<table>
<thead>
<tr>
<th>Veterinary Medicine</th>
<th>173</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zoology</td>
<td>175</td>
</tr>
</tbody>
</table>

**Facilities for Research and Service**

<table>
<thead>
<tr>
<th>Bureau of Educational Research and Service</th>
<th>179</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center for Business and Economic Research</td>
<td>179</td>
</tr>
<tr>
<td>Center for Information Studies</td>
<td>179</td>
</tr>
<tr>
<td>Centers of Excellence</td>
<td>179</td>
</tr>
<tr>
<td>Child Development Laboratories</td>
<td>180</td>
</tr>
<tr>
<td>Communications Research Center</td>
<td>180</td>
</tr>
<tr>
<td>Computing Center</td>
<td>180</td>
</tr>
<tr>
<td>Continuing Education and Public Service</td>
<td>180</td>
</tr>
<tr>
<td>Energy, Environment, and Resources Center</td>
<td>182</td>
</tr>
<tr>
<td>Institute of Agriculture</td>
<td>182</td>
</tr>
<tr>
<td>Libraries</td>
<td>182</td>
</tr>
<tr>
<td>Management Development Center</td>
<td>183</td>
</tr>
<tr>
<td>Measurement and Control Engineering Center</td>
<td>183</td>
</tr>
<tr>
<td>Oak Ridge Associated Universities</td>
<td>184</td>
</tr>
<tr>
<td>Off-Campus Graduate Centers</td>
<td>184</td>
</tr>
<tr>
<td>Psychological Clinic</td>
<td>184</td>
</tr>
<tr>
<td>Textiles and Nonwovens Development Center</td>
<td>184</td>
</tr>
<tr>
<td>Transportation Center</td>
<td>184</td>
</tr>
<tr>
<td>University of Tennessee Space Institute</td>
<td>185</td>
</tr>
<tr>
<td>Water Resources Research Center</td>
<td>185</td>
</tr>
</tbody>
</table>

**Index**

**Map**
University Calendar for 1993-94

**Summer Term 1993**

- June 3 (Thursday)  Classes Begin
- July 5 (Monday)    Independence Day
- July 7 (Wednesday) First Session Ends
- July 7 (Wednesday) Change of Registration Deadline, Full Term
- July 8 (Thursday)  Second Session Begins
- August 11 (Wednesday) Second Session Ends
- August 13 (Friday)  Commencement

**Fall Semester 1993**

- August 25 (Wednesday) Classes Begin
- September 6 (Monday)  Labor Day
- September 7 (Tuesday) Change of Registration Deadline
- October 21-22 (Thursday-Friday) Fall Break
- November 25-26 (Thursday-Friday) Thanksgiving
- December 9 (Thursday)  Classes End
- December 10 (Friday)  Study Period
- December 11, 13-16 (Saturday, Monday-Thursday) Final Exams
- December 19 (Sunday)  Commencement

**Spring Semester 1994**

- January 12 (Wednesday) Classes Begin
- January 17 (Monday)    Martin Luther King Day
- February (Tuesday)     Change of Registration Deadline
- March 21-25 (Monday-Friday) Spring Break
- April 1 (Friday)       Good Friday
- May 2 (Monday)         Classes End
- May 3-4 (Tuesday-Wednesday) Study Period
- May 5-7, 9-10 (Thursday-Tuesday) Final Exams
- May 13 (Friday)        Commencement

**Summer Term 1994**

- June 2 (Thursday)  Classes Begin
- July 4 (Monday)    Independence Day
- July 6 (Wednesday) First Session Ends
- July 8 (Wednesday) Change of Registration Deadline, Full Term
- July 7 (Thursday)  Second Session Begins
- August 10 (Wednesday) Second Session Ends
- August 12 (Friday)  Commencement

Late registration normally begins two days before classes.

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

Board of Trustees

Ex Officio Members
- Governor, State of Tennessee
- Commissioner of Education
- Commissioner of Agriculture
- President of the University of Tennessee
- Executive Director, Tennessee Higher Education Commission

From Congressional Districts
- R.B. Hailey, Sevierville
- William B. Sansom, Knoxville
- Roger Nickson, Chattanooga
- William M. Johnson, Spartanburg
- Roy C. Flowers, Nashville
- Amon Carter Evans, Columbia
- Tom Elam, Union City
- J. Houston Gordon, Esq., Covington
- Ronald Terry, Memphis

From Anderson, Bedford, Coffee, Franklin, Lincoln, Moore, and Warren Counties
- J. Steven Ennis
- Michael Graves
- Paul J. Kinser
- Donald M. Leake
- James A. Haslam, II
- King W. Rogers, Ill, Esq.
- Edward W. Reed

From Weakley County
- Nancy Overton
- Jacqueline M. Haddad

Officers of the Board
- Governor Ned McWherter, Chairman
- James A. Haslam II, Vice Chairman
- Beauchamp E. Brogan, Secretary

TERM EXPIRES

June 1, 1993
June 1, 1995
June 1, 1994
June 1, 1996
June 1, 1997
June 1, 1998
June 1, 1993
June 1, 1996
June 1, 1996
June 1, 1996
June 1, 1995

University of Tennessee Administration

Joseph E. Johnson, A.B., A.M., Ed.D., President, The University of Tennessee
Emerson H. Fly, B.S., CPA, Executive Vice President and Vice President for Business and Finance
Homer S. Fisher, B.S., MBA, Senior Vice President for Student Affairs
Charles F. Brackbill, B.S., Vice President for Development
M. D. (Pete) Gossett, B.S., M.S., Ph.D., Vice President for Agricultural Sciences and Natural Resources
Joel W. Muelhauser, B.S., Ph.D., Acting Vice President of the UT Space Institute
William R. Rice, A.B., J.D., Acting Chancellor and Vice President for Health Affairs
Sammie Lynn Puett, B.S., M.S., APR, Vice President for Public Service, Continuing Education, and University Relations
Beauchamp E. Brogan, B.S., LL.B., J.D., General Counsel
Charles M. Peccolo, Jr., B.S., M.Acc., CPA, CCM, Treasurer

UT, Knoxville Administration

William T. Snyder, B.S., M.S., Ph.D., Chancellor
O. Glen Hall, B.S., M.S., Ph.D., Acting Vice Chancellor for Academic Affairs
Raymond L. Hamilton, B.S., M.Acc., CPA, Vice Chancellor for Business and Finance
Fred H. Harris, B.S., M.S., MBA, Vice Chancellor for Computing and Telecommunications
Philip A. Scheurer, B.A., M.S., Vice Chancellor for Administration and Student Affairs
Jack E. Williams, B.S., Vice Chancellor for Development and Alumni Affairs
C.W. Minkel, B.A., M.A., Ph.D., Associate Vice Chancellor and Dean of the Graduate School
Lee L. Riedinger, A.B., Ph.D., Acting Associate Vice Chancellor for Research
Gerhardt Schneider, B.S., M.S., Ph.D., Acting Dean of the College of Agricultural Sciences and Natural Resources
J. William Rudd, B.A., M.A., Dean of the College of Architecture and Planning
C. Warren Neel, B.S., M.A., D.B.A., Dean of the College of Business Administration
Dwight L. Teeter, A.B., M.J., Ph.D., Dean of the College of Communications
Richard Wisniewski, B.S., M.E., Ed.D., Dean of the College of Engineering
Jacquelyn O. DeJonge, B.S., M.A., Ph.D., Dean of the College of Human Ecology
Richard S. Wirtz, B.A., M.P.A., J.D., Dean of the College of Law
Lorman A. Ratner, A.B., M.A., Ph.D., Dean of the College of Liberal Arts
Joan E. Uhl, B.S.N., M.S.N., Ph.D., Dean of the College of Nursing
Eunice O. Shatz, B.A., M.S., Ph.D., Dean of the College of Social Work
G. Michael H. Shires, B.V.Sc., M.R.C.V.S., Dean of the College of Veterinary Medicine
Laverne B. Lindsey, B.S., M.Ed., Ed.D., Associate Vice Chancellor and Dean of the Division of Continuing Education
Gerald D. Bowker, B.A., M.A., Dean of Admissions (Undergraduate) and Records
Raymond A. Popp, B.S., M.S., Ph.D., Director of the UT-Oak Ridge Graduate School of Biomedical Sciences
Joseph Marie Griffiths, B.Sc., Ph.D., Director of the Graduate School of Library and Information Science
Paula T. Kaufman, A.B., M.S., MBA, Dean of Libraries
The Graduate School Administration

C.W. Minkel, B.A., M.A., Ph.D., Associate Vice Chancellor and Dean of The Graduate School
Linda R. Painter, B.S., M.S., Ph.D., Associate Dean of The Graduate School
Michael Singletary, B.A., M.A., Ph.D., Assistant Dean of The Graduate School
Diana C. Lopez, B.S., M.S., Director, Graduate Admissions and Records
Irene Kaplan, Assistant Director, Graduate Admissions and Records
Rose Ann Trantham, Assistant Director, Graduate Admissions and Records
S. Kay Reed, B.S., M.S., M.A., Ph.D., Graduate Recruitment Coordinator
Ann L. Lacava, Thesis/Dissertation Consultant

The Graduate Council

Membership August 1, 1992

Ex Officio Members
Dr. C.W. Minkel, Graduate Council Chairman
Dr. Sam Bills, Continuing Education
Dr. Joseph Cook, College of Law
Mr. Glenn Estes, School of Library & Information Science
Dr. Mildred Fenske, College of Nursing
Dr. Glen Hall, College of Agricultural Sciences and Natural Resources
Dr. Herb Howard, College of Communications
Dr. Charles Jackson, College of Liberal Arts
Dr. Roger Jenkins, College of Business Administration

College or Unit | Elected Members | Expiration | Proxy
--- | --- | --- | ---
Arch. & Planning | Dr. Pat Fisher | July 31, 1995 | Dr. David Johnson
Business Administration | Dr. William Parr | July 31, 1993 | Dr. Ernest R. Cadotte
 | Dr. Kenneth E. Anderson | July 31, 1994 | Dr. Gary N. Dicer
Communications | Dr. Barbara Moore | July 31, 1993 | Dr. Mark Miller
Education | Dr. Phyllis Huff | July 31, 1993 | Dr. John Matthews
 | Dr. Mark Christiansen | July 31, 1993 | Dr. Thomas K. Ryan
 | Dr. S. Wayne Mulkey | July 31, 1994 | Dr. Michael Hannum
 | Dr. Don Dossart | July 31, 1995 | Dr. Lester N. Knight
 | Dr. Wendell P. Lienmoh | July 31, 1995 | Dr. Pat Beitel
 | Dr. Bill C. Wallace | July 31, 1995 | Dr. Raymond Buchanan
Engineering | Dr. Wayman E. Scott | July 31, 1993 | Dr. John N. Snider
 | Dr. Hsien-Wen Hsu | July 31, 1994 | Dr. David Goodpasture
 | Dr. Marshall Pace | July 31, 1995 | Dr. John Landes
 | Dr. Arun Chatterjee | July 31, 1995 | Ms. Cindy Richardson
Graduate Student Association | Mr. Jimmy Rodgers | July 31, 1993 | Ms. Katie Buckley
 | Mr. John Altman | July 31, 1993 | Mr. Derek Crownover
 | Mr. Greg Williams | July 31, 1993 | Dr. Jo Lynn Cunningham
Human Ecology | Dr. Carl Dyer | July 31, 1993 | Ms. Mary Jo Hoover
Law | Mr. Carl Pierce | July 31, 1994 | Dr. Jan Simek
Liberal Arts | Dr. Suzanne Kurth | July 31, 1993 | Dr. William Helfin
 | Dr. William Bass | July 31, 1994 | Dr. Harry McSween
 | Dr. Dewey Bunting | July 31, 1994 | Dr. Al Burstein
 | Dr. Dorothy Scora | July 31, 1994 | Dr. Michael Sepaniak
 | Dr. Richard Aquila | July 31, 1995 | Dr. David Dobbs
 | Dr. Kathleen D. Lawler | July 31, 1995 | Dr. Carl W. Cobb
 | Dr. Kula C. Misra | July 31, 1995 | Dr. Martha Alligood
Nursing | Dr. Inez Tuck | July 31, 1995 | Dr. J. Michael Pemberton
School Lib. & Inf. Sci. | Dr. William C. Robinson | July 31, 1994 | Dr. Catherine Fayer
Social Work | Dr. Charles Glisson | July 31, 1995 | Dr. Judith Fiene
 | Dr. James Orten | July 31, 1995 | Dr. Ching F. Lo
UT Space Institute | Dr. Atul C. Sheth | July 31, 1994 | Dr. Ahmad Yakii
 | Dr. John Steinhoff | July 31, 1995 | Dr. Ahmad Yakii
Veterinary Medicine | Dr. Erby Wilkinson | July 31, 1994 | Dr. Ahmad Yakii
GRADUATE
STUDY
Rules, policies, fees, and courses described in this catalog are subject to change without notice. Refer to inside front cover.
The Graduate School

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

The University of Tennessee is the official land-grant institution for the State of Tennessee, with its main campus in Knoxville. UT Knoxville is the state's oldest, largest, and most comprehensive institution, and is the only state-supported "Research University I" (Carnegie classification) in Tennessee. A wide range of graduate programs leading to the Master's and doctoral degrees is available. The University offers Master's programs in 85 fields and doctoral work in 52. More than 6,500 graduate students are enrolled on and off campus under the tutelage of 1450 faculty members.

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

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

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

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

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

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

Graduate education has been conducted at The University of Tennessee since 1821. The first known Master's degree was awarded in 1827. In 1879 the Board of Trustees created a graduate department with authority to confer the Master of Arts, the Doctor of Philosophy, Civil Engineer, and Mining Engineer degrees. The Graduate Department was renamed The Graduate School in 1912. Although a Ph.D. degree was awarded in 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 6,800 doctoral degrees and 39,000 Master's degrees have been awarded to date.

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

<table>
<thead>
<tr>
<th>MAJOR</th>
<th>DEGREE</th>
<th>GEN</th>
<th>SUBJ</th>
<th>GRE</th>
<th>GMAT</th>
<th>LETTERS OR DEPT. APPL. &amp; THESIS</th>
<th>LANGUAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>College of Agricultural Sciences and Natural Resources</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural &amp; Extension Education</td>
<td>MS</td>
<td>X</td>
<td></td>
<td>3c</td>
<td>Xd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural Economics</td>
<td>MS</td>
<td>X</td>
<td></td>
<td>3c</td>
<td>Xd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural Engineering</td>
<td>MS</td>
<td>Xa</td>
<td>Xa</td>
<td>3c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Agricultural Engineering Technology</td>
<td>MS</td>
<td>X</td>
<td></td>
<td>3c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Animal Science*</td>
<td>MS</td>
<td>PHD</td>
<td>X</td>
<td>3c</td>
<td>Xd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entomology &amp; Plant Pathology</td>
<td>MS</td>
<td>PHD</td>
<td>X</td>
<td>3c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Food Science &amp; Technology*</td>
<td>MS</td>
<td>PHD</td>
<td>X</td>
<td>3c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Forestry*</td>
<td>MS</td>
<td>X</td>
<td></td>
<td>3c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Ornamental Horticulture &amp; Landscape Design*</td>
<td>MS</td>
<td>PHD</td>
<td>X</td>
<td>3c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Plant &amp; Soil Science*</td>
<td>MS</td>
<td>PHD</td>
<td>X</td>
<td>3c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Wildlife &amp; Fisheries Science*</td>
<td>MS</td>
<td>X</td>
<td></td>
<td>3c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>College of Architecture and Planning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Architecture*</td>
<td>MARCH</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planning*</td>
<td>MSP *</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College of Business Administration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accounting*</td>
<td>MAcc</td>
<td>PHD</td>
<td>X</td>
<td>2d</td>
<td>Xd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business Administration*</td>
<td>MBA *</td>
<td>PHD</td>
<td>X</td>
<td>2d</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Economics*</td>
<td>MA</td>
<td>X</td>
<td></td>
<td>3c</td>
<td>Xd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management Science*</td>
<td>PHD</td>
<td>X</td>
<td>or</td>
<td>3c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Statistics*</td>
<td>MS</td>
<td>X</td>
<td>or</td>
<td>2c</td>
<td>Xd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>College of Communications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communications*</td>
<td>MS</td>
<td>PHD</td>
<td>X</td>
<td>3c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>College of Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College Student Personnel</td>
<td>MS</td>
<td>X</td>
<td></td>
<td>3c</td>
<td>Xd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Curriculum &amp; Instruction</td>
<td>MS *</td>
<td>EDS *</td>
<td></td>
<td>3c</td>
<td>Xd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>PHD</td>
<td>EDD</td>
<td>Xb</td>
<td>6c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Educational Administration &amp; Supervision*</td>
<td>MS</td>
<td>EDS</td>
<td>X</td>
<td>3c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Educational Psychology</td>
<td>MS</td>
<td>EDD</td>
<td>X</td>
<td>3c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Educational Psychology &amp; Guidance</td>
<td>MS</td>
<td>EDD</td>
<td>Xb</td>
<td>4c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Health Education</td>
<td>EDD *</td>
<td></td>
<td></td>
<td>5c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Health Promotion and Health Education</td>
<td>MS</td>
<td>EDD</td>
<td></td>
<td>5c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Human Performance &amp; Sport Studies*</td>
<td>MS</td>
<td>EDD</td>
<td></td>
<td>5c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Public Health*</td>
<td>MPH</td>
<td></td>
<td></td>
<td>3d</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Recreation &amp; Leisure Studies</td>
<td>MS</td>
<td>EDS</td>
<td>X</td>
<td>3d</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Rehabilitation Counseling</td>
<td>MS</td>
<td>EDS</td>
<td></td>
<td>3d</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Safety Education &amp; Service</td>
<td>MS</td>
<td>EDS</td>
<td></td>
<td>3d</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Special Education</td>
<td>MS</td>
<td>EDS</td>
<td></td>
<td>2c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Technological &amp; Adult Education</td>
<td>MS</td>
<td>EDS</td>
<td>X</td>
<td>5c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Vocational-Technical Education</td>
<td>MS</td>
<td>EDS</td>
<td>X</td>
<td>5c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>College of Engineering</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aerospace Engineering*</td>
<td>MS *</td>
<td>Xa</td>
<td>Xa</td>
<td>3c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Chemical Engineering*</td>
<td>MS</td>
<td>Xa</td>
<td>Xa</td>
<td>3c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Civil Engineering*</td>
<td>MS</td>
<td>PHD</td>
<td>Xa</td>
<td>3c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Electrical Engineering*</td>
<td>MS</td>
<td>PHD</td>
<td>X</td>
<td>3c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Engineering Science*</td>
<td>MS</td>
<td>PHD</td>
<td>X</td>
<td>3c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Environmental Engineering*</td>
<td>MS</td>
<td>Xa</td>
<td>Xa</td>
<td>3c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Industrial Engineering*</td>
<td>MS</td>
<td>PHD</td>
<td>X</td>
<td>3c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Mechanical Engineering*</td>
<td>MS</td>
<td>PHD</td>
<td>X</td>
<td>3c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Metallurgical Engineering*</td>
<td>MS</td>
<td>PHD</td>
<td>X</td>
<td>3c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Nuclear Engineering*</td>
<td>MS</td>
<td>PHD</td>
<td>X</td>
<td>3c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Polymer Engineering*</td>
<td>MS</td>
<td>PHD</td>
<td>X</td>
<td>3c</td>
<td>Xd</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

*Non-degree and provisional 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.
<table>
<thead>
<tr>
<th>MAJOR</th>
<th>DEGREE</th>
<th>GEN</th>
<th>GRE</th>
<th>SUBJ</th>
<th>GMAT</th>
<th>LETTERS OR</th>
<th>DEPT, APPL &amp;</th>
<th>THESIS</th>
<th>LANGUAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADMISSION TEST REQUIRED</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>RATING FORMS</td>
<td>REQUIREMENTS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>College of Human Ecology</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child &amp; Family Studies*</td>
<td>MS*</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foodservice and Lodging Administration*</td>
<td>MS*</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home Economics*</td>
<td>MS*</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human Ecology*</td>
<td>PHD*</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interior Design*</td>
<td>MS*</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nutrition*</td>
<td>MS*</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Textiles, Retailing and Consumer Sciences*</td>
<td>MS*</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College of Liberal Arts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anthropology*</td>
<td>MA*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Letter of Intent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Art*</td>
<td>MFA*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Audiology*</td>
<td>MA</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biochemistry*</td>
<td>MS</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Botany*</td>
<td>MS</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemistry*</td>
<td>MS</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer Science*</td>
<td>MS</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English*</td>
<td>MA</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Xd.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>French</td>
<td>MA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Xd.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Geography</td>
<td>MS*</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geology*</td>
<td>MS*</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Xd.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>German*</td>
<td>MA</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Xd.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>History*</td>
<td>MA</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Xd.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Mathematics</td>
<td>MS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microbiology*</td>
<td>PHD*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modern Foreign Languages*</td>
<td>PHD*</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Music*</td>
<td>MM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Audition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Philosophy</td>
<td>MA*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physics</td>
<td>MS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Political Science*</td>
<td>MA</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychology</td>
<td>MA</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public Administration*</td>
<td>MPA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Xd.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Sociology</td>
<td>MA</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Xd.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Spanish</td>
<td>MA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speech &amp; Hearing Science*</td>
<td>PHD*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speech Pathology*</td>
<td>MA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theatre*</td>
<td>MFA*</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Audition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zoology</td>
<td>MS</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Xd.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>College of Nursing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nursing*</td>
<td>MSN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Xd.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>College of Social Work</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Work*</td>
<td>MSSW*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Xd.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Knoxville, Memphis, Nashville)</td>
<td>PHD*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School of Biomedical Science*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biomedical Sciences*</td>
<td>MS</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School of Library &amp; Information Science</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Library Science*</td>
<td>MSLS*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Xd.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercollegiate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aviation Systems (only at UTSI)*</td>
<td>MS*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Xd.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comparative &amp; Experimental Medicine*</td>
<td>MS*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Xd.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ecology*</td>
<td>MS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Xd.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Industrial &amp; Organizational Psychology*</td>
<td>MS*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Xd.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Life Sciences*</td>
<td>MS*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Xd.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Management Science*</td>
<td>MS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Xd.</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

a) International applicants only.
b) American applicants only.
c) G.S. Rating Form submitted to Department.
d) Forms obtained from & returned to Department.
e) Foreign or computer language.
Admission Requirements

Admission to The Graduate School requires a Bachelor's degree with a satisfactory grade-point average from a college or university accredited by the appropriate regional accrediting agency or foreign equivalent. Admission to The Graduate School does not ensure acceptance into a specific degree program nor admission to candidacy for the degree desired.

The Graduate School requires a minimum grade-point average of 2.5 out of a possible 4.0, or a 3.0 during the senior year of undergraduate study. Applicants with previous graduate work must have a grade-point average of 3.0 out of a possible 4.0 or equivalent on all graduate work. Many programs require a higher average. The equivalent of a minimum B average is required for international students.

An applicant whose GPA falls below 2.5 may be admitted in provisional status. Refer to Admission Classifications for requirements.

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

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

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

Application Procedures

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

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

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

Application forms for the above tests can be obtained by writing:
   Educational Testing Service
   Princeton, NJ 08450
   UT Knoxville is an approved testing center for all examinations. Examination results reach the University in approximately six weeks.

All of the above documents become the property of the University and will not be returned.

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

Admission Classifications

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

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

DEGREE ADMISSION

Admission to a degree program requires that a person meet the minimum requirements of The Graduate School and additional program requirements (see Admission Requirements). 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 admission tests for graduate studies, 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.
3. wish to register for graduate courses while meeting any additional requirements for non-degree admission; or
4. wish to continue enrollment in a degree program. If no degree is proposed to achieve that objective, the plan of study must include a stated educational objective and a list of courses proposed to achieve that objective.

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, the student must either:

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

A maximum of 15 graduate hours taken before acceptance into a degree program may be applied toward a graduate degree if approved by the student's committee. Courses applied toward any graduate degree must fall within the time limit specified for the degree.

Every graduate student must meet with an academic advisor at least once each semester to discuss his/her program. If no degree is proposed to achieve that objective, the plan of study must include a stated educational objective and a list of courses proposed to achieve that objective.

Leading standards for a person meet the minimum requirements of The Graduate School to assure admission to a degree program. The student who seeks to enter a degree program will be directed to the appropriate department.

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

PROVISIONAL ADMISSION

Applicants may be admitted as provisional students for one semester (or for one course in each of two semesters) who, for example:

1. do not meet the minimum grade-point average requirements;
2. wish to register for graduate courses while meeting any additional requirements for non-degree admission; or
3. desire graduate credit for a limited number of courses (one semester only).

The graduate application, a $15 application fee, and proof of a Bachelor's degree from a college or university accredited by the appropriate regional accrediting agency are required. Copies of official proof are acceptable. A major area need not be declared, but some departments do not permit provisional students to register for graduate courses (see Majors and Degree Programs chart for information on restricted programs).

Every graduate student must meet with an academic advisor at least once each semester to discuss his/her program. For 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 Assistant Dean of The Graduate School or designee is the advisor.

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

An international student on a non-immigrant visa may not enroll in the non-degree status.
degree or degree status has not been obtained. To be admitted to the non-degree or degree status, the student must earn at least a 3.0 grade-point average in all coursework (graduate and undergraduate) taken in provisional status, to include at least six hours of graduate work. Provisional students failing to meet this requirement will be denied registration.

The Office of Graduate Admissions and Records will process the change to non-degree status if all requirements are met. To apply for a specific degree program, the student must submit the Request for Change of Graduate Program form to the Office of Graduate Admissions and Records.

Provisional admission does not assure admission to the non-degree status or to a degree program. A student who hopes to enter a degree program will be directed to the appropriate department.

