outreach.utk.edu/ppd.

DEPARTMENT OF DISTANCE EDUCATION AND INDEPENDENT STUDY

Robert Jackson, Assistant Dean and Director

The Department of Distance Education and Independent Study, in concert with academic departments at UT, offers internet-based, web-delivered classes, and programs leading to certificates and degrees. The School of Information Sciences offers the M.S. degree program through web-based coursework, while the Departments of Nuclear Engineering and Statistics offer many courses leading to degree and certificate programs. Other undergraduate and graduate classes and programs are in development, and a variety of individual courses in many disciplines are available. Current course availability can be found on the Web at anywhere.tennessee.edu.

The department provides services and support for faculty, students, and industry interested in flexibly-delivered education. It
also provides the support infrastructure for UT New College. The Internet eLearning Institute provides certificate programs, professional development courses and training for information technology professionals or individuals wanting expertise in internet technology. Courses are offered over the world wide web in the areas of e-commerce, web databases, web mastering, network systems engineering, administrative technology, technical sales, and instructional technology. For information and registration forms, contact the Distance Education Program at: Distance Education and Independent Study, 1534 White Avenue, Knoxville, TN. 37996-1525, Phone: (865) 974-9311 or (800) 670-8657, FAX: (865) 974-6629, E-mail: DistEducation@utk.edu, Website: anywhere.utk.edu.

UT NEW COLLEGE
Gayle Cooper, Assistant Dean
University of Tennessee New College will lead Tennessee economic development and improve quality of life by providing exemplary education beyond campus borders. UT New College offers academic programs off-campus to students at convenient times and places. The primary mission of New College is to help Tennesseans complete a college degree without leaving their families, communities, and careers.

To accomplish its mission, New College offers online academic programs from the University of Tennessee campuses. By providing a single portal, it is easy for citizens of the state to access online programs offered by all UT campuses. UT New College strives to emphasize a commitment to excellence, service to its students, an excitement for learning, and an entrepreneurial spirit that seeks new and more effective ways to engage students and faculty in the teaching-learning process.

In support of Tennessee's Workforce Initiative, UT New College works with business and industry to develop degree and non-degree programs needed by their employees. UT New College also provides educational pathways for Tennesseans seeking career changes.

Fulfilling its commitment to all Tennesseans, UT New College also enables students in rural and underserved areas, as well as the homebound, to access the University's programs online at convenient times and locations.

For further information, contact UT New College, 1534 White Avenue, Knoxville, TN 37996-1525, Phone: (865) 974-6622 or (1-866) 974-6629, FAX: (865) 974-6629, E-mail: NewCollege@utk.edu.

UNIVERSITY EVENING SCHOOL
M.K. Warden, Assistant Dean
The University Evening School administers on- and off-campus, undergraduate and graduate courses in a variety of nontraditional formats. All courses are approved and offered in conjunction with academic colleges and departments. Support services are provided to assist working adult students in their educational pursuits.

On-Campus Evening Program
Classes are offered during late afternoon and evening hours for those students who work or have other commitments during the day. The Master of Science degree is available in Computer Science, Statistics, Communications, Sport Management, Civil Engineering, Environmental Engineering, Human Resource Development, and Library Science. Also available are the Master of Public Administration and the Doctor of Education degrees.

Mini-Term
The University Evening School offers a Mini-Term during May. Students may enroll in one concentrated credit course during the Mini-Term period. Courses and instructors listed for the Mini-Term are carefully selected to reflect a broad academic base of offerings suited to an intensive program of study.

Off-Campus Programs
The Evening School conducts undergraduate and graduate courses in a number of locations away from the Knoxville campus. All course offerings and instructors are approved by the appropriate academic departments, and the credit awarded is resident credit. The M.S. with a major in Human Resource Development is available in Nashville. The M.S. with a major in Education is available in Anderson and Hamblen Counties. The Ed.D. with a major in Education is available in Chattanooga. In Oak Ridge, the Evening School offers courses leading to advanced degrees in Environmental, Industrial, and Nuclear Engineering, as well as Safety Education.