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

TRANSIENT ADMISSION

A student enrolled in good standing in a graduate degree program at another institution and who wishes to take courses for transfer to a graduate degree program at another institution must apply for transient admission any semester, but normally enters the summer or fall semester. Deadlines for admission to any semester, but normally enters the summer or fall semester. Deadlines for admission are:

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

The Office of Graduate Admissions and Records will be notified when action has been taken by the department/program and The Graduate School.

A student who is permitted to enroll and is subsequently denied readmission will receive credit for courses completed successfully. Future registration will not be allowed until readmission is granted.

Revision of Admission Classification

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

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

Registration and Enrollment Requirements

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

Undergraduate and Professional Students

UT KNOXVILLE SENIORS

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

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

UT KNOXVILLE VETERINARY MEDICINE STUDENTS

A student in good standing in the College of Veterinary Medicine may enroll in UT Knoxville graduate courses without being admitted to The Graduate School under the following conditions:

1. The student's advisor must approve in advance the student's enrollment in each course.
2. The student may take a maximum of 10 semester hours of graduate courses during the D.V.M. program.
3. Approval must be obtained each semester at registration through the Office of Graduate Admissions and Records. The student's progress is subject to review and approval each semester by the Assistant Dean, College of Veterinary Medicine.

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

UT KNOXVILLE LAW STUDENTS

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

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

Law Courses

A graduate student may take up to 6 semester hours of law courses and apply them toward a graduate degree upon approval of the College of Law and the student's major professor. The graduate student must register for law courses during the registration period at the College of Law and request an S/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.-M.P.A. programs. Grades must be earned according to the grading system of the respective colleges, e.g., numerical grades for law courses, letter grades for graduate courses. Refer to sections on Business Administration, Political Science, and Law under Fields of Instruction for grades acceptable to meet degree requirements.

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

Elderly and Disabled Persons

Legislation gives Tennessee citizens who are 60 years of age or older, or those who are totally disabled, the opportunity to attend credit and non-credit courses at the University at no charge on an audit, space available basis. Legal verification of either of these conditions is required for enrollment. Students who are 65 or over, or who are totally disabled, and who desire to receive UT credit for their courses, may pay a reduced charge of $7 per credit hour up to a maximum of $75 for a full-time load. Registration for day and evening classes is handled by the Evening School, 451 Communications and University Extension Building, (615) 974-5361 or 1-800-334-1724.

Auditors and Audited Courses

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

The names of all auditors properly registered will appear on the intermediate class rolls, but will be removed from the final grade report. No record of audited coursework will appear on the permanent record.

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

Short Courses and Workshops

The University offers a wide variety of short courses and workshops for graduate credit.

Correspondence Study

No graduate credit is accepted at UT Knoxville for work done by correspondence study at any university.

Proficiency Examinations

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

English Proficiency

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

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

**Prerequisites**

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

**Advisor/Major Professor**

Every graduate student must have an advisor from the major department. This professor advises the student about courses, supervises the student's research, and facilitates communication within the major department, to other departments and to The Graduate School. The advisor must approve the student's program each semester. Many departments assign a temporary advisor to the student's program each semester. Many departments assign a temporary advisor to the student's program each semester. Many departments assign a temporary advisor to

**Departmental Liaison**

In the list of faculty under each department, one member has been designated as a liaison to graduate students in other majors. The liaison acts as a departmental contact to assist non-departmental students with course selection and other academic matters.

**Registration**

Registration is required of all graduate students when using University facilities and/or faculty time. The minimum number of hours for registration is three. Registration allows use of services such as library checkout, laboratories, and recreation facilities not open to the public. Information concerning registration is available in the Graduate School News and Timetable of Classes. Each term, a registration period is scheduled during each semester for a subsequent semester. A student who has applied for graduate admission may register (see Conditional Registration). A late registration period is held normally two days prior to the beginning of classes. A late fee of $15.00 is assessed to any student in attendance at the University who fails to register early for the following semester(s). A student who participates in regular registration must obtain the computerized class schedule and pay fees on the first day of registration check-in. Additional information can be obtained from the Office of Graduate Admissions and Records.

Failure to pay tuition and fees before the deadline listed each semester in the Timetable of Classes will result in the assessment of a late registration fee. Retroactive registration is not permitted.

For registration procedures, students should consult the Timetable of Classes for the appropriate term.

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

**Conditional Registration**

A person who appears to meet the admission requirements of The Graduate School may be allowed to register for an initial term after submitting the Graduate Application for Admission form and application fee. Time is allowed to obtain transcripts and additional requirements for admission. The student who fails to gain admission within seven weeks after registration will NOT be permitted to register again until all admission requirements are met.

International students may not register conditionally.

**Registration for Use of Facilities**

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

**Course Description**

Each course listing 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. A student must register for graduate credit only if listed in the Graduate Catalog. To receive graduate credit for these, a student must so indicate on the registration material.

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

"Prereq:" indicates courses which must be taken prior to the course in question. A "Coreq:" course may be taken prior to or concurrently with the specific course. A "Recommended prereq:" course should be taken previously but is not mandatory.

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

"S/NC only" indicates that the course may be taken only for Satisfactory/No Credit grading (refer to section on Grades).

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

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

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

**Change of Registration**

The permanent record will show all courses for which the student has registered except those audited and those from which the student has withdrawn during the first 29 calendar days after the beginning of classes.

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

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

The deadline for all other changes of registration (e.g. from graduate to undergraduate, graduate to graduate, withdrawal) is approximately 42 calendar days after the first day of classes each semester. (See Graduate School News or Timetable of Classes each term for exact dates.) A student may change registration for a course at any time prior to and including this date by executing a change of registration form through the Office of Graduate Admissions and Records or Computer Assisted Registration. The student must sign the form certifying approval of the advisor. The instructor's signature is required to add a course if the course is closed and/or after the first 29 calendar days of classes.

If the student withdraws from a course or from the University after the first 29 calendar days of classes and before the change of
Course Loads

The maximum load for a graduate student is 15 hours, and 9 to 12 hours are considered a full load. Students holding a one-half time assistantship normally should enroll for 6-11 semester hours. A one-fourth time graduate assistant normally should take 5-11 semester hours. A student on a one-half time assistantship who takes six semester hours will be considered full time. Refer to the Policy for the Administration of Graduate Assistantships for additional information.

For the summer term, graduate students may register for a maximum of 12 semester hours in an entire summer term or for a maximum of 6 semester hours in a 5-week summer session. Students may enroll in only one course during a mini-term session.

Students receiving financial aid should consult with the department/program head concerning appropriate course loads. Courses audited do not count toward the minimum graduation hours required for financial assistance. Registration for more than 15 hours during any semester, or for more than 12 hours in the summer term, is not permissible without prior approval of The Graduate School, which may allow registration of up to 18 hours during a semester if the student has achieved a cumulative grade-point average of 3.6 or better in at least nine hours of graduate work with no outstanding incompletes. No more than 12 hours are permissible in the summer term without prior approval.

Grade-Point Average and Grades

A cumulative grade-point average of 3.0 is required on all graduate coursework taken at UT Knoxville to remain in good standing and to receive any graduate degree from the University. All coursework taken for graduate credit is computed into the GPA.

Grades in The Graduate School have the following meanings:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>(4 quality points per semester hour), satisfactory performance</td>
</tr>
<tr>
<td>B</td>
<td>(3 quality points per semester hour), satisfactory performance</td>
</tr>
<tr>
<td>C+</td>
<td>(2.5 quality points per semester hour), less than satisfactory performance</td>
</tr>
<tr>
<td>C</td>
<td>(2 quality points per semester hour), performance well below the standard expected of graduate students</td>
</tr>
<tr>
<td>D</td>
<td>(1 quality point per semester hour), clearly unsatisfactory performance and cannot be used to satisfy degree requirements</td>
</tr>
<tr>
<td>F</td>
<td>(no quality points), extremely unsatisfactory performance and cannot be used to satisfy degree requirements</td>
</tr>
<tr>
<td>I</td>
<td>(no quality points), a temporary grade indicating that the student has performed satisfactorily in the course but, due to unforeseen circumstances, has been unable to finish all requirements. An I is NOT given to enable a student to do additional work to raise a deficient grade. All incompletes must be removed within one semester, excluding the summer term. If a supplementary grade report has not been received in the Office of Graduate Admissions and Records at the end of the semester, the I will be changed to an F. The course will not be counted in the cumulative grade average until a final grade is assigned. No student may graduate with an I on the record.</td>
</tr>
<tr>
<td>S/NC</td>
<td>(carries credit hours, but no quality points), S is equivalent to a grade of B or better, and NC means no credit earned. Courses where NC is received may be repeated for a grade of S. A grade of S/NC is allowed only where indicated in the course description in the Graduate Catalog. The number of S/NC courses in a student's program is limited to one-fourth of the total credit hours required.</td>
</tr>
<tr>
<td>P/NP</td>
<td>(carries credit hours, but no quality points), P indicates progress toward completion of a thesis or dissertation. NP indicates no progress or inadequate progress.</td>
</tr>
<tr>
<td>W</td>
<td>(carries no credit hours or quality points), indicates that the student officially withdrew from the course.</td>
</tr>
</tbody>
</table>

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

Refer to Law Courses under Registration and Enrollment Requirements and Law under Fields of Instruction for Law grading system.

Academic Standards

Graduate education requires continuous evaluation of the student. This evaluation includes not only periodic objective evaluation, such as the cumulative grade-point average, performance on comprehensive examinations and acceptance of the thesis or dissertation, but also judgements by the faculty of the student's progress and potential. 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 by The Graduate School. It is the student's responsibility to be familiar with the special requirements of the department or program.

ACADEMIC PROBATION

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

DISMISSAL

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

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

Academic Honesty

Academic Honesty is a responsibility of all members of the academic community. An honor statement is included on the application for admission and re-admission. The applicant's signature acknowledges that the statement is confirmed. The honor statement declares that: An essential feature of The University of Tennessee, Knoxville is a commitment to maintaining an atmosphere of intellectual integrity and academic honesty. As a student of the University, I pledge that I will neither knowingly give nor receive any inappropriate assistance in academic work, thus affirming my own
Appeals Procedure

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

Degree Program Requirements

A complete list of programs is found under the Majors and Degree Programs chart. For specific degree requirements, consult individual program descriptions listed by college and field of instruction in this Catalog. See also the summary of procedures charts, and refer to the Graduate School News each semester for specific deadlines.

The following are the Graduate School’s minimum requirements for degree programs. Refer to the Fields of Instruction for additional program requirements.

Definition of Graduate Terms

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

Minor: An area of interest secondary to the major that is represented by a specified set of hours and/or courses. Diffsers 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 Knoxville, a minor is defined as 6-12 semester hours in one field outside the major. Usually the minor courses are within a single teaching discipline that also offers a minor.

Two interdisciplinary minors are available, at the Master’s and doctoral levels, in Statistics (Business Administration) and in Gerontology (Human Ecology). See Fields of Instruction for specific requirements and approval provisions.

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

Transfer Credits

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

To be transferred into a Master’s or Ed.S. program at UT Knoxville, a course must:

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

Courses transferred to any graduate program will not affect the minimum residence requirements for the program, nor will they be counted in determining the student’s grade-point average. Credits transferred from universities outside The University of Tennessee system cannot be used to meet the 500- or 600-level coursework requirements. Credit for extension courses taken from other institutions is not transferable, nor is credit for any course taken at an unaccredited and/or foreign institution.

MASTER’S DEGREE

A minimum of one-half of the total hours required for a Master’s degree must be taken at UT Knoxville. A maximum of one-third of the total hours may be transferred from institutions outside The University of Tennessee system, upon request by the academic unit. In addition, the student may transfer courses taken at other campuses of The University of Tennessee. Transferred courses must have been completed within the six-year period prior to receipt of the degree. The courses must be listed on the Admission to Candidacy form and will be placed on the student’s UT Knoxville transcript only after admission to candidacy.

ED.S. DEGREE

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

DOCTORAL DEGREE

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

Theses and Dissertations

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

The student, major professor and committee share responsibility for the accuracy and professionalism of the final product of the student’s research. The student should confer with the Thesis/Dissertation Consultant regarding problems and questions in advance of preparing the final copy. The UT Knoxville Guide to the Preparation of Theses and Dissertations (7th ed.) provides the correct format for theses or dissertations. Workshops are held periodically throughout the academic year. The date for each workshop is announced in the Graduate School News.

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

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

Master's Degrees

Master's degree programs are available with thesis and non-thesis options. These programs require 30 or more graduate hours of coursework. In addition to the M.A. and M.S. degrees, a number of other degrees are offered, including the MBA and the M.S.S.W.

COURSE REQUIREMENTS

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

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

SECOND MASTER'S DEGREES

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

MASTER'S COMMITTEE

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

ADMISSION TO CANDIDACY

Admission to candidacy reflects agreement among the student, graduate committee, and The Graduate School that the student has demonstrated ability to do acceptable graduate work and that normal progress has been made toward a degree. 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 contain all courses to be used for the degree, including transfer coursework. The student must submit the Admission to Candidacy form to the Office of Graduate Admissions and Records no later than commencement day of the semester preceding the semester in which he/she plans to graduate.

THESIS REGISTRATION

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

THESIS

The thesis represents the culmination of an original research project completed by the student. It must be prepared according to the UT Knoxville Guide to the Preparation of Theses and Dissertations (7th Ed.). Two copies of the thesis must be approved and accepted by The Graduate School on or before the deadline specified each semester in the Graduate School News. Each copy must include an approval sheet, signed by the members of the student's committee, certifying that they have examined the final copy of the thesis and have judged it to be satisfactory.

FINAL EXAMINATION FOR NON-THESIS STUDENTS

Each non-thesis student must pass a final comprehensive written examination. A department may require an additional oral examination. The examination is not merely a test over coursework, but a measure of the student's ability to integrate material in the major and related fields. Except with prior approval from The Graduate School, the examination must be given on the UT Knoxville campus. It must be scheduled through the Office of Graduate Admissions and Records in accordance with the deadlines specified in the Graduate School News and will be conducted by the Master's committee. Final examinations not properly scheduled must be repeated. Students taking the final examination but not otherwise using University facilities may pay a fee of $135 instead of registering. In case of failure, the candidate may not apply for reexamination until the following semester. The result of the second examination is final.

TIME LIMIT

Candidates have six calendar years from the time of enrollment in The Graduate School to complete the degree. Students who change degree programs during this six-year period may be granted an extension of two years and approval by The Graduate School. In any event, coursework used toward a Master's degree must have been taken within six calendar years of graduation.

Specialist in Education Degree

The Specialist in Education (Ed.S.) degree is offered with majors in Curriculum and Instruction, Educational Administration and Supervision, Educational Psychology and Guidance, Safety Education and Service, and Vocational-Technical Education. Admission to the Ed.S. program requires acceptance by The Graduate School, and review and acceptance by the department or area in which the student is majoring. It is recommended that students who apply for the Ed.S. have at least one year of related work experience. Additional information on admission requirements can be obtained from the departments offering the degree.

COURSE REQUIREMENTS

The student's program involves a minimum of four semesters of study totaling not fewer than 60 semester hours of graduate credit beyond the baccalaureate degree. A minimum of 12 hours is required outside the major department or area.

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

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

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 department or major area. Its responsibilities include formulating the student's program of coursework, supervising progress, recommending admission to candidacy, directing research, and coordinating the qualifying and final examinations.

RESIDENCE REQUIREMENTS

Residence is defined as full-time registration for a given semester on the campus where the program is located. The summer semester is included in this period.

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

ADMISSION TO CANDIDACY

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

The Admission to Candidacy form must be signed by the student's committee and contain all courses to be used for the degree, including transfer coursework. The Admission to Candidacy form is submitted to the Office of Graduate Admissions and Records before the student has completed 15 hours of coursework in the Ed.S. program. A qualifying examination may be required for admission to candidacy if the student has a Master's degree earned six years or more prior to admission to the program. This examination may be written and/or oral.

RESEARCH REQUIREMENTS

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

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

2. In the thesis program, or problems in lieu of thesis, 6 hours of research credit (518 and 519) must be earned in preparation of an acceptable piece of work. The student must continue to register for thesis or problems while working on the project, including the semester it is accepted by The Graduate School. The thesis must be prepared according to instructions in the UT Knoxville Guide to the Preparation of Theses and Dissertations (7th ed.), and approved by the student's committee prior to submission to The Graduate School for final approval and acceptance.

FINAL EXAMINATION

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

TIME LIMIT

Candidates have six calendar years from the time of entry into the last 30 hours of their degree programs to complete the 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 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 demonstrated capacity in original investigation, and competence in a particular field. The student's program of study is subject to Graduate Council policies and individual program requirements. The program of study as listed by the student on the Admission to Candidacy form must be approved by the doctoral committee. Doctoral programs include a major field or area of concentration and, frequently, one or more cognate fields. Cognate fields are defined as a minimum of 6 semester hours of graduate coursework in a given area outside the student's major field.

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

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

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

DOCTORAL COMMITTEE

The student and 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 a department 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.

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.

DOCTORAL EXAMINATIONS

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

Diagnostic Examination

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

Qualifying Examination

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

**Comprehensive Examination**

The comprehensive examination (or the final part of this examination, when parts are given at different times) is normally taken when the doctoral student has completed all or nearly all prescribed courses. Thus, its successful completion indicates that, in the 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 several times during the student's course of study. Students should review carefully the written statement from each doctoral degree program which details the timing, areas covered, grading procedures, and provisions for repeating a failed examination.

**Defense of Dissertation Examination**

A doctoral candidate must pass an oral examination on the dissertation. The dissertation, in the form approved by the major professor, must be distributed to the committee at least two weeks before the examination. The examination must be scheduled through the Graduate Admissions and Records Office at least one week prior to the examination. Final examinations not properly scheduled must be repeated. The examination is announced publicly and is open to all faculty members. The defense of dissertation will be administered by ALL members of the doctoral committee after completion of the dissertation and all course requirements. This examination must be passed at least two weeks before the date of submission and acceptance of the dissertation by The Graduate School. The major professor must submit the results of the defense by the dissertation deadline.

**LANGUAGE REQUIREMENTS**

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

Satisfactory completion (grade of B or better) of German 332 or French 302 may be substituted for a language examination. Some programs may accept a computer language 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 semester is included in this period.

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

A statement as to how and during what period of time the residence requirement has been met will be presented with the Application for Admission to Candidacy along with signatures of approval from the major professor and the Department Head/Program Director. Additional information about the rationale for the residence requirement may be obtained from the Graduate Council report available in The Graduate School.

**ADMISSION TO CANDIDACY**

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

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

**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 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*, 7th ed.) must be submitted to and accepted by The Graduate School. Each copy must include an approval sheet, signed by all members of the doctoral committee, which certifies to The Graduate School that they have examined the final copy and found that its form and content demonstrate scholarly excellence. Doctoral forms and a thesis card are also submitted at this time. The student should check with the department head concerning additional required copies of the dissertation.

**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 and Specialist in Education 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 Admissions and Records and Major Department</td>
<td>Prior to completing 15 hours of graduate courses</td>
</tr>
<tr>
<td>Formation of Master's/Ed.S. committee</td>
<td>Advisor/Major professor</td>
<td>Prior to application for admission to candidacy</td>
</tr>
<tr>
<td>Submission of application for admission to candidacy</td>
<td>Master's/Ed.S. committee</td>
<td>At least one semester prior to graduation*</td>
</tr>
<tr>
<td>Approval of admission to candidacy</td>
<td>The Graduate School</td>
<td>Prior to graduation</td>
</tr>
</tbody>
</table>

**GRADUATION REQUIREMENTS FOR NON-THESIS OPTION**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Responsible Party</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placement of name on graduation list</td>
<td>Student</td>
<td>Indicate on registration materials</td>
</tr>
<tr>
<td>Application for diploma</td>
<td>Office of Graduate Admissions and Records</td>
<td>Deadline available at registration*</td>
</tr>
<tr>
<td>Payment of graduation fee</td>
<td>Bursar's Office</td>
<td>Deadline available at registration*</td>
</tr>
<tr>
<td>Scheduling of Final Examination</td>
<td>Student and Office of Graduate Admissions and Records</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 three weeks prior to Commencement*</td>
</tr>
<tr>
<td>Removal of Incomplete(s)</td>
<td>Instructor of course</td>
<td>Not later than one week prior to Commencement*</td>
</tr>
</tbody>
</table>

**GRADUATION REQUIREMENTS FOR THESIS/PROBLEMS OPTIONS**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Responsible Party</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placement of name on graduation list</td>
<td>Student</td>
<td>Indicate on registration materials</td>
</tr>
<tr>
<td>Application for diploma</td>
<td>Office of Graduate Admissions and Records</td>
<td>Deadline available at registration*</td>
</tr>
<tr>
<td>Payment of graduation fee</td>
<td>Bursar's Office</td>
<td>Deadline available at registration*</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 and Office of Graduate Admissions and Records</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 and thesis card</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>
<td>Not later than one week prior to Commencement*</td>
</tr>
</tbody>
</table>

*Deadlines are printed in the *Graduate School News* each semester.
## 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 Admissions and Records and Major Department</td>
<td>Prior to completing 15 hours of graduate courses</td>
</tr>
<tr>
<td>*Appointment of doctoral committee</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>*Comprehensive Examination</td>
<td>Major department</td>
<td>Prior to admission to candidacy</td>
</tr>
<tr>
<td><em>Foreign language examination(s)</em>*</td>
<td>Office of Graduate Admissions and Records</td>
<td>Prior to admission to candidacy</td>
</tr>
<tr>
<td>Submission and approval of application for admission to candidacy</td>
<td>Doctoral committee and The Graduate School</td>
<td>At least one semester prior to graduation***</td>
</tr>
</tbody>
</table>

### GRADUATION REQUIREMENTS

<table>
<thead>
<tr>
<th>PROCEDURES</th>
<th>UNDER DIRECTION OF</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placement of name on graduation list</td>
<td>Student</td>
<td>Indicate on registration materials</td>
</tr>
<tr>
<td>Application for diploma</td>
<td>Office of Graduate Admissions and Records</td>
<td>Deadline available at registration ***</td>
</tr>
<tr>
<td>Payment of graduation fee</td>
<td>Bursar's Office</td>
<td>Deadline available at registration ***</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 and Office of Graduate Admissions and Records</td>
<td>Not later than one week prior to Defense of Dissertation Examination***</td>
</tr>
<tr>
<td>Defense of Dissertation Examination</td>
<td>Doctoral committee</td>
<td>Not later than four weeks prior to Commencement***</td>
</tr>
<tr>
<td>Approval and acceptance of final copy of dissertation, doctoral forms, and dissertation card</td>
<td>Doctoral committee and The Graduate School</td>
<td>After Defense of Dissertation Examination and not later than two weeks prior to Commencement***</td>
</tr>
<tr>
<td>Removal of Incomplete(s)</td>
<td>Instructor of course</td>
<td>Not later than one week prior to Commencement***</td>
</tr>
</tbody>
</table>

*The order of these items varies with individual programs.
**Not required in some programs.
***Deadlines are printed in the Graduate School News each semester.
Residency Classification for Tuition Purposes

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

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

A student wishing to appeal a classification should contact the Residency Assistant, 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 registration for a given semester, if the student is to be considered for reclassification that semester.

RULES OF RESIDENCY CLASSIFICATION

Intent

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

Definitions

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

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

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

(4) "Emancipated person" shall mean a person who has attained the age of eighteen years, and whose parents have entirely surrendered the right to the care, custody, and earnings of such person and who no longer are under any legal obligation to support or maintain such deemed "emancipated" person.

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

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

Rules for Determination of Status

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

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

(3) The domicile of an unemancipated person is that of his or her parent.

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

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

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

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

(3) Part-time students who are not domiciled in this State but who are employed full-time in the State, or who are stationed at Fort Campbell pursuant to military orders, shall be classified out-of-state but shall not be required to pay out-of-state tuition.

(4) Military personnel and their spouses stationed in the State of Tennessee who would be classified out-of-state in accordance with other provisions of these regulations will be classified out-of-state but shall not be required to pay out-of-state tuition. This provision shall not apply to military personnel and their spouses who are stationed in this State primarily for educational purposes.

Presumption

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

Evidence to be Considered for Establishment of Domicile

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

Appeal

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

Effective Date for Reclassification

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

University Fees

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

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

All students are required to have a validated fee receipt to complete the registration procedure. This includes graduate assistants, teaching assistants, teaching associates, research assistants, staff, and others whose fees may be billed, prepaid, or waived. Delayed registration service fees are also applicable to such students.

No student is authorized to attend classes who has not obtained a computerized class schedule and a validated fee receipt.

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

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

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

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

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

<table>
<thead>
<tr>
<th>IN-STATE FEES</th>
<th>Fall 1992</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAINTENANCE FEE</td>
<td>Per Semester $1,043</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OUT-OF-STATE FEES</th>
<th>Fall 1992</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAINTENANCE FEE AND TUITION</td>
<td>Per Semester $2,843</td>
</tr>
</tbody>
</table>

NOTE: In lieu of the tuition and/or maintenance fee, part-time students may elect to pay fees computed by the semester hour credit (or audit) as follows:

In-State
$135 per semester hour or fraction thereof; minimum charge $270.

Out-of-State
$316 per semester hour or fraction thereof; minimum charge $632.

UNIVERSITY PROGRAMS AND SERVICES FEE

PER SEMESTER ............................................ $111

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

All students enrolled in excess of eight semester hours per term are assessed an activity fee of $111. Part-time students taking fewer than nine semester hours will be assessed at the rate of $8 per semester hour or fraction thereof; minimum charge $16.

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

Knoxville campus students taking a course load of 6-8 hours may elect to pay the full programs and services fee.

Knoxville campus day students taking a course load of 3-8 hours may elect to pay the student health fee ($36), plus the appropriate part-time programs and services fee.

The University programs and services fee is not refundable.

The fee for the summer term is $65.

LATE PAYMENT FEE

Graduated Late Service Fee

Upon receipt of a schedule (full, partial, or incomplete) a student is registered and is immediately responsible for payment of fees. Students who register early for a semester must pay their fees (or make satisfactory arrangements with the Bursar's Office) within the two registration check-in days, prior to the beginning of classes, to avoid late payment service charges. Effective the first day of classes, a graduated late service fee of $2 per day will be charged during the next ensuing five regular business days.

Students who register through late registration will be granted two additional days after classes begin to pay their fees (or make satisfactory arrangements with the Bursar's Office) before the graduated late service fee begins. Such students will be charged the graduated late service fee, beginning with the third regular business day following the last registration day (minimum charge $6 third day, $8 fourth day, $10 fifth day).

Additional Late Service Fees

All students who have not completed registration and paid their appropriate charges (or made satisfactory arrangement with the Bursar's Office) within five regular business days after classes begin will be charged an additional $10 late service fee (total $20).

After regular business days, students will be charged a second additional $10 late service fee (total $30). After regular business days, students will be charged a third additional $10 late service fee (total $40). After regular business days, students will be charged a fourth additional $10 late service fee to a maximum of $70, and may, at the discretion of the University, be withdrawn from school and assessed the appropriate fees as of the date dropped.

Students who register through late registration will be granted two additional days after classes begin to pay their fees (or make satisfactory arrangements with the Bursar's Office) before the graduated late service fee begins. Such students will be charged the graduated late service fee, beginning with the third regular business day following the last registration day (minimum charge $6 third day, $8 fourth day, $10 fifth day).

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

Failure to pay fees or to make satisfactory arrangements for deferment or waiver by the end of the fourth week of classes will result in the assessment of appropriate fees and forfeiture of all university services, including the receipt of grades, transcripts, and schedule of classes. After grades are withheld, the reinstatement fee is $45.

LATE REGISTRATION FEE .................................. $15

Students who do not register during the preceding semester will be charged a $15 late registration fee.

RETURNED CHECK SERVICE FEE POLICY

During registration check-in days, all checks are deposited the day they are received. A $10 service charge will be assessed when checks fail to clear the bank on which drawn. In addition, if the returned check is in payment of initial fees and charges, the late payment fee in effect at the time the check is redeemed (minimum charge - $20) will be added to the returned check service fee. Returned checks will not be redeposited. Cash or certified checks are required for payment of the returned check, late fee, and service charges.

Any student who does not respond within seven days from the date of the first notice will be assessed an additional $10 Service Fee. For other returned checks the financial charge will be $10 if the check is made good within seven days from the date of notice and $20 if made good after seven days.

Failure to clear returned checks will result in the forfeiture of all university services, including the receipt of grades, transcripts, and schedule of classes.

MUSIC FEE

One half-hour lesson per week ................................ $45
One-hour lesson per week .................................. $90
Payable at registration by students receiving individual instruction in music.

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.

TUITION PAYMENT PLANS

All student fees are due in advance and should be paid in full at registration check-in each semester.

Prepayment Plan

A prepayment plan has been developed to assist students and/or parents with planning and budgeting their academic year expenses. Under the plan, students and/or parents may choose the expenses they wish to prepay, including room, board, tuition, and fees. Expenses can be prepaid over a period of eight months. Students and/or parents wishing to participate in the prepayment plan should contact the Bursar's Office for details.

Deferred Payment Plan

Although fees, rent, and other university expenses are due and payable at the beginning of each term, a student in good financial standing with a definite anticipated source of
funds may request the deferral of up to 50% of the total charges at registration check-in. The deferred payment may be divided into two equal installments payable on the 28th and 56th day of the term. All financial aid must be applied toward fees before a deferral will be considered. A deferred payment service fee of $10 is assessed when any portion of tuition, fees, and other charges are deferred with the approval of the Bursar's Office. An additional $25 late payment charge will be assessed on each monthly installment not paid on or before the due date. For more details, contact the Bursar's Office.

DEFERRED PAYMENT SERVICE FEE... $10  
(See Tuition Payment Plans)

This fee is applicable when payment of any part of a student’s account is deferred, including accounts which must be billed to outside agencies. This fee is also applicable when any additional charge (out-of-state tuition, music fee, room and board adjustment) is not paid within five business days after the date it was incurred. It is the student’s responsibility to pay all obligations promptly.

LATE PAYMENT SERVICE FEE .......... $5

This fee is applicable when a supplemental charge (tuition, room and board adjustments, etc.) is not paid within seven calendar days after the date it is incurred. The $10 deferred payment service fee will be added if it is necessary for the Bursar’s Office to send a notice regarding non-payment of the adjustment.

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-half courses.

REFUND OF FEES FOR WITHDRAWAL

After a schedule has been received by the student, withdrawal for the semester must be by official notification to the Withdrawal Office. 212 Student Services Building, whether or not fees have been paid, classes have been attended, or the schedule is incomplete. Failure to attend class does not automatically withdraw or drop a student from college or class.

The effective date of withdrawal is the date the Office of Graduate Admissions and Records is notified by completion of the official withdrawal form. The appropriate percentage of fees will be charged unless this action is completed by the close of the last day designated for registration check-in and before the first official day of classes for the semester. Failure to notify the Withdrawal Office promptly when withdrawing could result in a larger fee assessment. Withdrawal does not cancel fees and charges already incurred.

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

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

Refunds

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

First-time students who withdraw during the 60 percent point in time for which the student was charged and who received Title IV funds will have the refund calculated by the pro-rata refund policy published in the “1992-93 Federal Student Financial Aid Handbook.”

Repayments

Repayments are defined as the portion of aid received by a student after the University directs that funds have been used. The amount of repayment is determined by the Refund/Charge stated above.

Refunds and repayments to the Title IV programs are determined according to the formula published in the “1992-93 Federal Student Financial Aid Handbook.” The Bursar's Office is responsible for calculating the amount of the refund and/or repayment and distributing the correct amount to the financial aid programs according to the Refund/Repayment Allocation Policy.

REFUND OF FEES FOR DROPPED COURSES

Part-time students may pay fees computed at the appropriate semester-hour rate as indicated above. No charge is made for courses dropped during the first 6 business days following registration check-in. A 20 percent charge is made for courses dropped between 9 and 10 business days following registration check-in. A 40 percent charge is made for courses dropped between 11 and 15 business days. A 60 percent charge is made for courses dropped after 20 business days. Students who drop courses are eligible for a refund only if the sum of charges computed at the semester-hour rate for the hours continued, plus the percentage assessed for the hours dropped, results in an amount less than that paid. A course on a student's schedule is officially dropped, and the drop becomes effective, on the date that the change of registration form is processed on a drop/add terminal. Any refund due for dropped courses will be made after the final audit at the end of the semester.

Rental charges and adjustments will be determined by the Office of Residence Halls in accordance with terms of the housing agreement or contract.

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

The refund policy covering withdrawals and dropped courses for the summer semester is based on the length of the term for the course(s) dropped. No refund is applicable to term courses dropped later than 14 calendar days after the registration check-in day for the course(s) involved.

WAIVER OF FEES

Graduate assistants, teaching assistants and associates, research assistants, and others whose fees are billed, prepaid, waived, or partially waived must complete their registration with the Bursar's Office, where they should have their fee receipts validated and supply necessary details concerning fee payment. Fee receipts must be validated before classes begin to avoid late registration fees. 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 spouse/dependent discounts.

STUDENT HEALTH INSURANCE

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

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

IDENTIFICATION CARD

ID cards, issued during registration or anytime during the year to all students, are...
prepared during registration check-in of the first semester a student enrolls in the University and are validated each term thereafter. These cards are required for many purposes, such as use of library facilities, check cashing facilities in the UT Knoxville Bookstore, and admission to various athletic, social, and cultural events. These cards are non-transferable and may not be duplicated. A current validated fee receipt is necessary to obtain a new or replacement ID card. ID CARDS MUST BE CARRIED AT ALL TIMES FOR PURPOSES OF IDENTIFICATION. Lost or stolen cards should be replaced by contacting the Student ID Card Office, Room 344, University Center. There is a minimum charge for replacement or duplicate ID cards.

FEES FOR SPONSORED INTERNATIONAL STUDENTS

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

Financial Assistance

UT Knoxville offers several types of financial assistance for which graduate students may apply.

ASSISTANTSHIPS

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

FELLOWSHIPS

The Graduate School administers the Hilton A. Smith Graduate Fellowships, the Herman E. Spivey Graduate Fellowships and the National Alumni Association Graduate Scholarships. These awards are for full-time study at UT Knoxville, and awardees are selected on the basis of high achievement, broad intellectual ability and potential for significant career contributions. Candidates from any field of study are invited to apply for the Hilton A. Smith and National Alumni Association awards if they have a 3.6 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 3.6 grade-point average or above in all previous academic work. The Hilton A. Smith and the Herman E. Spivey fellowships include monthly stipends, tuition, and maintenance fees. National Alumni Association Scholarships include a stipend presented at the beginning of each semester (Fall and Spring). Application packets are available from November through January in the Office of Graduate Admissions and Records. Completed applications, including all supporting materials, must be submitted to the Staff Assistant, Office of Graduate Admissions and Records, by February 15. Offers of awards are announced March 15.

ACADEMIC COMMON MARKET

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

Cooperating states in the Academic Common Market are Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia. Twenty-five doctoral, two Specialist in Education, and thirty-one Master's programs at UT Knoxville are approved by the Academic Common Market for residents of these states to enroll at in-state tuition rates. Students must be fully admitted to the appropriate degree program, and the letter of certification must be received in the Office of Graduate Admissions and Records no later than the first day of classes for the effective semester.

Residents of states who seek further information should contact the Residency Assistant in the Office of Graduate Admissions and Records or the Southern Regional Educational Board, 592 Tenth Street, N.W., Atlanta, GA 30318-5790 (404) 875-9211.

EMPLOYMENT

Three sources of student employment are coordinated by the Financial Aid Office: (1) The Federal College Work-Study Program provides part-time on-campus jobs for U.S. citizens or permanent residents who have demonstrated financial need by the Student Aid Report (SAR). A wide range of jobs are available in academic units and administrative offices; (2) Job Location and Development, a non-need-based program, lists off-campus, part-time job opportunities with agencies and companies throughout the Knoxville area. Job interviews and minimal processing are required. Off-campus jobs are limited to U.S. citizens or permanent residents; (3) On-campus, part-time job opportunities are listed by the Student Employment Service. This listing of part-time jobs is based upon requests from on-campus agencies. Referrals are made in accordance with a student's skills and interests, regardless of financial need.

Students needing either part-time or summer employment are urged to contact the Financial Aid Office.

LOANS

Students must be admitted into a degree program to receive student loans. Five types of loan programs are administered by the Financial Aid Office: (1) Federal Perkins Loan, formerly National Direct Student Loan, (Student Aid Report, SAR, must be on file); (2) subsidized Federal Stafford Loan, formerly Guaranteed Student Loan, (SAR must be on file); (3) unsubsidized Federal Stafford Loan; (4) PLUS/FSLS Loan (requires appropriate loan papers on file and FSLS requires that the SAR be on file); and (5) The University of Tennessee Loan. Processing time varies from one loan program to another.

Interested students should contact the Financial Aid Office for more information. Students must apply through the Financial Aid Office for all loan programs. Loans are limited to U.S. citizens or permanent residents. Students who have attended any post-secondary institution other than UT Knoxville must provide a Financial Aid Transcript to the Financial Aid Office even if no financial aid was received from the previous institution.

All students receiving financial aid are expected to maintain financial aid progress standards to remain eligible to receive aid. Information on these standards, applications, and additional information are available from the Financial Aid Office, 115 Student Services Building.

VETERANS BENEFITS

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

Special Federal and State Laws and University Policies

Family Educational Rights and Privacy Act

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

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

Use of Social Security Number

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

**EEO/Title IX/Section 504 Statement**

The University of Tennessee, Knoxville, does not discriminate on the basis of race, sex, color, religion, national origin, age, handicap, or veteran status in provision of educational opportunities or employment opportunities and benefits.

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

Inquiries concerning Title IX, Section 504, and the Americans with Disabilities Act of 1990 should be directed to the Office of Affirmative Action: 403 C Andy Holt Tower; The University of Tennessee, Knoxville; Knoxville, TN 37996-0144; or telephone (615) 974-2498. Charges of violation of the above policy should also be directed to the Office of Affirmative Action.

**Security Information**

In accordance with the Tennessee College and University Security Information Act of 1989 and the Student Rights and Campus Security Act, the University of Tennessee, Knoxville has prepared a report containing campus security policies and procedures, data on campus crimes and other related information. 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 Personal Office, Employee Assistance Program, or the State of Tennessee Employee Assistance Program (600-488-8389). 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, psychois
- Damage to fetus if pregnant mother drinks
- Death--50% of fatal auto accidents involve alcohol; 31% of suicides are alcoholics

**DRUG USE HEALTH RISKS**

- Overdosing--psychosis, convulsions, coma, death
- Long-term use--organ damage, mental illness, malnutrition, death
- Casual use--heart attack, stroke, brain damage, death
- Needles--infections, hepatitis, AIDS, death

If a pregnant mother uses drugs, her baby can be born addicted or dead.

**Policy for the Administration of Graduate Assistantships**

**PREAMBLE**

Programs of graduate study are designed to transform the individual from student to knowledgeable practitioner or professional scholar. When a graduate assistantship is well conceived and executed, it should serve as an ideal instrument to help facilitate the desired transformation. The primary goal of an assistantship, then, is to facilitate progress toward the graduate degree. Rather than interfere or conflict with the student's educational objective, the assistantship is to aid in the prompt and successful completion of the degree program. While the student assistant makes progress toward an advanced degree, he/she also receives work experience in a profession under the supervision of a faculty mentor.

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

- Tennessee Conference of Graduate Schools

**TYPES OF ASSISTANTSHIPS**

It is imperative that each department adhere to the UTK Faculty Handbook's established four categories of assistantships. All departmental guidelines should reflect the descriptions provided in the Handbook (1967, p.40):

**Graduate Teaching Assistant**

Graduate Teaching Assistants work under the direct supervision of a regular faculty member in activities such as helping to prepare lectures, teaching discussion sections, conducting laboratory exercises, grading papers and keeping class records. In consultation with the supervisor, the Teaching Assistant works to gain teaching skills and an increased understanding of the discipline. Appointments are normally on a one-fourth to one-half time basis, and the annual stipend is payable in either nine or twelve monthly installments. [In addition to the stipend, the Graduate Teaching Assistant is entitled to a waiver of fees for the period of appointment in accordance with university policy.]

**Graduate Teaching Associate**

Exceptionally experienced graduate students may be assigned primary responsibility for teaching undergraduate courses, including the assignment of final grades. The
Graduate Assistant should clearly be informed that changes from an initial assignment, the assistant's obligation to make satisfactory and should be developed to reflect both the WORK ASSIGNMENTS AND RELATED policy.

The Graduate Research Assistant is entitled to a waiver of fees for the period of appointment in accordance with university policy.2

Graduate Research Assistant
Research assistantships are generally financed through gift, grant, or contract funds. Persons holding such appointments pursue a work and study program like that expected under the other types of awards. [In addition to the stipend, the Graduate Research Assistant is entitled to a waiver of fees for the period of appointment in accordance with university policy.]

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

WORK ASSIGNMENTS AND RELATED FACTORS

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

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

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

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

2. A one-half time graduate assistant in each of the four categories of assistantships normally should enroll for 6-11 semester hours of coursework. A one-fourth time graduate assistant in each of the four categories of assistantships normally should take 9-13 semester hours. Exceptions to the above must have prior approval of the Head of the student's academic home unit. A student on a one-half time assistantship who takes six semester hours will be considered full-time.

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

QUALIFICATIONS OF GRADUATE ASSISTANTS

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

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

Regulations specifically addressing the 18-hour requirement are excerpted from Section 4.4.10 and 4.4.2.0 of the SACS publication, Criteria for Accreditation, (Atlanta, December 1984, p.25 and p.18) and read as follows:

Graduate teaching associates who have primary responsibility for teaching a course for credit and/or for assigning final grades for such a course, and whose professional and scholarly preparation does not satisfy the provisions of Section 4.4.2.0 (which relate to exceptions) must be under the direct supervision of a faculty member experienced in the teaching field, receive regular in-service training, and be regularly evaluated. They must also have at least 18 graduate semester hours in their teaching fields.

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

[Exceptions are also discussed.]

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

Implementation of the SACS 18-hour Requirement at UTK
The appropriate Department Head has responsibility for certifying that the 18-hour requirement is met either through coursework or by documentation that the graduate assistant meets the requirement as an exception (e.g., experience in the performing arts). The Dean and Department Head must sign the appropriate form (APR FORM 1-89) that is attached to the PAF form. This is forwarded to the Personnel Office. Exceptions should be noted on this form, but a memo and appropriate documentation should be forwarded to the Graduate Office, 404 Andy Holt Tower.

COMPETENCY IN ENGLISH

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

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

RIGHTS/RESPONSIBILITIES OF GRADUATE ASSISTANTS

1. As specified in the Personnel Policies and Procedures Manual (Section 100 105-Pr3, 105-PF3, 105-PF4, p. 2), "A student employee is one whose primary function is that of enrollment in an academic program." Thus, the first priority of all graduate assistants must be satisfactory progress in their scholastic program. At the same time, acceptance of an assistantship is predicated on the belief that satisfactory progress can be concurrently achieved in work assignments and scholastic programs. Collaborative efforts between graduate assistants and their supervisors should be
focused on the goal of satisfactory performance in both these areas.

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

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

4. Graduate student assistantship appointments (Graduate Assistants, Graduate Teaching Assistants, Graduate Research Assistants) are of two types: "academic year" and "twelve month or other." Students on academic year appointments for the Fall and Spring terms receive 12 equal monthly payments for the 9 months of service and a waiver of fees for three terms (including the Summer). Students appointed to an academic year appointment beginning in the Spring term have the option of receiving 7 equal monthly payments for the January-July period or 5 equal payments for the February-July period. In both cases a fee waiver is provided for Spring and Summer terms. Graduate students on "academic year" appointments have no assistantship responsibilities in the Summer term. Students appointed to "12 month or other" appointments receive equal monthly payments for the months of the appointments and have assistantship responsibilities for the full period of the appointment. For these appointments a waiver of fees is provided only for those terms included within the appointments (i.e., a waiver of fees for the Summer term requires an appointment which encompasses the Summer term in its entirety). In some situations, a graduate assistant may be appointed for a period shorter than a year (e.g., a semester). Graduate assistants who are performing satisfactorily are normally reappointed up to the maximum time limit as stated below. In situations where the demands of the department do not call for a job to be continued, reappointment may not be made. In cases where a department has a rotational plan for assistantships, graduate assistants likewise may not be reappointed.

In all cases of appointment and reappointment, the supervisor is responsible for notifying the graduate assistant as early as possible. When an assistantship is not to be renewed, the graduate student should be notified in advance. In most cases, this notice must be given no later than one month prior to the end of the appointment. Specific reasons for not renewing the contract should be given (e.g., discontinuation of the program or grant, significant neglect of duty, unsatisfactory academic progress or progress toward a degree, non-compliance with university policies, etc.). In cases where an assistantship is for one year only, the student should be told this at the time of appointment. In some circumstances, graduate assistants may be given a conditional appointment such as an appointment in which funding of a grant is pending.

The maximum number of years that a graduate assistant can be appointed to an assistantship is three years as a Master's student, five years as a doctoral student, or eight years in doctoral programs in which students enter with a baccalaureate degree only. Some units may have maximum time limits that are less than those stated above. Requests for an extension beyond the maximum terms here specified must be made in writing by the academic unit to the Associate Vice Chancellor and Dean of the Graduate School.

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

EVALUATION/SUPERVISION OF GRADUATE ASSISTANTS

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

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

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

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

ORIENTATION/TRAINING OF GRADUATE 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 must be done at either the department, college, or university level. It is the responsibility of each supervisor to see that his/her graduate assistant is provided appropriate orientation/training.

There are several kinds of training that should occur beyond the initial orientation/training. Such training is usually specific to a particular job function. The Learning Research Center provides, for example, training and support services for Graduate Teaching Assistants and Graduate Teaching Associates who will be teaching at the University of Tennessee, Knoxville. Presented in several formats, this training includes attention to styles of learning and other student characteristics, communicating in the classroom, leading discussions, lecturing, directing laboratory work, using media and computers, designing syllabi, constructing and using tests, grading, evaluating courses and instructors, and similar topics. Special programs are offered for international GTAs. Evaluation and consultation services are also available through the Learning Research Center. A Handbook for New Instructors and a newsletter are made available to all GTAs. Supervisors of GTAs are responsible for notifying them about these services and about departmental and college policies on attendance at these programs and the use of these services.

ORIENTATION/TRAINING OF GRADUATE ASSISTANTS AND GRADUATE RESEARCH ASSISTANTS

Graduate Assistants and Graduate Research Assistants must also participate in a thorough, systematic orientation and training program. This training is usually at the department or college level, but the Office of Research Administration at the University level is available to assist with programs designed to help train the Graduate Research Assistant in various aspects of the job to be done.

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

ACCEPTING/DECLINING AN ASSISTANTSHIP

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

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

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

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

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

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

4 Discussed elsewhere in this document.

Student Services

Black Cultural Center

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

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

Career Services

Career Services, located in Dunford Hall, 974-5435, is a university-wide department providing career-related assistance to UT Knoxville students through a wide range of programs and services. Included in the services offered are a Career Carnival, an annual career fair providing opportunity to speak informally with representatives from 80-100 different companies about their entry level jobs and hiring practices; a Graduate School Information Day, an annual fair to which a number of graduate schools provide information for advanced study; employer information which includes types of majors sought, job descriptions, career profiles, annual reports and other pertinent information for hundreds of companies that recruit at UTK; and workshops providing instruction in skills and tactics for successful interviewing, resume preparation, business and dining etiquette, and other topics.

On-campus interviews are scheduled during the year, and require an orientation workshop for registration and participation. Thousands of interviews are scheduled each year which include approximately 375 companies, government agencies and school systems. Two job newsletters are published biweekly, one for positions in education and one for business, industry, and government. Career Services also administers a Credentials Service. 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.

Center for International Education

The Center for International Education (CIE), 201 Alumni Hall, telephone 974-3177, promotes and supports all aspects of international education and international exchange at UT Knoxville, both for American students and faculty and for students and faculty from other countries. The administration of official linkage agreements between UT Knoxville and institutions of higher education in thirty countries on six continents, CIE coordinates campus administration of such international grants and scholarships for students as the Fulbright, Rhodes, and Marshall programs, and provides information about other sources of funding for overseas study and research, including the Rotary Foundation, St. Andrews, and German Academic Exchange Service (DAAD) grants. Within its library on study, work and travel abroad, CIE has information about student summer job programs in seven countries.

International students and scholars: CIE provides information and assistance in matters relating to United States visa regulations, to UT Knoxville requirements for international students, and to UT Knoxville academic policies and registration procedures. It publishes The Link, a newsletter for UT Knoxville's international community, 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, 1515 Cumberland Avenue, is CIE's on-campus social, recreational, and programming center that serves as a meeting place for international and U.S. students, faculty and staff.

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

Child Care

The Child Development Laboratories, operated by the Child and Family Studies department within the College of Human Ecology, currently offer child care programs for young children ages six weeks to five years. The Child Development Laboratories are accredited by the National Academy of Early Childhood Programs, a division of the National Association for the Education of Young Children.

Food Service Facilities

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

Room and board meal arrangements offer the best combination of balanced, nutritious meals, carefully planned and served at a reasonable charge to the student. Meal plan arrangements are Seven Star Dining (seven day meal plan, Monday-Sunday noon), Five Star Dining (five day meal plan, Monday-Friday). For students not under the Board Plan, meals can also be obtained from cafeterias operated on a cash basis.

The Dining Services Department offers two additional dining options. (1) The All Star account debit plan where students make a minimum deposit and can then make purchases at any Food Service location. Any deposits over the minimum enable the student to make purchases at other participating campus locations. (2) The Dining Club account works just like a charge card. No money is deposited in advance. Food may be purchased at any Food Service location and convenient monthly statements are sent to students or parents.

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

For additional information, offices are located at 405 Student Services Building, (615) 974-4111.
Graduate Student Association

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

Handicapped Student Services

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

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

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 Office of Rental Properties, Stadium Hall.

RESIDENCE HALLS

The Department of Residence Halls 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 Apartments 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 Apartments Residence Hall provides apartment-style living for four students. A graduate student wing has been reserved in the Apartment Residence Hall. It is the responsibility of each student to maintain the apartment to University standards. Applications and further information can be obtained from the Department of Residence Halls, 405 Student Services Building.

OFF-CAMPUS HOUSING

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 on a nine-and-a-half month contract. For additional information, contact the Department of Residence Halls at 974-2571.

Student Counseling Services Center

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

The Center also works with the faculty and student personnel staff to develop educational programs and projects to meet the needs of various groups at the University.

Minority Student Affairs

The Office of Minority Student Affairs is designed to enhance the quality of life for minority students. Working in conjunction with other campus and community groups, the office helps identify, encourage, and assist students who have academic potential and motivation to develop their talents at UT Knoxville.

Housed within the Black Cultural Center, the office furnishes information about educational, employment and financial assistance opportunities, and offers tutorial services, workshops, and career development programs.

Ombudsman Office

The Ombudsman Office in the University Center assists students in the resolution of problems encountered with any aspect of the University. The office is open during the regular working day, and students are welcome to drop in at their convenience. Problems are treated confidentially and are dealt with expeditiously. The office supplements existing appeals channels and actively seeks better ways for the University to serve students.