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 University's Knoxville campus, location 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: Priority registration by Web, touchtone phone, mail, FAX or regular phone is offered as a convenience to current Evening School students. Final registration at both on- and off-campus locations is available by Web, phone or in person.

Fees: The Evening School functions as a Bursar's office. Fees may be paid in person, by mail or by phone (with a credit card).

Advising: Advising is available for the benefit of all Evening School students who need assistance with academic or related matters. The program can accommodate students during regular daytime hours and in the evenings by appointment, as well as at several centralized off-campus locations.

The Colleges of Arts and Sciences, Business Administration, Communications, Education and Engineering cooperate with the Evening School to provide advising appointments after work hours.

Fee Waiver Program for Senior and/or Disabled Citizens
The Evening School administers this state-legislated program for UT Senior or totally disabled Tennessee citizens who wish to take UT credit courses may audit these free of charge or, upon admission, may pay a reduced rate to receive regular credit. Specific information about the regular program may be obtained in the Evening School office.

For more information, contact: University Evening School, 451 Communications Blvd., Knoxville, TN 37996-0349, Phone: (865) 974-5361 or 1-800-676-8657, FAX: (865) 974-2027, E-mail: eveningschool@utk.edu, Website: www.outreach.utk.edu/evening.

SUMMER SCHOOL AND SPECIAL PROGRAMS
M. K. Warden, Assistant Dean
Summer School
The Summer School offers a wide range of educational opportunities to regular students of the University of Tennessee and to visiting students. More than 1,000 different summer courses are offered by the School of Information Sciences, and departments in the Colleges of Agricultural Sciences and Natural Resources, Architecture and Design, Arts and Sciences, Business Administration, Communications, Education, Engineering, Human Ecology, Law, Nursing, and Social Work.

One full term of ten weeks and two five-week sessions are offered during the summer. The principal mission of the Summer School is to enhance the academic program for undergraduate and graduate students, attract students from other colleges to the Knoxville campus, and utilize the cultural and natural attractions of the area to further enrich students' summer experience.

The summer faculty is composed largely of regular University faculty. In addition, some well-qualified visiting faculty members may be invited to teach each session.

To obtain more information about UT Summer School, contact: Summer School, 451 Communications Blvd., Knoxville, TN 37996-0349, Phone: (865) 974-5361 or 1-800-676-8657, FAX: (865) 974-2029, E-mail: eveningschool@utk.edu, Website: www.outreach.utk.edu/summer.

Special Programs
The University of Tennessee offers a number of special programs on its Knoxville campus. Many of Special Programs' activities that may be of interest to K-12 teachers and teachers and students.

Southern Appalachian Science and Engineering Fair: The Fair brings between 300 and 400 students from East Tennessee middle and high schools where projects have been chosen to compete at the regional level. The event lasts 3-4 days, with judging occupying one afternoon and evening. Projects are displayed for public viewing after the competition until the awards convocation. Senior grand prize winners advance to international competition.

Tennessee Governor's School for the Sciences: The annual Governor's
School brings between 130 and 150 high school students from Tennessee to the campus for a four-week residential program that emphasizes skill development in writing, computer use and analytical thinking skills. The school also provides the opportunity for students to spend half of their time in a choice of seven programs with focused topics in contemporary science, engineering and mathematics.

**East Tennessee Academic Decathlon:** This event brings high school teams of nine students and their coach(es) to campus for a day of competitive test taking. Approximately ten teams register and pay an annual entry fee for the privilege of competing for medals and trophies.

**Tennessee Science Olympiad:** Having won regional competitions, approximately 270 middle and high school students and their coaches from around the state participate in this event. The day-long competition involves approximately 25 events in each of the two school levels. Some events require intellectual performance in timed competitions, while other events require that a contrivance, prepared in advance or during the competition, be made to perform to standards which are not announced until competition time.