Religious Resources

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

Student Health Service

Health services provided by the University are available to any student who has paid the health services fee. Services are available to any student who has paid the full University Programs and Services Fee or, if part-time, any student who has paid the optional student health service fee.

The Center serves as a clinical observation and education facility for students majoring in Speech-Language Pathology or Audiology. It also serves as a community hearing and speech center providing diagnostic and treatment services for persons of all ages exhibiting communication disorders/differences.
health fee (either through paying the full University Programs and Services Fee or, if taking fewer than 9 hours, paying the optional health fee). These out-patient services are available continuously throughout every term.

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

Those requiring allergy injections may arrange to receive them at the Clinic. Virtually all medical services at the campus clinic except lab tests performed off campus are provided to eligible students at no additional cost while charges are made for some services such as x-rays, lab tests, and injections received through the evening/weekend clinic at The University of Tennessee Memorial Hospital.

The primary clinic at 1818 Andy Holt Avenue maintains scheduled daytime hours Monday through Friday. Emergency care during evenings and weekends is available through the emergency room student health clinic at The University of Tennessee Memorial Hospital except during the break after the fall term. Ambulance and transportation service for the campus is provided by the Campus Police.

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

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

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

Vehicle Operation and Parking

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

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

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

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

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

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

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

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

Women's Center

The Women's Center provides essential informational services and referral services to UT Knoxville students and faculty. The library's specialized collection provides books, journals, and brochures about issues and concerns of women from both a current and historical perspective. Information is available on a variety of topics ranging from racism, violence against women, spirituality, and sex roles. The Women's Center is located in 301 University Center.
COLLEGES
Colleges

College of Agricultural Sciences and Natural Resources

Gary Schneider, Acting Dean

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

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

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

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

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

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

MASTER OF SCIENCE PROGRAMS

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

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

DOCTORAL PROGRAMS

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

College of Architecture and Planning

J. William Rudd, Dean
William J. Lauer, Associate Dean
James A. Spencer, Director

Schools
Architecture
Planning

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

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

Most states require that an individual intending to become an architect hold an accredited degree. There are two types of degrees that are accredited by the National Architectural Accrediting Board: (1) The Bachelor of Architecture, which requires a minimum of five years of study, and (2) The Master of Architecture, which requires a minimum of three years of study following an unrelated bachelor’s degree or two years following a related preprofessional bachelor’s degree. These professional degrees are structured to educate those who aspire to registration/licensure as architects.
The four-year, preprofessional degree, where offered, is not accredited by NAAB. The preprofessional degree is useful for those wishing a foundation in the field of architecture, as preparation for either continued education in a professional degree program or for employment options in architecturally related areas.

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

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

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

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

College of Business Administration

C. Warren Neel, Dean
Michael J. Stahl, Associate Dean for Research and External Affairs
David A. Stahl, Director, Center for Business and Economic Research
John E. Riblett, Director, Management Development Programs
Scott Buechler, Director, Graduate Business Programs

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

Facilities for Research and Service
Center for Business and Economic Research
Management Development Center

The College of Business Administration was originally the School of Commerce, dating back to 1919. Commerce was changed to Business in 1937 and gained college status in 1947. The college-wide MBA program was approved in 1966 and the doctoral program in 1971. Graduate programs of the College of Business Administration are designed to prepare men and women to assume positions in the increasingly complex world of business and industry, teaching and research, and government.

Viewing the business firm as operating in dynamic social, political, and economic environments that demand leaders capable of dealing with innovation and rapid change, the College places central importance on development of students' thought processes. 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. Above all else, we strive to instill the irreplaceable desire to continue to learn and grow in knowledge throughout the student's life.

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

The College of Business Administration is fully accredited by the American Assembly of Collegiate Schools of Business and is associated with other leading graduate schools of business as a member of the Graduate Management Admission Council.

GRADUATE PROGRAMS

The College of Business Administration offers programs leading to five advanced degrees: the Doctor of Philosophy with majors in Business Administration, Economics, and Management Science; the Master of Arts with a major in Economics; the Master of Science with a major in Statistics; the Master of Accountancy and the Master of Business Administration. The Department of Management and the Department of Psychology in the College of Liberal Arts jointly offer an intercollegiate program in Industrial and Organizational Psychology leading to the Master of Science and Doctor of Philosophy degrees (see Industrial and Organizational Psychology). Also, the Department of Management Science coordinates an intercollegiate program leading to the Master of Science (see Management Science).

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

FINANCIAL ASSISTANCE

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

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

College of Communications

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

Departments and Schools
Advertising
Broadcasting
Journalism

Facility for Research and Service
Communications Research Center (CRC)

The College of Communications grew out of the School of Journalism, which was originally located in the College of Business Administration. The Master's program began in 1968 under Journalism and was changed to Communications after the School gained College status in 1970. The doctoral program was initiated in 1973.

A chair of excellence was established in 1987 to support a distinguished professorship in science, technology, and medical writing.

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

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

In addition, Communications is available as a minor for students majoring in other departments. Required coursework will be selected after discussion with the major advisor and an advisor from the College of Communications.

The M.S. program is accredited by the Accrediting Council on Education in Journalism and Mass Communication. The College is a member of the Association of Schools of Journalism and Mass Communication and the Broadcast Education Association.

For application forms and other information about the M.S. and Ph.D. programs in Communications, write to Assistant Dean for Graduate Studies, College of Communications, 426 Communications Building, The University of Tennessee, Knoxville, TN 37996-0347.

College of Education

Richard Wisniewski, Dean
C. Glennon Rowell, Associate Dean for Graduate Studies
Thomas W. George, Associate Dean for Undergraduate Studies
Carol E. Kasworm, Associate Dean for Research

Departments
Curriculum and Instruction
Educational and Counseling Psychology
Education in the major areas listed on the Majors and Degree Programs chart. Ph.D. in Education requirements are available under Education, Fields of Instruction.

TEACHER CERTIFICATION

Applicants for initial teacher certification and those applicants previously certified who are seeking initial institutional recommendation for certification must gain admission to the college's Teacher Education Program. A complete explanation of the admission process appears in the Undergraduate Catalog.

College of Engineering

Jerry E. Stoneking, Acting Dean
William A. Miller, Associate Dean

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

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

The College had its beginnings in the University when surveying was introduced into the curriculum in 1838. The first two professional degrees, Civil Engineer and Mining Engineer, were established in 1879 at the same time that the Board of Trustees authorized the establishment of a graduate school. Known as Mechanic Arts originally, Engineering became a college in 1904.

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

GRADUATE PROGRAM AT THE UT SPACE INSTITUTE

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

CENTER OF EXCELLENCE FOR MATERIALS PROCESSING

The Center for Materials Processing is one of the "Centers of Excellence" created by the State of Tennessee. It is an inter-disciplinary program designed to bring together individuals with appropriate expertise to solve important materials processing problems. It emphasizes (1) the development of desirable materials properties through the control of composition, molecular structure and microstructure, (2) measurement of process variables, and (3) control of those variables to ensure proper processing. The Center conducts basic research and teaching in materials processing and directs outside research to improve existing processing technologies and transfer of research results to private industry. A major aspect of the Center is student participation in industry-sponsored research programs.

College of Human Ecology

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

Departments
- Child and Family Studies
- Nutrition
- Textiles, Retailing and Interior Design

Facilities for Research and Service
- Center of Excellence for Materials Processing
- Child Development Laboratory
- Small Animal Research Laboratory
- Textiles and Nonwovens Development Center

Human Ecology brings together the natural and social sciences to enhance the well-being of individuals and families across the life span. The University of Tennessee was one of the first institutions of higher education in the South to offer home economics, with the first class being offered in 1897. Initially called a School of Home Economics, it combined with Agriculture in 1947 to become the College of Agriculture and Home Economics. In 1959, the two colleges became separate units, although they continue to share resources. In 1985 the name was changed to Human Ecology, reflecting its focus on people interacting with their environments.

Graduate study in Human Ecology prepares the student for teaching, research, and public service in colleges and universities or managerial positions in government, business, and industry.

The Master of Science degree is offered with majors in Child and Family Studies, Home Economics, Interior Design, Foodservice and Lodging Administration, Nutrition (including public health nutrition), and Textiles, Retailing and Consumer Sciences; the Doctor of Philosophy degree is offered with a major in Human Ecology and concentrations in child development, family studies, nutrition science, textile science and consumer environments. For additional information, contact the Associate Dean of Graduate Studies, College of Human Ecology.
FACILITIES FOR RESEARCH AND SERVICE

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

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

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

College of Law

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

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

While the principal objective of the college is to prepare students for the private practice of law, its total mission is more broadly conceived. The college exposes students to the legal issues of our society enabling them to develop analytical skills with respect to decisional law and statutes, the ability to communicate effectively their knowledge of the law, an awareness of the historical growth of the law, a knowledgeable appreciation of the interrelationship of law and society, and the ability to use law as an implement of societal control and development. Students are thus equipped to serve their communities not only as advocates and counselors, but as policy makers and active, responsible citizens.

THE PROFESSIONAL PROGRAM

The program of the college has three dimensions: teaching and learning, research into and appraisal of our legal systems and institutions, and service to the community. Each plays a significant role in the college as a modern law center.

The teaching and learning element of legal education at the college involves a cooperative classroom interaction between faculty and students in the analytical study of a host of questions and problems found in today’s legal profession. These involve decisional law, statutory interpretation, administrative regulation, techniques of trial and appellate advocacy, and the roles and responsibilities of the lawyer in advising and representing clients. While proper consideration is given to the problems of Tennessee law, the course of study is conducted with a view toward providing an awareness and understanding of the regional and national perspective to prepare students for service in any state.

The college is also directly involved in providing service to the community. A major element of public service is centered in the Legal Clinic where students, under the guidance of skilled and experienced licensed practitioners, provide legal services to clients. Additionally, through research, consultation, and other services to legal institutions and groups within the state, the college seeks to participate in the development and improvement of the society in which its students may eventually practice law.

In combination, the direction and objectives of the college lead to the development not of a narrow technician, but of a student of the law with the perspective, breadth, and understanding necessary to accomplish the many tasks assigned by society to the legal profession.

GRADUATE PROGRAM

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

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

College of Liberal Arts

Lorman A. Ratner, Dean
Charles O. Jackson, Associate Dean
Loraryn W. Lester, Associate Dean
Clifton Woods, III, Associate Dean

Departments

Anthropology
Art
Audiology and Speech Pathology
Biochemistry
Botany
Chemistry
Classics
Computer Science
English
Geography
Geological Sciences
Germanic and Slavic Languages
History
Mathematics
Microbiology
Music
Philosophy
Physics and Astronomy
Political Science
Psychology
Religious Studies
Romance Languages
Sociology
Speech Communication
Theatre
Zoology

Facilities for Research and Service

Center for Applied and Professional Ethics
Center for Environmental Biotechnology
Center for Psychosocial 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
James R. Stokely Institute for Liberal Arts
Education
Joint Institute for Heavy Ion Research
Latin American Studies Institute
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 is one of the oldest established colleges in the University.

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

GENERAL INFORMATION

Foreign Study Courses

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

Off-Campus Study

Recognizing that learning is not restricted to formal classroom situations, the college provides for students to earn credit toward graduation for approved off-campus study. Such study may be undertaken only with prior approval of the faculty member and the department concerned. It may include certain kinds of work experiences, community involvement, or political campaigns. Credit per semester will vary from 1-15 hours. The maximum credit that may be applied toward a degree in the college is established in each individual case by the department in which the student is working.
Independent Study
Certain educational goals may best be met through independent study by an individual under the direction of a faculty member. Students who wish to do such independent work should obtain the approval of the faculty 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 Nursing
Joan Uhl, Dean
Mildred M. Fenske, Associate Dean for Graduate Programs
Johnie N. Mozingo, Associate Dean for Undergraduate Programs
Sandra P. Thomas, Director of Doctoral Program and Director of Center for Nursing Research

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

The College of Nursing was established in July 1971. The Master's program was initiated in 1976 and approval for the doctoral program was granted in 1986. More specific information about the programs may be obtained under Nursing, Fields of Instruction, or by contacting the Director of M.S.N. or Ph.D. Program, The University of Tennessee, College of Nursing, 1200 Volunteer Blvd., Knoxville, TN 37996-4110, (615) 974-4151.

MASTER OF SCIENCE IN NURSING
The general purpose of the M.S.N. program is to prepare nurses at the graduate level to function as clinical specialists, teachers, or managers in a variety of health care or educational settings. The program is accredited by the National League for Nursing and is unconditionally approved by the Tennessee Board of Nursing. Students admitted to the program select a concentration in adult health nursing, parent-child nursing, mental health nursing, primary care nursing (family nurse practitioner), or nursing administration.

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

College of Social Work
Eunice Shatz, Dean
William J. Bell, Associate Dean, Nashville
Jeanette Jennings, Associate Dean, Knoxville
Hisoski Hirayama, Acting Associate Dean, Memphis
Paul M. Campbell, Director, Office of Social Work Research and Public Service

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

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

Social work is a helping profession which focuses on providing skilled intervention in the prevention and amelioration of individual and societal problems. It is the purpose of the College to provide an education which fosters growth in both individual and career development.

GRADUATE PROGRAMS
The two-year program (thesis or non-thesis option) leading to the Master of Science in Social Work is fully accredited by the Council on Social Work Education and is offered on all three campuses. The foundation curriculum of the Ph.D. program is available only in Knoxville. A dual degree program in Social Work and Divinity is offered by the college's Nashville Branch and the Divinity School of Vanderbilt University. The College also offers a dual degree program with Public Administration on the Knoxville campus. A special bulletin describing facilities, admission, fees, and degree requirements is available from the College of Social Work, Henson Hall, Knoxville, TN 37996-3333.

College of Veterinary Medicine
Michael Shires, Dean
James J. Brace, Assistant Dean

Departments
- Animal Science-Veterinary Medicine
- Environmental Practice
- Microbiology-Veterinary Medicine
- Pathobiology
- Rural Practice
- Urban Practice

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

The primary objective of the college is to enable students to attain essential information, skills, attitudes and behaviors to meet the varied needs of society and the veterinary profession. The professional curriculum provides an excellent basic science education in addition to training in diagnosis, disease prevention, medical treatment, and surgery. Graduates are qualified to pursue careers in many facets of veterinary medicine and related health professions.

About two-thirds of the veterinarians in the United States are engaged exclusively in pet or companion animal practice. A growing number are concerned with the health problems of zoo animals, laboratory animals, wildlife, and aquatic species. A number of veterinarians are involved in the health care of food and fiber animals ensuring the supply of safe and healthy food. Veterinarians also find rewarding careers in the U.S. Public Health Service, the Armed Forces, and in state, county, or local health agencies. A number of veterinarians are employed by the U.S. Department of Agriculture and by state departments of agriculture for important work in livestock disease control, meat and poultry inspection, serum and vaccine production, and the protection of our country against the importation of foreign animal diseases.

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

Accounting and Business Law
(College of Business Administration)

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

Jan R. Williams, Head

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

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

Assistant Professors:
Bentley, Denise D., J.D. .......... Vanderbilt
Gatian, Amy W., Ph.D. .......... VPI
Letsinger, M. Clyde (Emeritus), CPA, M.S. .......... Tennessee

Murphy, Daniel, CPA, Ph.D. .......... North Carolina
Slabaugh, Michael D., CPA, Ph.D. .......... Indiana

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

Lecturers:
Anderson, Ellen B., CPA, M.Acc. .... Tennessee
Hendrick, Lee W., CPA, J.D. .......... Houston
Hughes, Harry N., B.S. .......... Tennessee

THE MASTER OF ACCOUNTANCY PROGRAM

The objective of the Master of Accountancy (M.Acc.) program is to provide persons having an undergraduate accounting background and a high level of ability and motivation with the depth and understanding of accounting which 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, business, industry, and government.

Admission Requirements
Application deadlines for international students are: Fall and Summer, January 15. Application deadlines for U.S. citizens and permanent residents are: Fall and Summer, March 1. Although the program is designed for students who have completed an accredited baccalaureate degree program with a major in Accounting, those with outstanding undergraduate records in any area may earn the M.Acc. degree by completing prerequisites in accounting and including courses in other business and related disciplines to supplement the applicant's undergraduate background.

Credit for courses taken at other AACSB accredited institutions that otherwise conform to the transfer policy of The Graduate School may be credited toward M.Acc. degree requirements.

Other Requirements
To qualify for the degree, a student must maintain a B average (3.0) or above in the core and concentration area accounting courses and a B average or higher in the overall program. The student must satisfactorily demonstrate his/her ability to recognize, analyze, and solve accounting policy problems and integrate concepts from the various areas of accounting by passing a comprehensive written examination. This examination is included in the capstone courses in each concentration as follows: 519, Research in Financial Accounting and Auditing; 539, Tax Policy and Special Topics; and 549, Systems Policy.
BUSINESS ADMINISTRATION

CONCENTRATIONS

For complete listing of Ph.D. program requirements, see Business Administration.

Ph.D. Concentration: Accounting

This degree provides a research-oriented terminal qualification for those seeking entry-level faculty positions in accounting. 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, and 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/hers 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 semester's coursework as established by the degree program for part-time students.

GRADUATE COURSES

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

504 Financial Accounting Issues in Business Decisions (3) Comprehensive investigation of various financial reporting issues relating to decision making. Economic consequences of accounting procedures, role of financial information in market economy, and specialized topics in financial reporting. Prereq: Admission to M.Acc. program or consent of instructor.

505 Taxation for Business Decisions (3) Conceptual foundation and analysis of current issues in taxation; impact on use and management of financial and investment information applied to individual, corporate, partnership, and fiduciary taxpayers. Prereq: Admission to M.Acc. program or consent of instructor.

511 Seminar in Accounting Theory (3) Analysis of conceptual framework; general-purpose external financial reporting by business enterprises. Framework of reference for evaluation of generally accepted accounting principles and alternative principles. Prereq: Advanced Accounting and admission to M.Acc. program or consent of instructor.

512 Selected Topics in Current Accounting Theory and Practice (3) Critical in-depth consideration of current issues. Alternative solutions to emerging topics. Prereq: 511 and admission to M.Acc. program or consent of instructor.

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

519 Seminar in Accounting and Auditing Research (3) Problem-oriented research design in financial accounting and auditing. Research methodologies and approaches to particular research questions. Research project. Prereq: Admission to M.Acc. program or consent of instructor. Prereq or coreq: 512 and 513.

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. Prereq: Cost and Managerial Accounting and admission to a graduate business program or consent of instructor.

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

531 Tax Research and Planning (3) Development of expertise in tax research utilizing authoritative sources of tax law and advanced study of tax alternatives available to minimize tax liability compatible with achieving taxpayer objectives. Prereq: Federal Income Taxation and admission to M.Acc. program or consent of instructor.

532 Corporate Taxation and Reorganizations (3) Organization and structure, distributions, liquidations, and special problems in taxation of corporations and shareholders. Prereq: Admission to M.Acc. program or consent of instructor. Prereq or coreq: 531.

533 Taxation of Partnerships and S Corporations (3) Formation, operation, termination, and other special problems of partnerships. Election for S Corporations, and comparison of partnerships and S Corporations. Prereq: Admission to M.Acc. program or consent of instructor. Prereq or coreq: 531.

534 Unified Estate and Gift Transfer Taxation (3) Taxation of wealth transfers; transfers at death, inter vivos transfers, and generation skipping transfers. Income taxation of estates and trusts. Determination and payment of state and federal wealth transfer and income taxes. Prereq: Federal Taxation and admission to M.Acc. program or consent of instructor.

539 Tax Policy and Special Topics (3) Basic concepts of tax policy, current issues in tax policy, and selected topics in taxation. Topics vary. Prereq: 531 and admission to M.Acc. program or consent of instructor. Prereq or coreq: 532, 533.

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

542 Systems Analysis and Design (3) Analysis and design of information systems for management and decision making in budgeting, creative strategy, media strategy, and planning and control models to meet organizational objectives. Prereq: Accounting Information Systems and admission to a graduate program or consent of instructor.

549 Systems Policy (3) Seminar in emerging topics in management systems and knowledge-based systems. Prereq: 541 and admission to a graduate program or consent of instructor. Prereq or coreq: 542.

592 Graduate Internship in Accounting (3) Full-time resident professional employment for one academic semester involving qualified job experience, written report of internship experience, and evaluation of student performance. Prereq: Admission to M.Acc. program or consent of M.Acc. advisor.

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

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

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

611-12 Doctoral Seminar in Accounting (3,3) Study of research methodology and application of various research methods in accounting literature. Prereq: Consent of Ph.D. program advisor.

621-2 Accounting Colloquium (1,1) Research and discussion of contemporary issues in practice of acountancy. Prereq: Consent of Ph.D. program advisor. May be repeated. S/NC only.

Advertising

(College of Communications)

MAJOR

DEGREES

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

Ronald E. Taylor, Head

Professor:

Taylor, Ronald E., Ph.D. ................. Illinois

Associate Professors:

Hovland, Roxanne, Ph.D. .................. Illinois

Jackson, DeForrest, M.S. ............... Tennessee

Stankiewicz, Michael J., Ph.D. ...... Illinois

Assistant Professor:

Hale, Eric, Ph.D. .......................... Georgia

Hoy, Mariea, Ph.D. ....................... Oklahoma State

The Department of Advertising offers a concentration area for the Master's degree with a major in Communications and participates in the Interdisciplinary doctoral program. See Communications for additional information.

GRADUATE COURSES

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

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

520 Advertising and Communications Theory (3) Application of contemporary communications theories of attitude change, information-processing, and persuasion as applied to creative strategy decisions. Prereq: Consent of instructor or admission to program. F

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

540 Advertising Planning (3) Analysis of decision-making in budgeting, creative strategy, media strategy, research, evaluation, and agency-client relationships. Advertising response functions. Prereq: Consent of instructor or admission to program. Sp

590 Seminar in Advertising Issues (3) Salient issues in advertising. Topics vary. Prereq: Consent of instructor or admissions to program. May be repeated. Maximum 6 hrs. Su

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

598 Internship (3) Professional work in advertising supervised by advertising manager with faculty approval. No retroactive credit for previous work experience. Prereq: Completion of core courses. Su
Agricultural and Extension Education

(College of Agricultural Sciences and Natural Resources)

MAJOR DEGREE

Agricultural and Extension Education M.S.

Roy R. Lessly, Head

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

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

The Department of Agricultural and Extension Education offers a program leading to the Master of Science degree with a major in Agricultural and Extension Education. The program is designed primarily for teachers of Agricultural Education and staff employed by the Agricultural Extension Service. However, due to the flexibility of the program, it would be of value to any student interested in agriculture or adult and continuing education. The program may be completed under a thesis or non-thesis option with a concentration in either agricultural education or agricultural extension education. Candidates for the Master's degree must meet the general requirements of The Graduate School and those stipulated by the department.

THE MASTER'S PROGRAM

Thesis Option
A candidate for the Master's degree who elects the thesis option must successfully complete:
1. A minimum of 36 hours of graduate credit in courses approved by the student's advisory committee. Six hours of thesis may be counted toward degree requirements. May be repeated. S/NC only.

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.

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 12 hours of graduate credit in courses numbered at or above the 500 level.

3. A minimum of 6 hours of graduate credit in courses appropriate to the area of concentration taught in the department and a minimum of 3 hours taught from outside the department.

4. A minimum of 3 hours of graduate credit in coursework in either research methodology or statistics.

5. A creative component designed by the student and approved by the student's advisory committee for 3 hours of graduate credit.

6. A written and oral comprehensive examination.

GRADUATE COURSES

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

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

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

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

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

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

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

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

526 Agricultural Education for First-Year Teachers (2) Developing competencies needed by first-year teachers for planning, organizing and conducting programs of agricultural education in local community. Group meetings in selected centers and visits by instructor. Prereq: 436 or consent of instructor.

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

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

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

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

531 Extension History, Philosophy and Objectives (2) Historical and philosophical foundation of adult education in American agriculture, key figures, issues, legislative movement, farmer organizations and programs. Cooperative Extension Service, origin, legislation and growth and nature of present-day objectives and programs. Prereq: 411 or consent of instructor. Sp

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

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

Agricultural Economics and Rural Sociology

(College of Agricultural Sciences and Natural Resources)

MAJOR DEGREES

Agricultural Economics M.S., Ph.D.
Handy Williamson, Head

Professors:
Badenhop, M. B. (Emeritus), Ph.D............ Purdue
Brooker, J. R., Ph.D..................... Florida
Cleland, C. L., Ph.D................. Wisconsin
Eastwood, D. B., Ph.D.................. Tufts
Keller, L. H. (Liaison), Ph.D............ Kentucky
Kline, 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., J.D.................... Tennessee
Ray, Daryl E. (Distinguished Prof.), Ph.D........... Iowa State
Roberts, R. K., Ph.D................... Iowa State
Sappington, C. B. (Emeritus), Ph.D......... Illinois
Whately, T. J. (Emeritus), Ph.D............ Purdue
Williamson, H., Ph.D................... Missouri

Associate Professors:
English, B. C., Ph.D..................... Iowa State
Jensen, K. L., Ph.D...................... Oklahoma State
Pompeii, G. K., Ph.D.................... California (Davis)

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

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

THE MASTER’S PROGRAM

 Thesis Option

A candidate for the Master’s degree must complete a minimum of 30 hours of graduate credit in courses approved by the student’s Master’s committee. Six hours of thesis may be counted toward this requirement. At least 24 hours of graduate credit must be earned in courses numbered at or above the 500 level. In the agricultural economics concentration, 12 hours of agricultural economics, 6 hours of economic theory and 6 hours of quantitative methods are required. In the rural sociology concentration, 12 hours in the department (9 hours rural sociology), 6 hours of sociological theory, 3 hours of research methods and 3 hours of statistics are required. Each student must successfully complete a final oral examination.

 Non-Thesis Option

A minimum of 36 hours of graduate coursework is required. At least 27 hours must be in courses numbered at or above the 500 level. The program must include a minimum of 18 hours in agricultural economics, 6 hours of economic theory, and 6 hours of quantitative methods. Each student must successfully complete both written and oral comprehensive exams.

Minor

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

THE DOCTORAL PROGRAM

A minimum of 78 hours of graduate credit beyond the B.S. degree, including 24 hours of dissertation research, but excluding any Master’s research credit, is required. A minimum of 24 hours of agricultural economics, 15 hours of economic theory, and 9 hours of quantitative methods are required. The program must include a minimum of 6 hours in courses numbered at or above the 600 level (excluding dissertation credits).

Comprehensive exams include five written exams and one oral exam. The written exams are in general agricultural economics, microeconomic theory, macroeconomic theory, quantitative methods, and the area of concentration. Provisions exist for waiving the economic theory exams with a sufficient academic record in specific economic theory courses.

Minor

A minor will consist of a minimum of 9 hours of coursework taken in the department and approved by the minor professor. At least 5 hours of credit in the minor area must be in 500- and 600-level courses.

Agricultural Economics

GRADUATE COURSES

412 Agricultural Finance (3) Micro-finance; financial objectives; acquisition of debt and equity funds, capital investments, capital allocation, credit analysis, borrower and lender loan application analysis, insurance strategies, computer applications, kinds and sources of agricultural credit, and financial intermediation. Prereq: Economics 201; junior standing or consent of instructor. F

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

430 Agricultural and Trade Policy (3) Values, goals, and policy process; historical development and current characteristics of commodity, credit, food, and trade policy; relationship between domestic and international agricultural policy. Prereq: 210 or consent of instructor. Sp

440 Agricultural Production Economics (3) Application of microeconomic theory to problems of resource allocation, enterprise selection, scale of operation of agricultural firms; economic interpretation of technical and agricultural production relationships. Prereq: 210 and Economics 311. F

442 Farm Business Management II (3) Advanced topics and methods for farm business analysis using micro and mainframe computers: linear programming applications in farm planning; spreadsheet analysis of whole farm business; systems analysis and management control, risk analysis and management; income tax management; farm growth and intergeneration transfer. Prereq: 342. Sp


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

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

493 Independent Study in Agricultural Economics (1-3) Directed individual or team research and report. Off-campus intern experience and reporting. Credit given on a pass/fail basis. Prereq: 210 or consent of instructor. F

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

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

524 Econometric Methods in Agricultural Economics (3) Application of statistical methods to agricultural economic models; estimation of supply, demand and production functions; microeconomic forecasting models; interpretation of results. Prereq: Statistics 461 or consent of instructor. F

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

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

560 Advanced Rural Economic Development (3) Theoretical and historical perspectives on process of economic development; analysis of role of agriculture, sectoral interdependence and trade in development; application of theory to specific development issue. Prereq: 450 or consent of instructor. Sp

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

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

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

620 Advanced Quantitative Methods (3) Discussion and evaluation of advanced statistical and mathematical techniques in current agricultural economics research. Prereq: 522, 524, and Economics 681-85, or consent of instructor. Sp,A

630 Agricultural Policy Analysis (3) Evaluation of public policy as related to agricultural industry and rural areas. Prereq: Economics 510 and 513 or consent of instructor. F

640 Agricultural Supply Analysis (3) Critical evaluation of both theoretical basis and empirical procedures used for estimating agricultural supply relationships using regression techniques, production functions, mathematical programming, farm growth models and simulation in supply analysis. Prereq: 540 or consent of instructor. F,A

650 Analysis of Agricultural Markets (2) Advanced theory and application of market analysis. Analysis of technical and pricing efficiency and examination of issues in agricultural and food markets. Prereq: 450 and 550 or consent of instructor. Su,A

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

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

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

GRADUATE COURSES

480 Diffusion of Agricultural Technology (3) Analysis of diffusion and communication processes whereby new technology spreads from scientists to change agents and then to farmers. Innovation-decision process; communication behavior; mass media; role of professional change agents; opinion leadership and consequences of technological change. Prereq: 380 or consent of instructor. May be repeated. Maximum 6 hrs. (Same as Sociology 480.) Sp

580 Advanced Rural Sociology (3) Application of sociological concepts and theory to analyze changing structure and function of rural life in U.S. and developing countries. Demographic changes, rural social and community indicators, and rural development processes. Prereq: 380 or equivalent. (Same as Sociology 590.) 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. (Same as Sociology 595.) E

Agricultural Engineering

(College of Agricultural Sciences and Natural Resources)

MAJORS DEGREES

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

Fred D. Tompkins, Head

Professors:
Bledsoe, B. L., PE, Ph.D. ............... Oklahoma State
Henry, Z. A., PE, Ph.D. ................. NC State
Luttrell, D. H. (Emeritus), Ph.D. ..... Iowa State
Mcdow, J. J. (Emeritus), PE, Ph.D. .... Michigan State
Mote, C. R., PE, Ph.D. .................. Ohio State
Sewell, J. I., PE, Ph.D. .................. NC State
Shelton, C. H. (Emeritus), M.S. ....... VPI
Tompkins, F. D. (Liaison), PE, Ph.D. ...... Tennessee
Wilhelm, L. R., PE, Ph.D. .............. Tennessee

Associate Professors:
Freeland, R. S., PE, Ph.D. ............. Tennessee
Grandle, G. F., Ph.D. ................. Tennessee
Wills, J. B., M.S. .............. Tennessee

Assistant Professors:
Baxter, D. O., M.S. ................. Missouri
Biswal, R. N., Ph.D. ................. Massachusetts
Buschermeier, Michael J., Ph.D. ...... Clemson
Hamilton, D. W., Ph.D. ............... Penn State
Hart, W. E., Ph.D. ............... Purdue
Prater, T. G., M.S. ................. Georgia
Wilkinson, J. B., Ph.D. ............... Purdue
Womac, A. R., Ph.D. ............... Tennessee
Yoder, D. C., Ph.D. ............... Purdue
Yoder, R. E., PE, Ph.D. .............. Colorado State

Graduate programs leading to the Master of Science and Doctor of Philosophy with a major in Agricultural Engineering are available to graduates of a recognized curriculum in engineering, mathematics, or one of the physical or biological sciences. A graduate program leading to the Master of Sciences in Agricultural Engineering Technology is available to graduates in a recognized curriculum in agriculture or other related fields. Each applicant will be advised about any prerequisite courses before entering a program. The student's program of study must be approved by his/her advisory committee and must comply with the requirements of that Graduate School.

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

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

THE MASTER'S PROGRAMS

Agricultural Engineering

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

Agricultural Engineering 504 (1), 505 (1), and other major subject courses 12 hours
Coursework in computational methods (mathematics, computer science, statistics, or any course containing appropriate computational components that may be approved by the department) 6 hours
Program electives 6 hours
Thesis 500 6 hours

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

Agricultural Engineering Technology

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

Agricultural Engineering Technology 504 (1), 505 (1), and other major subject courses 12 hours
Coursework in computational methods (mathematics, computer science, statistics, or any course containing appropriate computational components that may be approved by the department) 6 hours
Program electives 6 hours
Thesis 500 6 hours

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

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

Agricultural Engineering Technology 504 (1), 505 (1), and other major subject courses 12 hours
Coursework in computational methods (mathematics, computer science, statistics, or any course containing appropriate computational components that may be approved by the department) 6 hours
Program electives 6 hours
Coursework in special emphasis area 6 hours
Capstone Experience (project and report, typically 508) 3 hours

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. Applications accepted into the program must complete a final oral examination covering the graduate program, including the capstone experience. At the discretion of the candidate's committee, an oral examination may also be required.

To earn a degree, each doctoral student must complete at least 75 hours of approved graduate credit (beyond the baccalaureate degree) in agricultural engineering and supporting areas (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-K numbered greater than 600. Other specific requirements for the minimum 75 hours are:

Major subject courses 18 hours
Coursework in computational methods (mathematics, computer science, statistics, or any course containing appropriate computational components that may be approved by the department) 9 hours
Program electives 21 hours
Seminar (504, 505 or equivalent courses) 3 hours
600 Dissertation 24 hours
In addition to completing the minimum 75 hours of graduate credit required for a degree, each doctoral student must also pass a comprehensive examination as required by The Graduate School.

Agricultural Engineering

GRADUATE COURSES

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

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

430 Mobile Hydraulic Power System Design (2) Functional and operational characteristics of mobile hydraulic system components: pumps, valves and actuators; analysis and synthesis of power transmission and control circuits. Prereq: Engineering Science and Mechanics 341. 1 hr and 1 lab. Sp,A

433 Food and Bioprocessing System Design (3) System design for processing, handling, and storage of food and biological materials. Mass and energy balances, production characteristics, equipment specifications, economic analysis, safety and human factors considerations. Prereq: Processing Food and Biological Materials. 1 hr and 2 labs. Sp

451 Electronic Systems (4) Basic electronics with food and biological materials. Mass and energy balance, system design for processing, handling, and storage of food and biological materials. Analog and digital electronics; 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 (1) Planning and executing research program; ethics and professionalism; departmental procedures and resources. Prereq: Agricultural Engineering Technology 504. S/NC only. F

505 Professional Communications Seminar (1) Reviews, reports and discussion of ideas, recent advances and current topics; presentations by students. Prereq: 504. May be repeated in doctoral program. Maximum 2 hrs. (Same as Agricultural Engineering Technology 505.) S/NC only. F,Sp

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

520 Agricultural Engineering Instrumentation (3) Modern instrumentation techniques, static and dynamic response of instrumentation; signal conditioning; temperature, moisture, optical radiation, displacement, strain, pressure, velocity, acceleration, and flow measurements; digital data acquisition and control. Prereq: 410 or equivalent. Prereq: 451 or Electronics and Computer Circuits or equivalent. 3 hrs and 1 lab. Sp,A

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

575 Applied Microbiology and Bioengineering (3) (Same as Chemical Engineering 575) Environmental Engineering 575, and Microbiology 575. Prereq: 452 and 506. 2 hrs and 1 lab. F, A

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 and model output; verification and calibration of simulation model results. Prereq: Basic Engineering 101, 201 or equivalent. 2 hrs and 1 lab. F, A


640 Research Project in Agricultural Engineering (2) Research and manuscript preparation for a technical meeting presentation and submission to refereed journal. Manuscript content significantly different from the thesis. 1 hr and 2 labs. E

650 Selected Topics in Agricultural Engineering (3) Lecture, group discussion, and individual study on specialized developments. May be repeated. Maximum 6 hrs. Sp

Graduate Studies:

Agricultural Engineering Technology

DEGREES

Agriculture (College of Agricultural Sciences and Natural Resources)

GRADUATE COURSES

512 Teaching Internship in Agriculture (1) Supervised experience in teaching; test preparation and evaluation of agriculture students. May be repeated. Maximum 2 hrs for M.S. students; 4 hrs for Ph.D. students.

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

MAJOR

DEGREES

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

Kelly Robbins, Head

Professors:

Barth, K. M. (Emeritus), Ph.D. .......... Rutgers University Bell, M. C. (Emeritus), Ph.D. .... Oklahoma State University Blaisdell, J. K. (Emeritus), Ph.D. .... Ohio State University Chamberlain, C. C. (Emeritus), Ph.D. .... Iowa State University Erickson, B. H. (Emeritus), Ph.D. .... Kansas State University Hall, O. G., Ph.D. .... Iowa State University Harsdorff, S. L. (Emeritus), Ph.D. .... Florida State University Lidvall, E. R. (Emeritus), M.S. ......... Iowa State University McDonald, T. P., Ph.D. ........ Tennessee State University McNair, J. B. (Emeritus), Ph.D. ....... Auburn University Miller, J. K., Ph.D. ......... Georgia Agricultural College Murphy, R. L. (Emeritus), Ph.D. ......... Wisconsin State University Oliver, S. P., Ph.D. ................ Ohio State University Richardson, D. O., Ph.D. ........ Ohio State University Robbins, K. R., Ph.D. ............ Illinois University Shirley, H. V. (Emeritus), Ph.D. ......... Illinois University Shrode, R. R. (Emeritus), Ph.D. ......... Iowa State University Schultz, T. W., Ph.D. ............ Tennessee University
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. and Ph.D. levels. All areas of concentration are nutrition, breeding, physiology (reproductive, mammal, and metabolic), and management with orientation towards beef cattle, dairy cattle, swine, and poultry. Since the department is also a part of the College of Veterinary Medicine, the areas of anatomy, systemic physiology (blood, cardiovascular, and neural), and histology are also available. The Ph.D. program offers concentrations in animal nutrition, animal breeding, animal physiology, animal anatomy, and animal management. For specific information, contact the department head.

The master's program

For admission to the M.S. program, a student must have maintained 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 any 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. degree. Requirements to complete any one of the M.S. degree programs may be required if the student has insufficient undergraduate background. If the student has an unsatisfactory grade-point average acceptance may be granted at the probationary (non-degree) basis and a minimum of 9 hours of graduate coursework must be completed during the first term with a minimum grade-point average of 3.0 for admission to the M.S. program.

The program requires the writing of a thesis based on original research: the completion of a minimum of 24 hours of graduate coursework, of which at least 14 hours must be taken in courses numbered at or above the 500 level; and 6 hours of thesis. Included in the course requirement is 1 hour of Agriculture 512 and a minimum of 3 hours in statistics. These statistics courses must be chosen from the 400, 500, or 600 level of courses approved for use in the Intercollegiate Graduate Statistical Program (IGGSP). 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 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 nutrition, breeding, physiology, or anatomy concentration must complete at least 12 hours at the 500 and 600 level in the respective concentration or closely related area. Students in the management concentration must complete Animal Science 581 and 9 hours at the 500 level or 600 level in two non-management concentrations for a total of 12 hours (including 581).
3. A minimum of 1 hour of Agriculture 512 in addition to that required at the M.S. level.
4. A minimum of 6 hours in 400-, 500-, or 600-level statistics courses approved for the IGGSP.

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 dissertation research proposal and determines if there is to be a foreign language requirement. The advisory committee conducts the comprehensive written and oral examination and the final dissertation defense examination.

GRADUATE COURSES

420 Advanced Reproduction (3) Collection, evaluation, and preservation of ova, spermatozoa and embryos; application of methods of natural breeding and techniques of artificial insemination and embryo transfer; hard sire and dam evaluation; pregnancy determination; gestation and parturition; infertility; recent advances in teratology. Prereq: 320 or equivalent. 1 hr and 2 labs.

430 Advanced Ration Formulation (2) Advanced ration formulation for beef cattle, goats, sheep, horses, swine, poultry, laboratory, zoo, and companion animals. Mathematical and computer solutions and applications to formulated rations with constraints. Prereq: 330 or equivalent and introductory computer science course. 2 labs. Sp

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

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 responses and economic returns. Prereq: Completion of 300-level core courses or equivalent 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. F

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

486 Lamb and Wool 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 responses and economic returns. Alternatives evaluated: production responses and economic returns. Prereq: Animal science sophomore and junior core courses or consent of instructor. 2 hrs and 1 lab. Sp, A

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

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when the 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 Special Problems in Animal Science (1-4) Prereq: Consent of instructor and department head. May be repeated. Maximum 9 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 undergraduate anatomy and physiology, or biochemistry, or consent of instructor. F

522 Principles in Physiological Recording (1) Theories of acquisition and interpretation of physiological data. Experiments; principles involved in obtaining physiological data from animals using modern recording devices. Supports Animal Science-Veterinary Medicine 521. 1 lab. F

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

524 Advances in Mammary Physiology (3) Development, anatomy, and function of mammary glands; endocrine interactions associated with mammary development and function; factors affecting yield and composition of mammary secretions. Prereq: 320 or consent of instructor. Sp, A

531 Analytical Techniques in Animal Sciences (3) Physical and chemical analyses of feeds, ingredients,
Animal Science-Veterinary Medicine
See Veterinary Medicine for program description.

GRADUATE COURSES

501 Special Topics in Anatomy and Physiology of Domestic and Laboratory Animals (1-4) May be repeated. Maximum 6 hrs. E

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student 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

521 Advanced Mammalian Physiology I (4) Membrane, neuron, central nervous system, muscle, cardiovascular system, and control mechanisms. Prereq: general undergraduate anatomy and physiology and Biochemistry 410 or equivalent or consent of instructor. Recommended prereq: Biochemistry 418. (Same as Zoology 521) 3 hrs and 1 lab. Sp

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

535 Nutritional Aspects of Companion Animal Health (2) Nutritional concepts applied to veterinary management of normal and disease states for pets including dogs, cats, horses and exotic species. Sp

551 Mammalian Orgonomics (3) Microscopic study of structure of organs of major animal systems. Prereq: Embryology, histology and/or consent of instructor. 2 hrs and 1 lab. Sp

552 Anatomy of Domestic Carnivores (4) Gross dissection by systems and regions of dogs with comparison to cat. Prereq: Consent of instructor. 1 hr and 3 labs. F

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

571 Design and Analysis of Biological Research (3) Experimental design and procedures; selection of experimental units and control of experimental error; analysis of data; statistical models and contrasts, 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 (2) Least-squares estimation and hypothesis testing procedures for linear models with possible singular covariance structures; maximum likelihood, variance component models; estimation. Prereq: 571 or equivalent. 2 hrs and 1 lab. F

573 Intermediate Statistical Computing (2) Application of statistical procedures to analysis and handling of data using computers; capabilities of existing software and hardware; statistical analysis methods with high speed digital computer. Prereq: 571 or equivalent; knowledge of UTK mainframe and software package. 2 hrs and 1 lab. Sp

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

582 Advanced Animal Breeding (3) Procedures for estimating breeding values, optimum methods of simultaneously altering several genetic characters, individual application of animal breeding methodology. Prereq: 541 or equivalent. S/A

591 The Genetics of Populations (3) Application and extension of principles and concepts learned in basic genetics, breeding and statistics to convey usable comprehension of the genetics of populations. Prereq: Basic courses in genetics, breeding and statistics. 1 hr and 1 lab. F, A

595 Colloquium in Animal Science (1) Orientation; 1 hr and 1 lab. F

632 Advanced Energy-Protein Nutrition (4) Chemical forms, digestion, absorption, intermediary metabolism, deficiencies, excesses and interaction of energy and protein. Prereq: 533 or 534, and Biochemistry 410 or Nutrition 511 or consent of instructor. Sp,A

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

Anthropology

College of Liberal Arts

MAJOR

DEGREES

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

Jan F. Simek, Head

Professors:

Bass, William M., Ph.D. .......................... Pennsylvania State University
Faulkner, Charles H., Ph.D. ................. Indiana University
Jantz, Richard L., Ph.D. .......................... Kansas State University

Parmelee, Paul W. (Emeritus), Ph.D. ................. Texas A&M University
Wheeler, Margaret C. (Emeritus), Ph.D. ....... Yale University

Associate Professors:

Harrison, Faye V., Ph.D. .......................... Stanford University
Harrison, Ira E., Ph.D. ............................ Syracuse University
Howell, Benita J., Ph.D. .......................... University of Kentucky
Kleppel, Walter E., Ph.D. .......................... University of Missouri
Logan, Michael H., Ph.D. .......................... Pennsylvania State University
Schoedel, Gerard F., Ph.D. ........................ Washington State University
Simek, Jan F., Ph.D. .............................. SUNY Binghamton

Research Associate Professor:

Chapman, Jeffrey D., Ph.D. .......................... North Carolina State University

Research Assistant Professor:

Tardif, Suzette D., Ph.D. .......................... Michigan State University

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

THE DOCTORAL PROGRAM

For admission, an applicant must provide three letters of recommendation and a letter of intent. An undergraduate background in anthropology is required, but students lacking this may be admitted under special circumstances.

M.A. Requirements

1. A minimum of 30 hours for graduate credit. A minimum of 24 of these hours must be in anthropology, including the following:
   a. 510 and 560
   b. one of the following courses: 512, 513, 514, 515
   c. one of the following courses: 520, 531, 561, 564
   d. two of the following courses: 580, 581, 582, 583

2. Successful completion of the departmental examination.

3. An introductory statistics course (usually Statistics 531) if such a course has not been previously taken.

4. Successful completion of the thesis and final oral examination.
School for the Ph.D., the Anthropology Department requires the following:
1. Formation of an advisory committee and establishment of a program of study in consultation with the committee.
2. Specific courses to be taken are determined by students and their advisory committees. Students should plan to devote a minimum of 4 years beyond the B.A. to attain the Ph.D.
3. Demonstration of competence in statistics by completing Statistics 531 and 532 with a grade of B or better.
4. Demonstration of knowledge of one foreign language. This language should normally be French, German, Russian or Spanish, but another language may be substituted at the committee's discretion. This requirement may be met by:
   a. Successful performance on a language examination administered by the appropriate language department. Students electing this alternative should consult with their advisor.
   b. Completion of the intermediate (200 level) sequence of a language with a grade of B or better in the second semester.
   c. Completion of the second semester of specialization courses for graduate students with a grade of B or better.
5. Written and oral comprehensive examinations in three areas of specialization to be determined by the committee.

ACADEMIC COMMON MARKET
An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.A. program in Anthropology is available to residents of the states of Louisiana (concentration in zoarchaeology only), South Carolina or Virginia (concentration in cultural or zoarchaeology only). The Ph.D. program is available to residents of Alabama, Arkansas, Louisiana, Mississippi, South Carolina, or West Virginia. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

GRADUATE COURSES
410 Principles of Cultural Anthropology (3) Exploration and illustration of major concepts, theories, and methods in cultural anthropology, with application to analysis of specific ethnographic data. Prereq: 130.
411 Linguistic Anthropology (3) Basic linguistic concepts applied to research in cultural anthropology: investigation of relationships between language and culture. Prereq: 130 or Linguistics 200. (Same as Linguistics 411.)
412 Folklore in Anthropology (3) Introduction to anthropological study of folklore, using folklore and folk material from various tribal, peasant, and complex societies. Prereq: 130 or consent of instructor.
413 Dynamics of Culture (3) Major forms of culture change, ranging from evolution and diffusion to religious revitalization and historical continuity and change in diverse cultural settings through use of archaeological, ethnographic, and contemporary cases. Prereq: 130.
414 Political Anthropology (3) Organization and dynamics of power and politics in both stateless and state-level societies. Study of symbols, rituals, and ideologies in producing and reproducing power relations. Relationship between actors (individuals and structures. Encapsulation of traditional political forms and systems within modern states. Prereq: Cultural anthropology or consent of instructor.
431 Ethnographic Research (3) Conceptual and practical exploration of techniques and fieldwork of cultural anthropologists. Credit for workfield. Prereq: Cultural Anthropology or consent of instructor.
432 Historical Archaeology Laboratory (3) Laboratory procedures for processing, identification, and interpretation of artifacts from historical sites. Basic material from historic East Tennessee sites used for class projects. Recommended prereq: Historic Archaeology.
440 Cultural Ecology (3) Concepts and methods in studying dynamic interaction between prehistoric and present day cultures and their environments; ecological theory, methods, and analysis and review of selected case studies. Prereq: 120, 130, 410, or consent of instructor.
450 Current Trends in Anthropology (3) Analytical, integrative review of current directions of research and theory in anthropology.
452 Techniques in Archaeology (3) Theoretical issues in anthropology for undergraduate students. Topics include practical experience or laboratory study of anthropological material. Prereq: Either Human Origins, Prehistoric Archaeology, Cultural Anthropology or consent of instructor. May be repeated. Maximum 6 hrs.
461 African Prehistory (3) African cultural history from earliest evidence of human activity to time of European contact. Stone age of African south of Sahara. Prereq: 120 or consent of instructor. (Same as Afro-American Studies 461.)
462 Early European Prehistory (3) Origins and evolution of human culture in Europe through beginnings of settled life. Paleolithic and Mesolithic chronology and lifeways. Prereq: 120 or consent of instructor.
463 Rise of Complex Civilizations (3) Development of complex societies in Old World from origins of agricultural economics to rise of States. Mesolithic, Neolithic, and Metal Age lifeways in Africa, Europe, and Asia. Prereq: 120 or consent of instructor.
464 Principles of Zooarchaeology (3) Basic osteological studies of major vertebrate groups: aboriginal use of faunal remains; introduction to laboratory use of comparative collections. Prereq: 120 or consent of instructor.
465 Urban Archaeology (3) Field archaeology and interpretation of archaeological remains on historic urban sites. U.S. Lectures and field and laboratory research on urban sites in East Tennessee. Recommended prereq: Historic Archaeology.
480 Human Osteology (4) Intensive examination of human skeletal remains. Pre: consent of instructor. 3 hrs and 1 lab.
481 Museology I: Museums, Purpose and Function (3) (Same as Art 481.)
482 Museology II: Exhibition Planning and Installation (3) (Same as Art 482.)
484 Museology III: Field Projects (1-12) (Same as Art 484.)
494 Primate Behavior (3) Social organization and behavior of selected primates: group composition, size, and structure; patterns of mating; other social interactions; communication; and cultural behavior. Application of primate studies to human anthropology. Prereq: 110 or consent of instructor.
498 Human Response to Environmental Stress (3) Physiological perception of stress from physical environment and psychological, anatomical and behavioral responses to stress.
500 Thesis (1-15) P/NP only. E
501 Graduate Research (1-9) Independent investigation of special problems in anthropology. May be repeated. Maximum 18 hrs.
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May be repeated. S/NC only. E
510 Method and Theory in Cultural Anthropology (3) Development of primary theoretical orientations by cultural anthropologists: formulation of research problems and methods of collecting, organizing, and utilizing data. Prereq: Consent of instructor.
511 Special Topics in Cultural Anthropology (3) Seminars for advanced students on topics of special interest: ethnomedicine, psychological anthropology, comparative social organization, religion, and art. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.
512 Urban Studies in Anthropology (3) Process of urbanization examined cross-culturally: theory and method in researching urban communities; urban problems and applied anthropology.
513 Rural Studies in Anthropology (3) Theory, method, and ethnographic research on selected problems and aspects of traditional agrarian groups in U.S. and peasant societies. Prereq: Cultural area course or equivalent. May be repeated. Maximum 6 hrs.
514 Anthropology of Development (3) Application of anthropological theory, method, and research on selected problems and aspects of development of agrarian groups in U.S. and peasant societies. Prereq: Cultural area course or equivalent. May be repeated. Maximum 6 hrs.
516 Medical Anthropology (3) Cultural impact on disease patterns, theories of disease causation, and models of therapy. Theoretical and applied aspects of the anthropological study of health and disease. Prereq: Consent of instructor.
518 Nutritional Anthropology (3) Anthropological contributions to study of food-related cultural and biological variability in past and present populations. Prereq: 110, 120, 130, or consent of instructor. Recommended prerequisite: Basic nutrition course.
519 Forms of Social Inequality (3) Anthropological perspectives on societies stratified along lines of rank, caste, race, ethnicity, and class; inequalities engendered by sex role structure. Construction of social distinctions before and after the rise of modern world systems. Intersections of race and ethnicity with class and gender.
520 Seminar in Zoolarchaeology (3) Approaches to analysis and interpretation of faunal remains and major faunal faunal studies, guides to identification, methods of presenting faunal data. Prereq: 120, 130, or consent of instructor. Recommended prerequisites: Basic zooarchaeology course.
522 Seminar in Archaeology (3) Theoretical and practical issues in contemporary archaeology: ethnoarchaeology, paleoethnobotany, isotope and ceramic analysis, archaeological theory, and regional archaeological cultures. May be repeated. Maximum 9 hrs.
530 Fieldwork in Archaeology (3-9) Practicum in surveying, excavating, processing, and analysis of archaeological data. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.
531 Quantitative Methods in Archaeology (3) Application of quantification techniques to archaeological data critically examined through literature and problem solving. Basic and advanced statistical analysis, and other mathematical methods. Prereq: Consent of instructor.
560 Theory in Archaeology (3) Detailed consideration of theory in contemporary archaeology: models of scientific explanation, research design, archaeological formation processes, and methods of analysis and interpretation.
561 Archaeological Resource Management (3) Federal legislation and regulations affecting identification, protection, and management of archaeological resources. Professional ethics and responsibilities of federal and state agencies, public interest groups, and
52 Architecture