**The Academy for Teachers of Science and Mathematics:** This annual event brings teachers and school administrators to the Knoxville campus. Teachers participate in a 4-week residential program, and administrators attend a 3-day workshop. Emphasis is placed on the exploration of the experiential nature of ideas in science and mathematics and the profound interdependence of these two fields of human endeavor. The goal is to teach new, exciting ways of presenting mathematics and science. In addition, the alumni are networked through the Internet and via annual meetings. Operating since 1991, the Academy presently has approximately 750 alumni in 19 states and eastern Canada.

**Directory of Special Programs:** Each year, the Special Programs office compiles a directory containing as many programs as can be identified on the University's Knoxville campus that may be of interest to K-12 teachers and students.

For a directory or additional information on Special Programs contact: Special Programs, 210 Hoskins Library, Knoxville, TN 37996-4012, Phone: (865) 974-3594, Website: www.acad.utk.edu/specprog.
Nursing, 166
Post-Master's Certificate in Family Nurse Practitioner, 166
Post-Master's Certificate in Management and Community Practice, 183
Post-Master's Certificate in Mental Health Nursing, 166
Post-Master's Certificate in Nursing Administration, 166
Post-Master's Certificate in Nursing of Women and Children, 166
Prerequisites, 17
Priority Registration, 17, 28
Privacy Act, 31
Probation, 19
Problems in Lieu of Thesis, 22
Procedures
Appeal, 19
Application, 14
Certificate of Credit Programs, 16
Change of Registration, 19
Doctoral Degree, 22-23, 25
Master's Degree, 20-21, 24
Readmission, 15
Registration, 17
Specialist in Education Degree, 21-22, 24
Product Development and Manufacturing, 127, 149
Professional and Personal Development, 206
Professional MBA Program, 71
Proficiency Examinations, 17, 28
Proficiency Fee, 28
Program of Study, 22
Programs and Services Fee, 27
Proprietary Research, 20
Psychological Clinic, 42, 204
Psychology, 42, 178
Public Administration, 175
Public Health, 118, 119
Public Health Nutrition, 168
Public Relations, 135
Qualifying Examination, 22
Rating Forms, iv
Reading Center, 43
Reading Education, 96, 190, 191
Readmission, 15
Recreation Administration, 87
Recreation and Tourism Management, 88
Recreation, Tourism and Hospitality Management, 87
Refund of Fees, 28, 29
Registrar, i
Registration, 17
Change of, 18
Conditional, 18
Dissertation, 23
Non-Thesis, 21
Proceedings, 17
Requirements, 16-19
Research, 21-23
Thesis, 21
Use of Facilities, 18
Registration and Enrollment Requirements, 16-19
Rehabilitation and Deafness, 91
Rehabilitation Counseling, 90, 91, 95
Reinstatement Fee, 28
Religious Resources, 36
Religious Studies, 42, 171, 180
Repayments, 29
Requirements
Admission, 14-16
Course, 21, 22
Degree Program, 19, 24, 25
Doctoral Degrees, 22-23
Enrollment, 16-19
Grades, 18
Graduate School, 14-23, 24, 25
Graduation, 24, 25
Master's Degrees, 20
Research, 22-23
Residence, 22, 23
Specialist in Education Degree, 21-22
Research Centers and Institutes, 199
Research Consortums, 204
Research Registration, 21-23
Research Requirements, 21-23
Residence Halls, 36
Residence Requirements, 22, 23
Residency Classification, 26
Responsibility, Graduate Student, i
Restricted Theses and Dissertations, 20
Retail and Consumer Sciences, 87, 89
Returned Check Policy, 28
Returned Check Service Fee, 28
Revision of Program, 15
Rules of Residency Classification, 26
Russian, 158
S
Safety, 118, 121
Scholarships, i, 30
School Counseling, 90, 95, 96
School Psychology, 86, 97, 100