Architecture (College of Architecture and Planning)

<table>
<thead>
<tr>
<th>MAJOR</th>
<th>DEGREE</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>J. William Rudd, Dean</td>
</tr>
<tr>
<td></td>
<td></td>
<td>William J. Lauer, Associate Dean</td>
</tr>
</tbody>
</table>

Professors:

- Anderson, G. I., M.Arch. | Illinois
- Conley, G. (Emeritus), B.Arch. | Harvard
- Gröger, F., M.Arch. | Pennsylvania
- Kelso, R. M., M.S. | Tennessee
- Kersavage, J. A., D.Sc. | Southern Cal
- Lauer, W. J. (Liaison), M.S.Arch. | Eng.
- Lester, A. J., M.Arch. | Virginia
- Lizon, P., Ph.D. | Pennsylvania
- Moffet, M. S., Ph.D. | MIT
- Robinson, M. A., M.Arch. | Pennsylvania
- Rudd, J. W., M.A. | Northwestern
- Shell, W. S., M.A. | Columbia
- Watson, J. S., M.Arch. | Pennsylvania
- Wodehouse, L. M., Ph.D. | St. Andrews

Associate Professors:

- Coddington, J., M.Arch. | Pennsylvania
- Herz, M. D., B.Arch. | Columbia
- Kaplan, M., M.Arch. | Harvard
- Kinzy, S. A., Ph.D. | SUNY (Buffalo)
- Martella, W. E., B.Arch. | California
- Narancic, V. (On Leave), B.Arch. | Belgrade
- Rabun, J. S., M.A. | Texas

Assistant Professors:

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

Masters of Architecture Program

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

Admission Requirements

In addition to meeting The Graduate School's minimum requirements, admission requires a baccalaureate degree from an accredited Track 2 institution, an NAAB accredited program, or foreign equivalent with a minimum 3.0 GPA. Candidates with a GPA less than 3.0 may be considered for conditional admission when evidence of exceptional promise is identified. The School requires a separate application for Architecture including an essay and three letters of recommendation.

A personal on-site interview is desirable but not mandatory.

For Track 1 applicants, twelve semester hours in humanities and a basic understanding of physical principles, systems and analytical procedures, and mathematical principles and analytical procedures, a general knowledge of western architectural history, and a general understanding of the use of computers is also required. Track 2 applicants must also submit a portfolio of design and research work.

Degree Requirements

Track 1 requires a minimum of 48 semester hours of undergraduate preparation and 57 semester hours of graduate coursework, taking approximately 3 1/2 years of full-time study. Track 2 requires a minimum of 30 semester hours of graduate coursework. Both tracks require six hours of Thesis 500 with a public presentation and oral defense of the thesis. Retention in the program is contingent upon evidence of satisfactory progress toward the degree. Each student's progress will be reviewed each semester by the Coordinator of Graduate Studies. Any questions regarding progress will be reviewed by the Graduate Program Advisory Committee.

For further information, contact the School of Architecture.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The B.Arch. program in Architecture is available to residents of the states of Maryland, South Carolina, or West Virginia. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

GRADUATE COURSES

403 Introduction to Preservation (3) History, theory, and legal aspects of architectural preservation and restoration.

404 Preservation Technology (3) Techniques of preservation: methods of analysis, history of materials and technology used in old buildings. Prereq: 403.

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

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

411 Architecture Since 1945 (3) Recent architectural developments and views of future.

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

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

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

415 Medieval Architecture (3) History of architecture from the fall of Rome to the beginning of Renaissance.
409 Special Topics in Fiber/Fabric (3) Student- or instructor-initiated course offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 12 hrs.


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


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


421 Ceramics: Advanced Projects (3-6) Development of the investigative nature of specific concept using appropriate methods, materials and presentation. Prereq: 421. May be repeated. Maximum 12 hrs.


424 Ceramics: Clay and Glazes (3) Clay chemistry, clay bodies, glaze theory, glaze calculation, intensive formulation, mixing and testing of clay bodies and glaze formulas. Prereq: 321 and 322.

425 History of Ceramics Seminar (3) Ceramics from ancient through contemporary. Ceramics sculpture, and vessel aesthetic. Individual projects and original presentations. May not be used toward art history requirement. Prereq: 321 and 322.

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

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


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

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

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


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

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

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

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

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

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


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


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

481 Museology 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. Prereq: 481. May be repeated. Maximum 12 hrs.

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

485 History of Printmaking (2) Prints from 15th-century to present. 20th-century in Europe and U.S. Prereq: 472 and 173.

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

488 Studies in Art History (3) Concentration in individually selected area. Prereq: 12 hrs of art history and consent of instructor. May be repeated. Maximum 6 hrs.

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

505 Graduate Fiber and Fabric I (2-6) May be repeated. Maximum 10 hrs.

506 Graduate Fiber and Fabric II (2-6) May be repeated. Maximum 10 hrs.

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

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

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

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

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

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

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

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

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

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

550 Graduate Studies in Graphic Design/Illustration History (3) Design and illustration ca. 1850 to present. Prereq: M.F.A. candidate or consent of department. May be repeated. Maximum 8 hrs.

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

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

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

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

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

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

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

565 Graduate Printmaking-Screen Printing I (2-6) May be repeated. Maximum 10 hrs.

566 Graduate Printmaking-Screen Printing II (2-6) May be repeated. Maximum 10 hrs.

571 Graduate Turkish Art (3) Architecture of major monuments from Byzantium or western Europe. Prereq: M.F.A. candidate or consent of instructor. May be repeated with consent of department. Maximum 6 hrs.

572 Graduate Italian Renaissance Art (3) Art and architecture of major works and artists from Byzantium or western Europe. Prereq: M.F.A. candidate or consent of instructor. May be repeated with consent of department. Maximum 6 hrs.

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

574 Graduate Modern Western Art (3) Selected topics in 18th- and 20th-century western art. Prereq: M.F.A. candidate or consent of instructor. May be repeated with consent of department. Maximum 6 hrs.

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

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

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

See Physics and Astronomy

Audiology and Speech Pathology

(College of Liberal Arts)

MAJORS DEGREES

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

Patrick J. Carney, Head

Professors:
Asp, Carl W., Ph.D. .... Ohio State
Carney, Patrick J. (Liaison), Ph.D. .... Iowa
Luper, Harold L., Ph.D. .... Ohio State
Nabekal, Igor V., Sc.D. .... Prague
Peterson, H. A., Ph.D. ................. Illinois

Silverstein, B., Ph.D. ..................... Purdue

Associate Professors:
Buchfield, Samuel B., Ph.D. .... Michigan State
Ferrall, Charles J., M.A. .............. Tennessee
Wallace, Gloria Jean L., Ph.D. ...... Northwestern

Assistant Professor:
Gordon, Pearl A., Ph.D. .............. Texas

THE MASTER'S PROGRAM

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

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

Students majoring in either of the two areas are expected to complete the academic requirements for clinical certification from the American Speech-Language-Hearing Association, including the required number of clock hours of clinical practicum (minimum 200 hours as a graduate student, 375 total). An exception to this rule must be approved by the appropriate departmental committee. Enrollment in clinical practicum courses is required for all clinical practice experiences. If the undergraduate preparation does not include sufficient coursework in speech pathology, audiology, psychology, and related fields, the student may be required to make up such deficiencies.

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

THE DOCTORAL PROGRAM

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

1. Basic speech, hearing, and language processes;
2. Speech, hearing, and language disorders;
3. Related disciplines providing insight into human communication processes;

4. Technical skills in instrumentation and experimental design which enable the student to investigate problems pertaining to speech and hearing processes.

The program will normally consist of three or more calendar years of graduate study beyond the Master's degree with the first year being devoted primarily to formal coursework and the last year to full-time research culminating in the doctoral dissertation.

The total program is a minimum of 60 semester hours, including a minimum of:

1. 24 semester hours in dissertation 600.
2. 6 semester hours in a research tool.
3. 6 semester hours in a cognate area outside the department.
4. 24 semester hours in 600-level coursework within the department of which:
   a. a minimum of 6 semester hours in the topic of major interest;
   b. a minimum of 6 semester hours in topic(s) of related interest;
   c. 2 semester hours in 611; and
   d. 3 semester hours in supervised teaching experience.
5. A comprehensive examination to demonstrate scholarly knowledge of audiology, speech and language pathology, and speech and hearing science; and advanced knowledge of the specifics of the area of concentration.
6. A final oral examination.

ACADEMIC COMMON MARKET

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

GRADUATE COURSES

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

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

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


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

461 Introduction to Language Pathology in Children (3) Nature, etiology, and treatment of language retardation in children; observations of language therapy. Prereq: 320 or consent of instructor.

465 Speech and Language of the Culturally Different Child (3) Speech and language differences of children of various minority groups, of different ethnic and class membership and from different geographic regions.

473 Audiology II (3) Basic principles of clinical audiology: pure tone, speech, masking and overview of special auditory tests. Prereq: 371. Same as Special Education 473.

494 Aural Habilitation/Rehabilitation of the Hearing Impaired (3) Psychosocial aspects, amplification components, characteristics, assistive devices, speech acoustics, speech perception, speech reading, parent-infant,
preschool school years of children, communication im-
pairments/handicaps/remediation of adults, effects of
aging/remediation on the elderly, and case studies. Prereq:
Phonetics and Acoustics of Speech and 473, or equiva-
lents 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

503 Anatomy and Physiology of Hearing (3) Structure
and function of the peripheral and central auditory sys-
tems, and their roles in mediating auditory processes.
Prereq: 473 or equivalent or consent of instructor.

511 Introduction to Research in Speech and Hearing
(3) Analysis of research techniques, fundamentals of
statistics, interpretation of statistics, and completion of a
proposal and hypothetical pilot research project.

512 Clinical Practice in Audiology (1-4) Prereq: 473
and 494. May be repeated. Maximum 9 hrs.

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

514 Practicum in Verbo-Tonal Habilitation (1-4)
Prereq: 494, 585, 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 8 hrs.

517 Instrumentation in Audiology and Speech Pa-
thology (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
speech and hearing processes.

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

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

544 Amplification for the Hearing-Impaired (3) Speech
acoustics/psychoacoustics. Influence of noise, rever-
beration and auditory pathology on speech perception.
Strategies for selecting amplification. Psychological con-
siderations. Orientation and counseling. Dispensing mod-
el. Prereq: 473, 507, and 543 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 Audiometry (3) Theoretical bases for
behavioral audiometry and acoustic immittance mea-
surement. Prereq: 473 or equivalent or consent of in-
structor.

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 phe-
nomena and how they relate to perception and diagnosti-
c audiology. Prereq: 473, 507, and 546 or equivalents or
consent of instructor.

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

552 Seminar in Speech Pathology (2-3) Current sig-
rificant research in speech pathology. Topics vary.
Prereq: 9 hrs in speech pathology. May be repeated with
consent of department. Maximum 9 hrs.

554 Seminar in Multicultural Issues in Communica-
tion Disorders (3) Discussion of current research re-

televant to cultural language differences: Prereq: 465 or
equivalent or consent of instructor.

555 Special Problems in Speech-Language Path-
ology (1-3) Prereq: Consent of instructor. May be re-
peated. Maximum 8 hrs.

556 Independent Study in Speech-Language Patho-

logy (1-3) Prereq: Consent of instructor. May be re-
peated. Maximum 6 hrs.

557 Management and Supervision for Speech-Lan-
guage-Hearing Professionals (3) Management sys-
tems, accountability, performance appraisal and clinical
supervision for audiologists and speech language pa-
thologists interested in private practice, supervisory or
administrative positions.

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

563 Practical Applications of Language Habilitation
Techniques (3) Various methods and procedures used in
therapy of disordered preschoolers. Alternative and sup-
estimative systems included. Prereq: 461 or equiva-
 lent or consent of instructor.

564 Pediatric Audiology (3) Theoretical and practical
considerations in evaluation and treatment of hearing
loss in children. Psychological and medical intervention in
case management of hearing impaired child: amplifica-
tion, educational alternatives, and state and federal
guidelines.

565 Electrophysiological Assessment of Auditory Func-
tion (3) Science of hearing, innervation and the audi-
onymical threshold. Use of various evoked potentials in
evaluation of auditory function and determination of site(s) of lesion. Prereq: 473, 507, and 546, or equivalents or consent of instructor.

579 Psycholinguistic Concepts in Speech Patho-

logy (3) Psycholinguistic concepts and information the-
ory in studying the normal acquisition of language and
certain disorders of language. Prereq: Consent of in-
structor.

591 Foreign Study (1-15) See page 32.

592 Off-Campus Study (1-15) See page 32.

593 Independent Study (1-15) See page 32.

594 Advanced Aural Habilitation/Rehabilitation of
the Hearing-Impaired (3) Study of grieving process,
counseling, group and individual amplification systems,
classroom/speech acoustics, central auditory problems,
therapy techniques, speech pathology, speech reading,
school-based programs, programs for adults and
the elderly; student research reports/case studies. Prereq:
Phonetics and Acoustics of Speech, 473 and 494 or
equivalents or consent of instructor.

595 The Verboten System: Auditory/Speech Per-
ception (3) Innovative therapy, therapy procedures, and
SUVAG amplification/filters for diagnosis/evaluation/
remediation of spoken language/listening skills of hear-
ing-impaired children/adults. Use of rhythms, movements,
and suprasegmentals; special audiometric tests, acous-
tic filters, correcting misarticulations through listening/normal
language; central auditory treatment; second (foreign)
language through listening/spoken language; relation-
ship of concepts to conventional concepts/practice; stu-
dent research reports. Prereq: Phonetics and Acoustics
of Speech, 473 and 494 or equivalents or consent of
instructor.

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

611 Experimental Phonetics (3) Acoustical and per-
ceptual analyses of speech production and overall oral
perception. Prereq: 517 or consent of instructor.

612 Psychoacoustics (3) Auditory perception and re-
ception of nonspeech and speech stimuli. Prereq: 517.

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

616 Advanced Speech Physiology (3) Physiology of
speech production and theories of speech motor control.
Techniques involved in physiological analysis of speech.
Prereq: 506.

617 Advanced Anatomy and Physiology of the Ear
(3) Anatomical and physiological correlates in hearing
science. Inner ear, peripheral systems, auditory mecha-
nical, and mathematical models of normal and abnor-
mal auditory mechanism function. Prereq: Consent of
instructor.

620 Seminar in Speech Science (2) Experimental
areas: speech physiology, acoustical analysis, recog-
nition, perception and intelligibility of speech, com-
munication theory, and psycholinguistic measurement of
speech and language. Topics vary. Prereq: 601 or con-
sent of instructor. May be repeated. Maximum 6 hrs.

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

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

619 Advanced Technology in Speech and Hearing
(2) Applications of recent technological advances, com-
puters, to speech and hearing research. Prereq: Con-
sent of instructor.

650 Advanced Seminar in Audiology (2) Topics vary.
Prereq: Consent of instructor. May be repeated. Maxi-
imum 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.
Research and Development Specialization
1. Twelve hours of 600-level courses in the major field of aviation systems.
2. Six hours in industrial engineering (engineering management).
3. Six hours of electives from the major field, mathematics or engineering.
4. Six hours of Aviation Systems 500 demonstrating the ability to conduct and report on an independent investigation.

Administration Specialization
1. Twelve hours of 600-level courses in the major field of aviation systems.
2. Six hours in industrial engineering (engineering management).
3. Three hours in economics or finance.
4. Six hours of electives selected from the major field, mathematics or engineering.
5. Six hours of Aviation Systems 500 demonstrating the ability to conduct and report on an independent investigation.

NON-THESIS OPTION
The non-thesis program will be permitted in special circumstances and involves satisfactory completion of the following requirements:

Research and Development Specialization
1. Twelve hours of 600-level courses in the major field of aviation systems.
2. Six hours in industrial engineering (engineering management).
3. Three hours in economics or finance.
4. Twelve hours of an assigned project under faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only.

 Administration Specialization
1. Twelve hours of 600-level courses in the major field of aviation systems.
2. Three hours in industrial engineering (engineering management).
3. Three hours in economics or finance.
4. Six hours of electives selected from the major field, mathematics or engineering.
5. Six hours of Aviation Systems 500 demonstrating the ability to conduct and report on an independent investigation.

DEGREES

Aviation Systems
(UT Space Institute)

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

R. D. Kimberlin, Program Chair

Professors:

Associate Professors:
Kimberlin, R. D. (Liaison), Ph.D. ................. RWTH (Germany)

Assistant Professor:
Solies, U. P., Ph.D. .................. Tennessee

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

To qualify for admission to this program, the student 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:

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

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

503 Air Vehicles (3) Current capabilities and future requirements for civilian and military air vehicles. Parameters significant for air vehicle type selection. Integration of air vehicle into aviation systems. Prereq: 501.


505 Governmental Policies for Aviation (3) Theoretical and legal basis for economic and governmental regulation of aviation. Historical and legislative development of aviation regulatory agencies, organizational structure, administrative, 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.

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.

588 Measurement Science I (3) (Same as Nuclear Engineering 586, Chemical Engineering 586, Civil Engineering 586, Electrical and Computer Engineering 586, Engineering Science and Mechanics 588, Mechanical Engineering 588 and Aerospace Engineering 588.)

589 Measurement Science II (3) (Same as Nuclear Engineering 589 and Engineering Science and Mechanics 589.)

Biochemistry
(College of Liberal Arts)

MAJOR DEGREES
Biochemistry ......................... M.S., Ph.D.

John W. Koontz, Head

Professors:
Associate Professor:
Koonz, John W. (Liaison), Ph.D. ....... Kentucky
Assistant Professors:
Feinberg, R. H. (Emeritus), Ph.D. ....... California
Howell, Elizabeth E., Ph.D. .......... Lehigh
Peterson, Cynthia B., Ph.D. ......... LSU
Roberts, Daniel M., Ph.D. ....... California (Davis)
Serpersu, Engin H., Ph.D. .......... Hatcepe

Adjunct Faculty:
Farkas, W., Ph.D. ................. Duke
Georgiou, S., Ph.D. .......... Manchester
Kennel, S., Ph.D. .......... California (San Diego)

THE MASTER'S PROGRAM
1. At least one year each of Introductory Organic Chemistry with laboratory* and approved physical chemistry.
2. A minimum of 8 semester hours of approved biology courses beyond the introductory level and including the subject areas of genetics and physiology.
3. Biochemistry 511-12 and 515-16.
4. At least 6 hours of advanced seminar courses from the following: 601, 603, 604, 605, 606.
5. Six hours of Master's research and a thesis.
6. A final examination that covers both the thesis endeavor and the subject matter of the course requirements.

THE DOCTORAL PROGRAM
1. Introductory Organic Chemistry*, Introductory Physics*, Differential and Integral Calculus*, approved physical chemistry, and at least 12 hours of biology beyond the introductory level and including the subjects of genetics and physiology.
2. Biochemistry 511-12 and 515-16.
3. At least two approved graduate courses in chemistry, physics, or other physical science; for example, Chemistry 550, 551, 552, Physics 521, 522, 551. No survey courses will be accepted.
4. At least 6 hours of topics offered in 521 and 621.
5. Participation in 601 and 603 during the entire period of residence.
6. Comprehensive examination, taken before the end of the third year of study.
7. A dissertation reporting the results of original and significant research carried out during the term of candidacy.
8. A final oral examination which will be concerned primarily with the student's dissertation.

*Though completion of these courses or their equivalent is required, they may not be taken for graduate credit.

Petitioning for Master's Degree
Students who have passed the comprehensive examination in the Ph.D. program and have completed at least 30 hours of approved coursework for graduate credit, at least two-thirds of which must be at or above the 500 level, may petition the department for award of a Master's degree. The additional requirements for such a degree are:
1. The preparation of a research manuscript suitable for submission for publication in a major scientific journal and oral defense of that manuscript before an examining committee of three faculty members appointed by the head of the department, at least two of whom shall be members of the department; or
2. Publication of at least one full-length paper in a major biochemical journal as senior author.

GRADUATE COURSES
410 Cellular and Comparative Biochemistry (4) Electrolyte behavior; chemistry and structure of proteins; enzyme behavior and biochemical function; catabolism and energy capture; synthetic metabolism; nucleic acid function, protein synthesis, and biochemical genetics; regulation of biological processes. Prereq: Chemistry 350-355, Biology 110-20, 3 hrs. and 1 discussion. F,SP
419 Cellular and Comparative Biochemistry Lab (2) Experiments with enzymes, nucleic acids, and membranes/organelles. Chromatography, kinetic, hybridization, sequencing, and immunochromical methods. Prereq or coreq: 410. F,SP
471-81 Biophysical Chemistry (3,3) Physicochemical principles with applications to biological systems. 471--Thermodynamics; chemical equilibrium; solution chemistry; transport; electrochemistry; kinetics; enzyme-catalyzed reactions. 481--Elementary quantum chemistry; interactions of light with biological molecules; optical and magnetic spectroscopy; light scattering; case studies of selected macromolecules. Prereq: Calculus, Organic Chemistry, General Biology or consent of instructor. (Same as Chemistry 471-81). 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
511 Advanced Concepts in Protein Structure, Protein Function and Intermediary Metabolism (4) Protein structure and function; regulation of enzyme activity: intermediary metabolism; membrane structure and function. Original literature and review articles; contemporary experimental approaches. Prereq: 510. 420 or consent of instructor. 3 hrs. and 1 discussion. F
512 Advanced Molecular Biology (4) Replication, repair, transcription, translation and control mechanisms. Prior knowledge of fundamentals of gene expression. Prereq: 511 or Life Sciences 511. 3 lectures and discussions. (Same as Life Sciences 512.) F
515 Experimental Techniques I (3) Modern experimental methodology and instrumentation in lab. Primarily for departmental graduate students. Prereq: Consent of instructor.
516 Experimental Techniques II (3) Laboratory rotations. Student works in laboratory of faculty member on clearly defined project. Written proposal and oral report. Primarily for departmental graduate students. Prereq: 515. 8, SP
521 Special Topics (1-3) Registration only by prior arrangement with department. May be repeated. Maximum 8 hrs. E
525 Graduate Research Participation (3-12) Tutorial laboratory experience. May be repeated. Maximum 12 hrs. E
561 Environmental Toxicology (3) Basic concepts in toxicology: molecular and cellular biology of toxic substances; excretion, excretoxicity, and bioaccumulation in organisms. Prereq: 410. Chemistry 350-60-65 or consent of instructor. (Same as Ecology 561.) F
600 Doctoral Research and Dissertation (3-15) P/NP only. E
601 Advanced Biochemistry Seminar (1) Invited speakers. Topics posted in advance. Required every semester in residence. S/NC only. F,SP
603 Current Topics in Biochemistry (1) Seminars and lectures dealing with current advances in field of chemical biology. Required every semester in residence. S/NC only. F,SP
604 Current Topics in Environmental Toxicology (1) Critical reviews of research problems and methods in environmental toxicology, behavioral toxicology, biochemical and ecological effects, biostatistics and epidemiology. Presentations by students, faculty, and guest lecturers from academia and industry. May be repeated with consent of department. Maximum 4 hrs. (Same as Ecology 604.) S/NC only. F,SP
605 Current Topics in Regulation of Protein Function (1) Covalent modifications of proteins by phosphorylation-dephosphorylation; allosteric interactions. Prereq: 410 or equivalent. May be repeated. Maximum 6 hrs. S/NC only. F,SP
606 Current Topics in Biological Membrane Research (1) Prereq: 410 or equivalent. May be repeated. Maximum 9 hrs. (Same as Microbiology 606) S/NC only. F,SP
621 Advanced Topics (1-3) Biochemical and biophysical methods, mechanisms of enzyme catalysis, gene expression, membrane structure and function, metabolic regulation, physical biochemistry. Prereq: 511-12 or consent of instructor. May be repeated. Maximum 9 hrs.

Biomedical Sciences
(Office of the Vice Chancellor for Academic Affairs)

MAJOR DEGREES
Biomedical Sciences ......... M.S., Ph.D.
Raymond A. Popp, Director
Professor:
Olin, Donald E., Ph.D. .......... Rockefeller
Research Professor:
Research Associate Professor:
Ch'ang, Lan-Yang, Ph.D. .......... Vanderbilt
Research Assistant Professor:
Foote, Robert S., Ph.D. .......... Duke
Oberbacher, Edward C., Ph.D. .... Pennsylvania

Shared Faculty:
Not all faculty listed are necessarily available in teaching and/or research roles in every academic year.

Burick, Gerald, Ph.D. .......... Pennsylvania
Cook, John S., Ph.D. .......... Princeton
Fry, R. J., M.D. .......... Dublin
Fujimura, Robert K., Ph.D. .......... Wisconsin
Godfrey, Virginia L., D.V.M., Ph.D. .... Tennesse
Hartman, Fred C., Ph.D. .......... Tennesse
Jacobson, K. Bruce, Ph.D. .......... Johns Hopkins
Kennel, Steve, Ph.D. .......... California (San Diego)
Larimer, Frank W., Ph.D. .......... Florida State
Lee, Kai-Lin, Ph.D. .......... Tulane
Littlefield, Gayle, Ph.D. .......... Georgia
Mazur, Peter, Ph.D. .......... Harvard
Mural, Richard, Ph.D. .......... Georgia
Niyogi, Sall K., Ph.D. .......... Northwestern
Popp, Raymond A. (Liaison), Ph.D. .... Michigan
Ritchik, Eugene M., Ph.D. .......... Duke
Russell, Lianne B., Ph.D. .......... Chicago
Shugart, Lee H., Ph.D. .......... Tennessee
Snyder, Fred L., Ph.D. .......... North Dakota
Solomon, A., M.D. .......... Duke
Srivastava, Prem C., Ph.D. .......... Lucknow
The University of Tennessee-Oak Ridge Graduate School of Biomedical Sciences, located within the Biology Division of Oak Ridge National Laboratories, offers programs leading to
the Master of Science and the Doctor of Philosophy. The National Laboratory is a well-known center of basic research. The school utilizes the staff and facilities of this laboratory and thus brings directly into the mainstream of
most advanced research methods and technology.

The program of study, which incorporates a high faculty-to-student ratio, is based on
intensive graduate courses supplemented by tutorial instruction, participation in a wide variety of seminars, and a heavy emphasis on
communication skills, research training, and
independent study. The program encourages
students to pursue graduate studies to the limits of
their abilities.

Each student's curriculum is planned to meet
individual needs, with the aim of giving: (1)
strength in the basic sciences; (2) perception of
the biomedical sciences as a whole; and (3)
experience and training in a chosen specialty.

The concentration areas available for
Master's thesis and Ph.D. dissertation work are biochemistry, biophysics, bioenergetics, genetics, cellular, developmental and mammalian biology, and radiation biology. Included
are such subjects as immunology, protein and
enzyme chemistry, nucleic acid chemistry,
cytology, radiation and environmental biology,
virology, developmental biology, experimental
pathology, microbial and mammalian genetics, mutagenesis, and problems of aging.

ADMISSION REQUIREMENTS

A Bachelor's degree or its equivalent is required. Students with M.S., D.V.M., or M.D.
degrees are also encouraged to apply.

Completed applications, Graduate Record Examination scores and letters of reference
should be sent to the address below. The
student will need preparation in biology,
calculus, physics, and organic and physical chemistry. A course in physical chemistry is
offered by the school in order to meet the last
requirement. It is recommended that deficien-
cies in preparation, as identified in the admis-
sion process, be eliminated prior to entrance.

Requests for application forms, information on admission, financial support, and housing
should be sent to Director, University of
Tennessee-Oak Ridge Graduate School of
Biomedical Sciences, Biology Division, ORNL,
Box 2009, Oak Ridge, Tennessee 37831-8077.

THE DOCTORAL PROGRAM

1. Satisfaction (A grade or better) completion of the following core courses or their equivalent:
   Biochemistry (511); Biophysical Biochemistry
   (514); Genetics (515); Cell Biology (518);
   Computing for the Life Sciences (525); and
   Statistics for Biologists (574).

2. Three semesters of Biomedical Sciences Laboratory (531-32-33).

3. Participation in at least one of the seminars during each term of residence after the
   first year is strongly recommended.

4. Satisfactory completion of formal advanced courses in the areas of the student's
   interest. The number and nature of the required advanced courses will vary depending upon
   the student's background and area of specialization.

5. Passing both written and oral comprehensive examinations.

6. A dissertation reporting the results of original and significant scientific research. A
   minimum of 24 semester hours of course 600 is required.

7. A final oral examination on the dissertation.

8. A formal seminar presentation of the dissertation research.

SPECIAL MASTER OF SCIENCE DEGREE PROGRAM

The graduate faculty has designed a Master
of Science program in Biomedical Sciences
primarily to fill the need for such a degree within the Oak Ridge National Laboratories; however, a limited number of students from other
institutions may be accepted if qualified and
as space is available. The requirements for the
degree are:

1. Graduate credit or a proficiency in the
   following core courses: Biochemistry (511);
   Biophysical Chemistry (514); Cell Biology
   (518-19); plus any three of the following
   courses: Genetics (515); Molecular Genetics
   (517); Statistics for Biologists (574); or
   Computing for the Life Sciences (525).
   Additional credits may be obtained (6 to 15
   hours) with electives.

2. Thirty hours of approved graduate
   courses including 8 hours for thesis.

3. For admission to candidacy: Completion
   of any required prerequisite courses and one
   semester of graduate coursework with a B
   average. Admission to candidacy forms must
   be filed at least one full semester prior to receipt
   of degree.

4. A Master's committee of three approved
   faculty members upon admission to candidacy.

5. A thesis reporting original and significant
   scientific research.

6. Passing a final oral examination.

GRADUATE COURSES

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

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

507 Physical Chemistry (3) Thermodynamics; phase
   equilibria; chemical equilibrium; electromotive force; surface
   chemistry; electrolyte solutions; kinetics; conduc-
   tance; viscosity; diffusion.

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

514 Biophysical Chemistry (3) Chemistry of
   biopolymers; biosynthesis of purines, pyrimidines and
   nucleic acids: biosynthesis of RNA, DNA, and proteins.
   Energy levels and excited states of large molecules;
   optical instrumentation; adaptations to system perturba-
   tions; properties of macromolecules in solutions; mole-
   cular solution; molecular conformations; inter-and
   intramolecular forces; principles of microscopy. Prereq:
   511.

515 Genetics (3) Mendelian genetics, mitosis and meio-
   sis; transmission genetics; mapping and linkage; genet-
   ics of phage, bacteria and eucaryotes; mapping, linkage,
   and behavior; cytoplasmic inheritance. Mechanisms of
   recombination, chromosome structure and replication.

516 Cell Biology (3) Structure and composition of
   major cell organelles: nuclear and cytoplasmic organelles of
   eucaryotic cells. Pertinent instruments and techniques; mitosis
   and meiosis; cell cycle; nuclear structure; DNA synthesis
   and replication; RNA transcription; ribosomes; distribution
   of specialized cells. Structure of genetic transmission and

525 Computing for the Life Sciences (3) Interactive
   computing. Mini- and micro-computing environments:
   Basic, Fortran, and Pascal programming; application of
   statistics, graphics, text manipulation, and computer
   communications.

531-32-33 Biomedical Sciences Laboratory (3,3,3)
   Approaches and techniques in various areas of mod-
   ern biology. Students spend a semester in each of three
   laboratories conducting research in different areas of
   biomedical science. Required of all first-year students.

543-46-49 Graduate Research Participation (3,6,9)
   Special advanced research project related to disserta-
   tion research. Topic chosen with consent of instruc-
   tor. May be repeated.

551-52-53 Special Topics in Biomedical Sciences
   (3,3,3) Either tutorials or formal lectures. Potential topics:
   X-ray diffraction and immunology: excited-state bio-
   physics, physical chemistry of macromolecules; pathol-
   ogy; mammalian genetics coverage.

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

624 Chemistry and Metabolism of Lipids (2) Nomen-
   clature, chromographic isolation, chemical, physical properties,
   and enzymology of lipids. Hormonal action of
   prostaglandins and role of lipids in membranes, enzy-
   matic expression, and nervous tissue. Lipid biochem-
   istry of mammals. Comparative aspects, lipid pathways in
   bacteria and yeast. Prereq: 511, 514.

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

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

665 Microbial Genetics (3) Basic phenomena in micro-
   biological genetics: transduction, transformation, conjugation,
   and mutation. Genetics of bacteria and yeasts. Prereq: 515,
   517.

666 Cyto-genetics (3) Chromosome structure, chromoso-
   mal alterations (mitosis and meiosis), mechanisms of
   induction of chromosomal alterations by radiation and
   chemicals, aneuploidy, chromosome breakage and in situ
   hybridization. Chromosome changes and cancer; hu-
   man cytogenetics, sister chromatid exchanges, human
   genetics\r\n\r\nDEGREES

Botany

MAJOR

Botany

DEGREES

Botany

Edward E. Schilling, Head

Professors:

Caponetti, J. D., Ph.D. Harvard
Clebsch, E. C., Ph.D. Duke
DeSelm, H. R. (Emeritus), Ph.D. Ohio State
Evans, A. M. (Emeritus), Ph.D........... Michigan
Herndon, W. R. (Distinguished Prof.), Ph.D.
Hickok, L. P., Ph.D.......................... Massachusetts
Holton, R. W., Ph.D......................... Michigan
Hughes, K. W., Ph.D.......................... Utah
Jones, L. W., Ph.D......................... Texas
McCormick, J. F., Ph.D..................... Emory
Mullin, B., Ph.D............................. NC State
Norris, F. H. (Emeritus), Ph.D........... Ohio State
Petersen, R. H. (Distinguished Prof.), Ph.D.. Columbia
Schilling, E. E. (Lisbon), Ph.D............ Indiana
Sharp, A. J. (Emeritus), (Distinguished Prof.), Ph.D...
Smith, D. K., Ph.D.......................... Tennessee
Woford, B. E. (Curator), Ph.D............... Tennessee

Associate Professors:
Amundsen, C. C., Ph.D..................... Colorado
Hellman, A. S., Ph.D....................... Ohio State
Schwarz, O. J., Ph.D....................... NC State
Smith, D. K., Ph.D.......................... Tennessee

Lecturer:
McFarland, K., Ph.D.......................... Tennessee

The Department of Botany offers the Master of Science and Doctor of Philosophy degrees with concentrations in anatomy, botany, plant biology, and plant taxonomy. Educational and ancillary courses include teaching and research in the department related to the instruction of courses.

For further information, contact the Department Head or the Graduate Coordinator.

ADMISSION REQUIREMENTS

The Botany Department requires scores from the general and biology subject portions of the Graduate Record Examination, at least three letters of recommendation or standard recommendation forms from academic or professional persons, and the following academic requirements:

1. Bachelor's degree: a B.A. or B.S. from an accredited college or university with a cumulative grade-point average of 2.5 or better (on a 4.0 scale), with evidence of ability to do work of graduate quality.
2. General Botany or General Biology: 8 semester hours.
3. Advanced Botany or closely allied biological sciences: 12 semester hours.
4. Physical sciences: general inorganic chemistry; 8 semester hours; organic chemistry. Physical Chemistry highly recommended.
5. College mathematics: 6 semester hours including 1 term of calculus.

Evidence of a broad undergraduate background, an ability to do work of graduate quality, and an interest in the study of plant science are considered to be much more important than the particular courses taken as an undergraduate. Accordingly, students lacking specific prerequisite courses but otherwise qualified may be admitted to graduate studies in botany. In such cases, the deficiencies should be removed as soon as possible, typically during the first year of the student's graduate program. The determination of deficiencies and the manner in which they will be removed will be decided upon by the student's pro-temp committee during the first meeting with the student.

THE MASTER'S PROGRAM

The program for the Master of Sciences is patterned to fit the needs of students who desire a less extensive course of study than the Ph.D. program. However, the applicant must be equally well prepared and display an aptitude and ability for advanced study. The M.S. includes thesis and non-thesis options.

Thesis Option

The thesis program is the usual route taken by botany students for the M.S. It is important that the entering student promptly identify a major professor and a suitable research project. The requirements for the thesis option consist of the following:

1. Satisfactory preparation of a written formulation and an oral defense to the student's committee of a research proposal suitable for a thesis. This must be completed before enrollment in Botany 500.
2. Successful completion of 30 hours of graduate credit, at least two-thirds of which must be at the 600 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 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 ancillary services; consult major professor and department head.
4. Satisfactory performance on a final written examination on all work offered for the degree. The student's committee may also require that an oral examination follow the written examination.

THE DOCTORAL PROGRAM

The Doctor of Philosophy program is patterned to provide training that involves extensive independent research within the student's area of concentration. Although there is no formal program of coursework, the student's committee may require specific courses for the completion of the degree. Most students spend from three to five years working on their Ph.D.

Requirements for successful completion of the Ph.D. are as follows:

1. Satisfactory presentation of a research problem by means of a written proposal and an oral defense to the student's committee. This must be completed before enrollment in Botany 600.
2. Satisfactory performance on a written comprehensive examination.
3. Presentation of one or more cognate areas outside of the department totaling 6 hours of graduate credit with at least a B average.
4. Satisfactory performance on an examination in one modern foreign language (see Graduate Coordinator) or an A or B in French 302 or German 332.
5. Satisfactory completion of 6 hours at the 600 level (excluding dissertation).
7. Presentation of a departmental seminar near the end of the doctoral program.

Note: The listed requirements for the M.S. and Ph.D. degrees should be interpreted as minimal requirements. Specific stipulations or requirements such as additional foreign languages or an additional oral comprehensive examination may be required by the student's faculty committee.

GRADUATE COURSES

401-02 Field Studies in Botany (3,3) Field experience and taxonomy of special plant groups. Topics vary: botany, lichenology, pteridology, agrostology, mycology, physiology, aquatics, and botanical photography. May be repeated under different topic. Maximum 9 hrs.


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

426 Paleobotany and Palynology (3) (Same as Geology 426.)

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

451 Plant Tissue Culture (3) Methods for culture of cells, tissues, and organs: media preparation and maintenance of cultures. Prereq: 110-20 or Biology 110-20 or equivalent. Prerequisites: Introduction to Molecular Biology 321, 421; Microbiology 310 or 319; Ornamental Horticulture and Landscape Design 330; and Plant and Soil Science 331.

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

501 Mycology (4) Intensive survey of fungi, all major classes. Lecture, laboratory and field information. Occasional field trips. Prereq: 310-3 hrs and 1 lab. Su.

502 Registration for Use of Facilities (2-15) 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

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. E

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 (B/W and Color) photomacro- and photomicrography, drawing, graphics and video for recording and presentation for research and publication of data in pictorial and graphic form.
509 Morphology and Evolution of Basidiomycetes
(4) Structure and function of somatic and sexual life cycles as applied to evolution in group. Cultures and specimens in laboratory. Prerequisites: 310 or equivalent.

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

512 Taxonomy of Grasses and Grass-like Plants (3) Collection, identification, classification of grasses, sedges and rushes, preparation of the grass subfamilies and tribes. Prerequisite: 330 or consent of instructor. F, A

516 Biosystematics (3) Major experimental methods in systematics and application to specific types of systematic problems. Cytology, numerical taxonomy, chemotaxonomy and cladistics.

521-22 Advanced Plant Physiology I, II (3, 3) Plant biochemical and molecular, respiration, photosynthesis, carbon partitioning, and biosynthesis of specialized plant products: terpenoids, alkaloids, phenolics and plant growth regulators. Prerequisites: 302. 2 hrs and 2 labs. Fall, Winter

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

536 Plant Communities and Plant Geography (4) Plants in communities and their classification and ordination; geographic distribution of communities; their climate and soil relationships. Prerequisite: 431. (Same as Geography 536.)

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/N only.


555 Phytoplankton Ecology (3) Interaction between environment and phytoplankton. Nutrient uptake, primary production, competition, ecological thinly applied to phytoplankton communities, and physiological adaptations by populations to environment. Prerequisite: 310 or consent of instructor.

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

580 Bryophytes and Pteridophytes (4) Taxonomy, phycology, ecology and developmental morphology; field studies and current research. Prerequisite: 310 or consent of instructor. 2 hrs and 2 labs. F, A

581 Cytogenetics (3) Chromosome structure and behavior during mitosis and meiosis, and meiotic and mitotic divisions in relation to structural changes, genetic control, hybridization, specialization, and polyploidy. Laboratory emphasis on normal and aberrant meiotic systems and somatic chromosomes from plants and animals. Prerequisite: 310 and at least 6 additional hrs in biological sciences. (Same as Forestry 581.) S, P, A

582 Methods and Instrumentation in Laboratory Investigation (1) Project experience and theoretical background in various research methods: ion exchange resins, adsorption spectrometry, disc electrophoresis, osmography, zonal and ultracentrifugation, gas chromatography, automatic analyzers, microscopy, culture methods, use and detection of radioisotopes. Prerequisite: Chemistry 350, 360; Physics 121, 122. May be repeated. Maximum 5 hrs: S/N only.

583 The Field Research Problem (3) Conceptualization, planning, and implementing field research. Criteria for choosing instruments, sampling methods, and locations for study of populations, communities, and ecosystems. Field practice. Development and critique of formal research proposal like those required by granting and contracting agencies. Prerequisite: 431, or 535 or 573.

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/N only.

590 Developmental Plant Morphology (3) Developmental morphology of plants from vegetative and reproductive organs of various plants, and of organ determination and differentiation. Prerequisite: 310, 320 or 412 and 321 or 521 or consent of instructor. 2 hrs and 1 lab. F, A

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

609-07 Advanced Topics in Botanical Sciences (1-3) Experimental botanical science, nomenclature, morphology and systematics of vascular plants, cryptogam, botany, cytology and cell biology, genetics, plant physiology and ecology. May be repeated. Maximum 12 hrs.

632 Ecosystems of the World (2) Characterization of world and regional ecosystems; special characteristics of ecosystem function. F, A

635 Environmental Assessment and Sustainable Development in Third World Countries (3) (Same as Ecology and Planning 635.)

637 Applied Ecology (3) (Same as Ecology 637.)

662 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.

550 International Broadcasting (3) Broadcasting systems in other countries. Analysis of international broadcasting organizations. Inter-cultural communication and international broadcasting. Prerequisite: consent of instructor.

560 Radio and Television Law and Regulations (5) Legal problems faced by broadcast managers. Philosophy of regulatory policy formation. 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. Prerequisite: Consent of instructor or admission to program.

570 Radio and 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. Prerequisite: Communications 512 or 612, or consent of instructor.

580 Seminar in Radio and Television (3) Sallet issues in broadcasting. Topics vary. International broadcasting, cable television, new technologies, corporate television, educational and public broadcasting, and society. Prerequisite: Consent of instructor or admission to program.

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

598 Internship (3) Full-time (30-40 hrs per week) work experience in news, production, or sales and management with non-university professional organizations. Educational experience beyond that available at university. Final term paper. No retroactive credit for previous work experience. Prerequisite: Senior or graduate standing, completion of at least 15 hrs of broadcasting courses, GPA 3.0 or better, and consent of department head.

Business Administration

(College of Business Administration)

MAJOR

DEGREES

Communications

M.S., Ph.D.

Norman R. Swan, Head

Professors:

Holt, Darrel W. (Emeritus), Ph.D. ............... Northwestern

Howard, Herbert H., Ph.D. .................... Ohio

Swan, Norman R., Ph.D. ....................... Missouri

Associate Professors:

Moore, B. A., Ph.D. ......................... Ohio

Ziegler, Dhyana, Ph.D. .................. Southern Illinois

Assistant Professor:

Buchman, Joseph, Ph.D. .............. Indiana

Wilkinson, Jeffrey, Ph.D. ................. Georgia

Adjunct Professor:

Nelson, Lindsey, B. A. ................ Tennessee

The Department of Broadcasting offers a concentration area for the Master's with a major in Communications and participates in the interdisciplinary doctoral program. See Communications for additional information.

GRADUATE COURSES

410 Television News (3) Writing, reporting, editing, and producing news for television. Experience as reporter/producer for television news program. Electronic news gathering equipment and techniques, video editing. Prerequisite: 310. 1 hrs and 4 labs. E

420 Television Sales and Promotion (3) Problems and practices of television and cable sales and promotion. Case studies in sales and sales management: use of ratings and computers in sales presentations, national television advertising and marketing campaigns. Practical experience in television sales and promotion. Prerequisite: Radio Sales and Promotion.

430 Producing for Television (3) Principles of television studio and field production, both technical and creative. Writing, producing, shooting, and editing video stories and programs, 3/4 cameras, recorders, and editing system. Prerequisite: 330. E


490 Radio & Television Management (3) Business policies and practices of broadcast operations, departmental function, cost and income analysis, leadership styles and techniques, mid-level management. Capstone course to be taken in student's last semester. Prerequisites: 275, 310, 320, 330, E

510 Broadcast News Management (3) Production of 30-minute news program for available on university stations. News packages and full-length programs. Prerequisite: 410.

550 International Broadcasting (3) Broadcasting systems in other countries. Analysis of international broadcasting organizations. Inter-cultural communication and international broadcasting. Prerequisite: consent of instructor.

560 Radio & Television Law and Regulations (5) Legal problems faced by broadcast managers. Philosophy of regulatory policy formation. 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. Prerequisite: 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. Prerequisite: Communications 512 or 612, or consent of instructor.

580 Seminar in Radio & Television (3) Sallet issues in broadcasting. Topics vary. International broadcasting, cable television, new technologies, corporate television, educational and public broadcasting, and society. Prerequisite: Consent of instructor or admission to program.

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

598 Internship (3) Full-time (30-40 hrs per week) work experience in news, production, or sales and management with non-university professional organizations. Educational experience beyond that available at university. Final term paper. No retroactive credit for previous work experience. Prerequisite: Senior or graduate standing, completion of at least 15 hrs of broadcasting courses, GPA 3.0 or better, and consent of department head.

The College of Business Administration offers two college-wide programs, the MBA and the J.D., with a major in Business Administration. Two tracks are available for the MBA: the regular, full-time program and an executive program. A dual degree program is also available with the College of Law leading to the J.D.-MBA. To obtain application materials, write or call:

Office of Graduate Business Programs, Suite 527, Stokely Management Center, College of...
Academic Common Market

An agreement among southern states for sharing graduate programs allows legal residents of certain states to enroll in certain programs at UT Knoxville on an in-state basis. The Ph.D. in Business Administration is available to residents of Florida (concentration in logistics and transportation only), Kentucky (concentration in logistics and transportation only), or West Virginia; the MBA is available to residents of Alabama, Arkansas, Florida (concentration in logistics and transportation only), or Louisiana. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

Academic Standards

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

The MBA Program

The MBA program is designed for students with undergraduate degrees in the social and natural sciences, the humanities, and professional fields such as engineering, business, agriculture, and architecture. The MBA program is a two-year program with students beginning in the fall of each year and graduating in the spring of the following year. The student must complete an internship with a company using those skills acquired during the first year of the MBA program. The MBA program consists of a common first-year core and a wide selection of second year elective courses. The first-year core develops a general management foundation upon which specialization is developed in the second year. Electives. The objective of the program is to develop leaders able to enhance the success of their organizations. The program consists of two 15-credit-hour MBA core courses in the first year and eight concentration/elective courses in the second. Each elective course is 3 semester hours of graduate credit.

Admission Requirements

Applications are accepted for fall semester only. The application deadlines for fall semester are March 1 for international students and April 1 for others. Applications by U.S. citizens and permanent residents received after April 1 will not be considered as space allows. To be considered for admission, the applicant’s file must be complete. A completed file includes the Graduate School Application, transcripts of prior college work, the MBA program application, two completed applicant recommendation forms, and the Graduate Management Admission Test (GMAT) score report. The first items should reach the Graduate School one month before the MBA application deadline to allow for processing. Additional information is required by the Graduate School for international students.

For admission to the MBA program, consideration is given to (1) applicant’s academic record with particular attention to the last two years of undergraduate work and previous graduate studies, (2) scores on the GMAT and the Test of English as a Foreign Language (TOEFL) for those whose native language is not English, (3) work experience and other activities that demonstrate potential for leadership, and (4) recommendations from professors and work supervisors. The admission decision is based on all factors which make up the total applicant. Therefore, there is no automatic cut-off for either grade point averages or GMAT scores. However, admission preference will be given to applicants with full-time work experience after obtaining the undergraduate degree.

Prerequisites

College-level mathematics through at least one course in college-level calculus, taken within the last 5 years, with a grade of B or better, is the only prerequisite requirement for entry into the program. Students whose undergraduate training does not include calculus should arrange to take it at UT Knoxville or at another accredited institution prior to the fall semester of entry into the program. Those electing the management science or statistics concentration must have completed two years of college-level calculus.

MBA Core

The MBA core consists of two 15-hour courses, one taken each semester. The courses are taught by the MBA core faculty in an integrated fashion and through a year-long simulation requiring students to learn the functional fundamentals (accounting, finance, management, marketing) when they need to apply them to solving a specific business problem. The topics introduced within this course follow three major themes: the functional fundamentals (learned within a cross-functional framework); the role of the firm in society (with attention to stakeholder value, economics, and the ethical and legal environment of the firm); and personal and team development. Students will be exposed to the assessment and delivery of customer value, statistical process control, continuous systems improvement, and the role of quality in competitive organizations.