Schools, 41, 59, 129, 134
Architecture, 41, 59
Art, 42, 60
Information Sciences, 129
Journalism and Public Relations, 43, 134
Music, 42, 160
Science Alliance, 42, 201
Science Education, 96, 190, 191
Second Master's Degree, 21, 188
Secondary Teaching, 96, 190
Security Information, 31
Senior Citizens, 16, 207
Seniors, 16
Services Fee, 27
Services, Student, 34-37
Short Courses and Workshops, 17
Small Animal Clinical Sciences, 45
Small Animal Research Laboratory, 44
Social Foundations, 96, 98
Social Services Education, 96, 190, 192
Social Science Research Institute, 42
Social Security Number, 31
Social Work, 45, 181, 204
Social Work, College of, 45, 181, 204
Socio-cultural Foundations of Sport and Education, 97, 98
Sociology, 42, 184
Soil Science, 173
Space Institute, 44, 205
Spanish, 155
SPEAK Test, 17
Special Course Fees, 28
Special Education, 96, 190, 192
Special Education: Early Childhood, 96, 190
Special Federal and State Laws and University Policies, 31-34
Specialist in Education, 90, 95, 96, 100, 132, 189
Specialist in Education Committee, 22, 24
Specialist in Education Degree, 21-22, 24
Specialization, Definition of, 20
Speech and Hearing Science, 63
Speech Communication, 43, 185
Speech Pathology, 63
Speech Services, 35
Sponsored International Students, 30
Sport Management, 96, 110
Sport Studies, 96, 98
Staff Members, Admission of, 15
State Laws and University Policies, 31-34
Statistics, 42, 73, 186
Student Apartments, 36
Student Counseling Services Center, 36
Student Employment, i, 30
Student Health Insurance, 29
Student Housing, i, 35
Student Identification Number, 31
Student Loans, 30
Student Responsibility, i
Student Services, 34-37
Summary of Procedures for Degrees, 24, 25
Summer Term Fees and Expenses, 29
T
Taiwan Executive MBA, 72
Teacher Education, 96, 190
Teacher Licensure, 97
Technology Fee, 27
Tennessee Internship Consortium in Professional Psychology, 43
Termination, 19
Terms, Definition of, 20
Test of English as a Foreign Language, 14, 15
Textile Science, 87, 89
Textiles and Nonwovens Development Center, 44, 205
Textiles, Retailing and Consumer Sciences, 87
Theatre, 42, 188
Theory and Practice in Teacher Education, 43, 95, 189, 192
Therapeutic Recreation, 87
Theses, 20, 21, 22, 24
Theses and Dissertations, 20, 24, 25
Thesis Registration, 21
Time Limit, 21, 22, 23
Tool, Definition of, 20
Tourism, 88
Tourism Institute, 44, 205
Track, Definition of, 20
Traffic Rules, 36
Transcripts, i, 14, 15
Transfer Credits, 20
Transient Admission, 15
Transportation and Logistics, 142
Trustees, Board of, 5
Tuition, 27
Tuition Payment Plans, 28
U
Undergraduate and Professional Students, 16
University Administration, 5
University Apartments, 36
University Calendar, 4
University Evening School, i, 206, 207
University Fees, 27-30
University Outreach and Continuing Education, 206
University Policies, 31-34
University Program and Services Fee, 27
Urban and Regional Planning, 42, 193
Urban Studies, 134
Use of Facilities Registration, 16
Use of Social Security Number, 31
V
Vehicle Operation and Parking, 36
Veterans Benefits, 30
Veterinary Medicine, 45, 55, 85, 154, 194
Veterinary Medicine, College of, 45
Comparative Medicine, 45
Large Animal Clinical Sciences, 45
Microbiology-Veterinary Medicine, 45
Pathology, 45
Small Animal Clinical Sciences, 45
Veterinary Medicine Students, 16
VolCard, 30
VOLXpress, 27

W
Waiver of Fees, 29
Waste Management Research and Education Institute, 201
Water Resources Research Center, 208
Wildlife and Fisheries Science, 112

Withdrawal, 18, 28
Women's Center, 37
Women's Studies, 134
Work-Study, i, 30
Workshops, 17
Written Examination, 21, 22