Students in the first-year core undertake active learning within a team-based environment. Many core requirements are experiential exercises in which self-discovery within a team setting is an important component 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 matriculation. In any event, selection must be made no later than completion of 15 hours of MBA program coursework. Requests for changes in concentration area must be submitted for approval to the Office of Graduate Business Programs. Approval must be granted in the concentration/electives block, at least 3 but not more than 4 must be in one of the following concentration areas. For specific courses required in concentration areas, see the appropriate field of instruction:

- Economics
- Environmental Management
- Finance
- Forest Industries Management
- Management Science
- Marketing
- New Venture Analysis and Entrepreneurship
- Statistics
- Logistics and Transportation

The remaining elective courses (4 to 5) must be in fields outside the concentration area, normally selected from MBA courses offered in other departments of the college. Courses outside the College of Business Administration as well as courses listed in the Graduate Catalog numbered below 500 may be included in this block only with written prior permission via formal petition to the Office of Graduate Business Programs.

Transfer Credits

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

Concentration Area: 3 hours (provided at least 6 hours of work at this institution are included in the concentration area).

Elective Area: 3 hours.

Because the fully integrated nature of the first-year curriculum, no credit hours are transferred into this core curriculum. The maximum number of hours that may be transferred to elective and concentration areas is 6 semester hours. Transfer credit will be considered upon formal petition to the Director of Graduate Business Programs.

Other Requirements

The Application for Admission to Candidacy must be approved by two faculty members and the department head in the student’s area of concentration and the Associate Dean for Academic Affairs in the College of Business Administration. It should be submitted to the Graduate Office at least one full semester prior to the date the degree is conferred. (Admission to candidacy in the fall semester permits graduation in the following spring semester.) To qualify for the degree, the student must achieve a B average (3.0) or above in MBA core courses required in his/her program, a B average or higher in courses comprising the concentration area, and a B average or higher in the overall program. Each student must write a satisfactory analysis of a comprehensive case administered at the end of the first year.

Business Administration Concentration

For complete listing of MBA program requirements, see above.

MBA Concentration: New Venture Analysis and Entrepreneurship

The concentration is comprised of three specifically designed courses which are interdisciplinary in nature. This concentration strives to build a strong academic foundation for both entrepreneurial and intrapreneurial activities. The new venture analysis and entrepreneurship concentration is offered to
both the full- and part-time student in recognition of the growing trend in American business today towards new product/venture development. The new venture analysis/entrepreneurship concentration courses may be combined with two elective courses in another area (management or marketing) to achieve a dual concentration.

Minimum course requirements are Finance 551, Management 551, and Marketing 550. These course descriptions are listed under their fields of instruction.

PRE-MBA PROGRAM

The College offers a joint BA/MBA program with the College of Liberal Arts. Students in this program take their first three years of coursework in Liberal Arts, and their last two years in the College of Business Administration. Within their first three years, students fulfill all general education requirements for the BA degree, both upper and lower division along with a minor offered by one of the Liberal Arts departments. They may use one Economics course only to fulfill distribution requirements, and they are required to take a year of calculus as the only prerequisite to the MBA.

Admission requirements are higher than those normally expected of MBA applicants. Desired qualifications include a minimum 3.4 GPA and a GMAT score of 600 or higher. Students interested in the program are counseled initially in the Liberal Arts Advising Center regarding admission standards and Liberal Arts requirements. At the end of their second year, they have a conference with the Associate Dean for Academic Affairs and are advised of their prospects for formal admission. Students who are likely candidates are advised to take the Graduate Management Admission Test in October of the third year, and to submit an application to the MBA program. The admission decision is made by January of the third year.

Upon admission, students begin MBA coursework in the fourth year and are awarded a BA degree at the end of that year. Upon successful completion of the fifth year (minimum of 30 semester hours of graduate credit), the student receives the MBA degree.

DUAL J.D.-MBA PROGRAM

The College of Business Administration and the College of Law offer a coordinated dual program leading to the concurrent degree of both the Doctor of Jurisprudence and the Master of Business Administration. The dual program saves the student approximately one semester over the time that would be required to earn both degrees independently.

The establishment of the dual program recognizes the increasingly complex body of knowledge necessary to the creative conduct of business and business-related law practice, the complementary nature of many aspects of the graduate programs of the College of Law and the College of Business Administration, and the intellectual benefits inherent in the concurrent study of both business and business-related law. The program is designed to accommodate the interests of students who (a) contemplate a career in public service and want to acquire the skills and perspectives 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 studies be started prior to entry into the last 28 semester hours of J.D. coursework and prior to entry into the second year of the MBA program. Students interested in entering the dual degree program should submit a letter of application to the Dual Program Committee. Upon receipt of the application, the Dual Program Committee will determine eligibility and assign students to advisors who will be responsible for course approval and supervision of the student's progress through the dual program.

Curriculum

A dual program candidate must satisfy the graduation requirements of each college. Students withdrawing from the dual program before completion of both degrees will not receive credit toward graduation from either college for courses in the other college, except as such courses qualify for credit without regard to the dual program.

The College of Law will award up to 9 semester hours of credit toward the J.D. for acceptable performance in approved graduate-level courses offered by the College of Business Administration. The College of Business Administration will award up to 9 semester hours of credit toward the MBA for acceptable performance in approved courses offered in the College of Law. The approval of courses is the responsibility of the Dual Program Committee and the student's assigned advisor. Students may begin their studies in either the J.D. or the MBA program, but may not enroll in MBA coursework while completing the first year of the law curriculum and may not enroll in J.D. coursework while completing the first year of the business curriculum. During the first year in the J.D. program, students register through the College of Law. For any term in which students take MBA courses, even though they are also taking law courses, they must register through The Graduate School. The Graduate School registration form must be approved by the Associate Dean for Academic Affairs.

Awarding of Grades

Grades for graduate business courses accepted by the College of Law and grades for law courses accepted by the College of Business Administration will be converted to either Satisfactory or No Credit and will not be included in the computation of the student's grade average or class standing in the college in which such grades are so converted. The College of Law will award a grade of Satisfactory for a graduate business course in which the student has earned a B grade or higher and a No Credit for any lower grade. The College of Business Administration will award a grade of Satisfactory for a law course in which the student has earned a 2.3 grade or higher and a No Credit for any lower grade. Grades earned in courses of either college may be used on a regular graded basis for any appropriate purpose in the college offering the course. The official academic record of the student maintained by the Registrar of the University shall show the actual grade assigned by the instructor without conversion.

Approved Dual Credit

MBA courses to be counted toward the J.D. program must include 9 semester hours approved by the College of Law. Law courses to be counted toward the MBA must be selected from those approved by the Director of Graduate Business Programs.

EXECUTIVE MBA PROGRAM

The executive MBA is designed for fully-employed individuals holding middle and upper level positions in organizations that wish to foster their attainment of an MBA degree for the benefit of both company and individual. This is a one-year program of three consecutive terms combining coursework on and off campus. Each term requires two residence sessions which are integrated with off-campus work in a structured program of study, case work, problem solving and analyses and applications within the participant's sponsoring organization. The off-campus work requires substantial and regular contact with program faculty and other participants.

The objective of the program is to develop executives able to lead change and enhance the success of their organizations. This program provides the context for managers to evolve their skills and perspectives from a functional focus to a broader set of strategic management skills and views that will equip them to provide leadership in a business environment that is changing rapidly in terms of global markets, information technology and workforce relationships. The curriculum utilizes the College's recognized strengths in customer value, cross-functional systems and quality and is designed to involve the participant in applying these concepts within his/her organization during the course of study.

The program consists of three 12-hour core courses and a 9-hour sequence which is a project of diagnosis and analysis of a significant strategic issue in the sponsoring organization.

Admission Requirements

All participants begin and complete the program together in one twelve-month period. Sessions will usually begin in January of each year. The deadline for applications to the executive program of the MBA is July 1 of the previous year. International students and students whose native language is not English must meet special requirements for admission to The Graduate School of UT Knoxville, and they are advised to make inquiries well in advance of the MBA program application deadline.

To be considered for admission the applicant must be proposed by his/her company or organization and must submit a complete application file. A completed file includes the Graduate School of UT Knoxville Transcripts of prior college work, the MBA program application, two completed applicant recommendation forms, and the Graduate Management
Admissions Test (GMAT) score report. The first items should reach The Graduate School one month before the MBA application deadline to allow for processing.

For admission to this program, primary consideration is given to the applicant's work history and the proposal from the sponsoring organization and to other activities that demonstrate the applicant's leadership. Other criteria include scores on the GMAT and the Test of English as a Foreign Language (TOEFL) for those whose native language is not English. There is no automatic cut-off for either grade-point averages or GMAT scores.

Curriculum

The program is taught by a core faculty of 10 professors assisted by other faculty on an ancillary basis. The core faculty develop the entire curriculum and teach it in an integrated, interdisciplinary manner.

The MBA program for executives is completed in three terms and requires registration for 15 hours in each term. The first term is comprised of Executive Core I and Management Project I; it includes two residence sessions.

The second term is comprised of Executive Core II and Management Project II; it includes two residence sessions.

The third term is comprised of Executive Core III and Management Project III. It includes two residence sessions, the first of which will be in some international venue.

The core courses are a full-term curriculum with reading and study, case work and problem solving, as well as analyses and applications within the sponsoring organization during the off-campus periods. The topics introduced within these courses follow five major themes: the functional fundamentals (learned within a cross-functional framework); the role of the firm in society (with attention to stakeholder value, economics, and the ethical and legal environment of the firm); the role of the firm in the global environment; organizational culture and change management; and personal and team development.

Students will be exposed to the assessment and delivery of customer value, statistical process control, continuous system improvement, and the role of quality in competitive organizations.

The management project, to be carried out as an independent study project, involves the diagnosis and analysis of some significant aspect in the sponsoring organization and will be based on applying major themes in the core courses. The written project and presentation to senior management and faculty serve as the comprehensive examination.

All of the off-campus work will require substantial and regular contact with faculty and other program participants.

Transfer Credits

Because of the integrated nature of the curriculum, no credit hours for courses already taken may be substituted for those in the executive program of the MBA.

Other Requirements

The Application for Admission to Candidacy must be approved by three faculty members and the Associate Dean for Academic Affairs in the College of Business Administration. It should be submitted to the Office of Graduate Admissions and Records by the end of the fourth residence session, for graduation at the end of the third term.

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 academic record 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 not later than March 1. Late applications are considered only if space is available.

Under exceptional circumstances, a student may be considered for acceptance into the Ph.D. program without having a Master's degree. An applicant in this situation should have an outstanding undergraduate background and should represent a deep and sincere commitment to the pursuit of a career in research and instruction.

Program of Study

The Ph.D. normally requires at least three years of intensive study and research beyond the Master's degree. Typically, the first two years of a student's program consist of coursework, writing, and research. The third year usually focuses on completion of the dissertation research and writing. It is emphasized that the Ph.D. program of study is structured for full-time students only. Upon acceptance of a student by a particular departmental faculty, the student is expected to remain in residence until the dissertation has been completed and all requirements are met for completion of the Ph.D.

Since the program focuses on the development of competent scholars, heavy emphasis is placed on both teaching and research skills. As part of the doctoral program, each student is required to serve as a teaching assistant to an undergraduate business class or as a research assistant to a senior faculty member. Typically, the College of Business Administration offers financial support for doctoral students during their tenure in the program.

The Ph.D. program is highly flexible, offering a wide array of concentrations and cognates. Moreover, heavy emphasis is placed on individualized instruction and close student-faculty interaction. Instruction takes the form of regular classes, seminars, and independent study and research. Students are also encouraged to attend lectures and discussions by visiting scholars throughout the year.

There are five concentrations offered in the Ph.D. program:

- Accounting
- Finance
- Management (Operations Management and Strategic Management)
- Marketing
- Logistics and Transportation

More detailed information concerning these specific areas is available by writing directly to each department chairperson and by referring to the appropriate fields of instruction.

Degree Requirements

Doctoral students must file a program of study that has been approved by their temporary doctoral advisory committee and the Associate Dean for Academic Affairs by the end of the first semester of coursework after entry into the program. 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 must complete appropriate courses at the graduate level, or other approved concentrations of coursework, in the following areas:

   - Accounting
   - Finance
   - Behavioral Science
   - Legal Environment
   - Business Policy
   - Management
   - Calculus
   - Marketing
   - Computer Science
   - Statistics
   - Economics

All work in the above areas is subject to approval by the temporary doctoral advisory committee and the Associate Dean for Academic Affairs. Specific majors may have prerequisites not listed above.

3. Basic Core: Economics 510 (or approved substitute) is required, except that Management 567 (or equivalent) may be substituted with prior approval.

4. Research Tools: A minimum of 9 semester hours of graduate research methods must be completed. At least 6 semester hours in statistics courses beyond Statistics 531 are required. The remaining 3 semester hours may be completed in additional statistics courses (not to include Statistics 531) or in other areas such as research methodology, management science, computer science, econometrics, and psychometrics.

5. Concentrations: The concentration is the focal point of the Ph.D. program. Students are expected to master the literature and research techniques in the concentration area and to do quality research as evidenced by the preparation of an acceptable dissertation. A minimum of 12 semester hours of coursework is required, including at least 9 hours of doctoral seminars. Graduate work taken in the concentration at other institutions is considered by the temporary doctoral advisory committee in approving the specific coursework required. Available concentrations are: accounting, finance, management (operations management and strategic management), marketing, and logistics/transportation. See the appropriate fields of instruction for specific course requirements.

6. A minimum of 9 semester hours of graduate coursework is required in an area outside, but complementary to, the concentration. The student may choose the cognate from one of the following: one of the five concentration business areas listed above, economics, statistics, or a related area in another school or college of the University.
Comprehensive Examinations
Comprehensive examinations over the concentration and cognate areas are required of each person seeking candidacy for the Ph.D. The comprehensive examination is administered in two sessions of approximately four hours each and the cognate area examination in one session of approximately four hours. Written examinations may be supplemented with oral examinations. For a doctoral student having a cognate area in the College of Law, the results of only an oral examination may be deemed acceptable. Scheduling of comprehensive examinations is coordinated through the Office of Graduate Business Programs. Comprehensive examinations are generally offered during the fall and spring terms. Comprehensive examinations must be taken within five years of matriculation.

When either the concentration or cognate area examination is passed, the remaining examination must be passed within the next 13 months.

Doctoral Committee
A doctoral student is advised to give serious attention early in the program to the composition of his/her doctoral committee. In accordance with Graduate School policy, the student and the major professor identify a doctoral committee composed of at least four faculty members, three of whom, including the chair, must be approved by the Graduate Council to direct doctoral research. When the doctoral committee has been formed, the temporary doctoral advisory committee ceases to exist.

Admission to Candidacy
Students may apply for admission to candidacy for the Ph.D. after maintaining at least a "B" average in coursework, successful completion of comprehensive examinations, and acceptance of a research proposal for the dissertation by the student's doctoral committee. Admission to candidacy must be approved at least one full semester prior to the date the degree is conferred. (Admission in the fall permits graduation in the following spring semester.)

Application for admission to candidacy must include a listing of all courses taken in each of the fields required for the degree (business functional areas, basic disciplines, concentration and cognate area). Graduate courses accepted from other institutions must be included. Under "Other Requirements," the date of acceptance of the research proposal by the doctoral committee should be indicated. The application must be approved by the student's doctoral committee and the Associate Dean for Academic Affairs before submission to The Graduate School.

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

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

GRADUATE COURSES

504 Core I (15) Development of roles and responsibilities of business manager. Functional fundamentals (accounting, finance, marketing, operations, human resource management) through year-long case in which knowledge is applied to solution of simulated real-world problems. Continuous systems improvement and delivery of customer value: role of firm in society (with attention to stakeholder value, economics, and the ethical and legal environment of firm). Personal leadership skills: teambuilding, written and oral communication, and assessment of students' leadership abilities. Prereq: Admission to MBA program and consent of Director of Graduate Business Programs.

505 Core II (15) Continuation of 504. Functional fundamentals through year-long case. Case-study work on organizational reality, global competition, managing technology, ethics and social responsibility, and strategic planning. Capstone integrated business simulation. Prereq: 504 or consent of Director of Graduate Business Programs.

506 Information Engineering and Management (3) Design and management of information necessary to accomplish organizational objectives using activity blueprints, entity-relationship diagrams, data base design principles, view diagrams, and ICASE (Computer-Aided Software Engineering) tools.

510 Management of Responsive Service Organizations (3) Management of organizations which respond to customer requests rather than to produce inventory: non-product economics, relationship building and management methods built on enabling, empowering, monitoring and mentoring employees as they diagnose and respond to individual customer needs.

551 Executive Core I (12) Integrated semester course: two 11-day periods in residence with studies and analyses during off-site periods. Integration of major business functions through strategic perspective, application of functional knowledge to tactical and strategic issues. Role of firm in society as it treats economic, legal, and social issues.


553 Executive Core III (12) Continuation of 552. One 11-day period and one two-week period at international site. Reading and study, analyses and applications within sponsoring organizations. Role of firm in environment: global, economic, legal and social issues. Strategic management/policy deployment topics and organizational culture, design and change management for global competition. National and international current issues. Prereq: 552. Coreq: 563.

561 Management Project I (3) Company project. Preliminary investigation of significant strategic issue (new initiative, program or significant organizational change). Work within firm under guidance of faculty member. Prereq: Admission to executive program of MBA. Coreq: 551.


599 Executive-in-Residence (3) Interaction with corporate executives from wide spectrum of business disciplines and discussion of domestic and international strategic planning as applied in major corporations. Prereq: MBA core and consent of instructor.

Chemical Engineering

(MAJOR)

DEGREES

Chemical Engineering M.S., Ph.D.

John W. Prados, Head

Professors:

Bogue, Donald C., Ph.D. Delaware

Byers, Charles H. (Adjunct), Ph.D. California

Clark, Edward S., Ph.D. California

Counce, Robert M., Ph.D. Tennessee

Crawford, Lloyd W. (UTSI), Ph.D. Cincinnati

Culberson, Oran L. (Emeritus), Ph.D. Texas

Donaldson, Terry L. (Adjunct), Ph.D.

Doss, James W. (Adjunct), Ph.D. Tennessee

Fellers, John F., Ph.D. Akron

Frazier, George C., Jr. (Condra Prof.). D.Eng.

Hansen, Marion G. Ph.D. Johns Hopkins

Hansen, Marion G., Ph.D. Alabama

Himes, John M. (Emeritus), Ph.D. Tennessee

Hsu, Hsiu-Wen, Ph.D. Wisconsin

Moore, Charles F., Ph.D. Louisiana State

Peña, Joseph J., PE, Ph.D. Northwestern

Prados, John W. (University Prof.). Rice

Scott, Charles D. (Adjunct), Ph.D. Tennessee

Thomas, Carl O., Ph.D. Tennessee

Watson, Jack S., Ph.D. Tennessee

Associate Professors:

Basararan, Osman A. (Adjunct), Ph.D. Minnesota

Bienkowski, Paul R., Ph.D. Purdue

Bruns, Duane D., Ph.D. Houston

Cochran, Henry D. (Adjunct), Ph.D. MIT

Davison, Brian H. (Adjunct), Ph.D.

Davison, Brian H., Ph.D. Cal Tech

Downs, James E. (Adjunct), Ph.D. Tenne

Ehrenberg, Joe M. (Adjunct), Ph.D.

Scott, Timothy C. (Adjunct), Ph.D. Wisconsin

Scott, Timothy C., Ph.D. Northwestern

Tose, N. (Adjunct), Ph.D. Texas

Wang, Tsoi-Wai, Ph.D. MIT

Weber, Frederick E., Ph.D. Minnesota

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

THE MASTER'S PROGRAM

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

1. A total of at least 21 hours in graduate coursework in chemical engineering and related areas excluding thesis. The minimum requirements are 15 hours in chemical engineering; 3 hours in other engineering, scientific, or business areas (as approved by the departmental faculty); and 3 hours chosen from either of these two categories.

3. Active participation in graduate seminars in the department. Resident students must register for ChE 501 every semester it is offered.
4. A final oral examination covering the thesis, related fields and graduate coursework.

**Non-Thesis Option:** Under certain conditions, a candidate may apply for a non-thesis program. To be eligible, a candidate must show evidence of significant professional experience after the baccalaureate degree; at least five years of industrial experience or research publications would be examples of such evidence. The departmental faculty will consider each application individually. Upon acceptance, the requirements for completion of the non-thesis option are as follows:

1. A total of at least 33 hours in graduate courses in chemical engineering and related areas. The minimum requirements are 18 hours in chemical engineering; 6 hours in other engineering, scientific, or business areas (as approved by the departmental faculty); and 9 hours chosen from either of these two categories.
2. Completion of a critical review of the literature and other sources in an area related to chemical engineering (ChE 580).
3. A written comprehensive examination over the major field and an oral examination covering the review paper and related areas.

**THE DOCTORAL PROGRAM**

Students applying for entrance into the doctoral program must submit evidence of ability to perform and report independent research to the satisfaction of the department. The Master’s thesis may be offered as such evidence.

Department requirements consist of the satisfactory completion of:
1. Graduate courses in chemical engineering, amounting to approximately 24 semester hours, at least 9 of which must be in 600 series courses.
2. Supporting courses in related scientific and engineering fields amounting to approximately 24 semester hours, subject to approval by the student's faculty committee. These related fields will normally include chemistry, mathematics, physics, and engineering.
3. The comprehensive examination, 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**

401 Chemical Engineering Data Analysis (3) Experimental design; identification of system variables; statistical properties of samples; empirical modeling of processes; statistical process control; optimization techniques. Sp
403 Introduction to Optimization (3) Principles and applications of optimization techniques to chemical process design; unconstrained and equality constrained optimization, linear programming, dynamic programming, and geometric programming. Prereq: Mathematics 241.
440 Transport Phenomena (3) Momentum, heat and mass transfer processes, analogies, differential and macroscopic balances, applications involving molecular diffusion, simultaneous mass transfer and chemical reaction. Prereq: 340. F
461 Advanced Process Dynamics and Control (3) Process and control system simulation and advanced industrial system design. Cascade, feedback, multi-variable, deadtime, adaptive, and nonlinear control system design. Both computer and laboratory work. Lab. Prereq: 360.
485 Hydrocarbon Processing (3) Chemical and physical properties of selected petroleum and those processes utilized in conversion of raw material into various fuels and selected chemical feedstocks. Prereq: Mass Transfer and Separation Processes, Organic Chemistry.
500 Thesis (1-15) P/NP only. E
501 Graduate Seminar (1) Prereq: Admission to graduate program. May be repeated. S/NC only. F,Sp
502 Registration for Use of Facilities (3-15) Required semester when student uses University facilities and/or capacity for a degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
505 Engineering Analysis (3) Formulation and solution of problems in chemical engineering and materials areas, ordinary and partial differential equations, ODE, PDE and solution techniques, transform methods, conformal mapping; variational methods; introduction to numerical methods. (Same as Materials Science and Engineering 505.)
506 Approximate Methods in Chemical Engineering (3) Chemical engineering problems requiring approximate solution; introduction to some approximate methods. Prereq: 505.
507 Application of Numeric Linear Algebra in Systems (3) Linear algebra concepts. Prereq: 505. (Same as Computer Engineering 507 and Mechanical Engineering 507.)
511 Advanced Chemical Engineering Thermodynamics (3) Phase equilibrium in ideal and nonideal solutes; composition relationship between phases, solution behavior and application to macromolecules; introduction to macroscopic approach to thermodynamics.
540 Fluid Mechanics and Polymer Processing (3) (Same as Materials Science and Engineering 541.)
541 Diffusive and Stagewise Mass Transfer Operations (3) Analysis of mass transfer phenomena, coupled mass transfer and reaction, mass transfer operations in packed and bubble columns, membrane separations. Equilibrium stage concepts applied to mass transfer operation, emphasizing nonisothermal and multicomponent systems.
551 Chemical Reactor Analysis (3) Rate models for heterogeneous reactions, properties of porous cata

600 Doctoral Research and Dissertation (3-15) P/NP only. E
631 Advanced Topics in Statistical Thermodynamics and Molecular Dynamics (3) Statistical thermodynamics, molecular based computer simulations, Monte Carlo and molecular dynamic calculations; applications to supermolecular macromolecules and biological systems. Prereq: 551.
642 Advanced Topics in Polymer Processing (3) (Same as Materials Science and Engineering 642.)
652 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 various levels (reactor or macro, ecological, cellular, biophysical, and molecular scales) and their effects on higher levels (community, ecosystem, and landscape). Prereq: 551.
Chemistry

(Co n College of Liberal Arts)

MAJOR DEGREES

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

Gleb Mamantov, Head

Professors:

Baker, D. C., Ph.D .................................. Ohio State
Bloor, J. E., Ph.D .................................. Manchester
Bull, William E., Ph.D ................................. Illinois
Chambers, J. O., Ph.D ................................ Kansas
Compton, R. N., Ph.D ................................. Tennessee
Dean, J. A. (Emeritus), Ph.D ......................... Michigan
Eastham, J. F. (Emeritus), Ph.D ......................... California
Fletcher, W. H. (Emeritus), Ph.D ......................... Minnesota
Grimm, F. A., Ph.D .................................. Cornell
Guliochon, G. (Distinguished Scientist), Ph.D .................. Ecole Polytechnic and Paris VI
Kabalka, G. W. (Distinguished Prof.), Ph.D .................. Purdue
Kleinfeelter, D. C., Ph.D ................................ Princeton
Kovac, J. D., Ph.D .................................. Yale
Lietzke, M. H. (Emeritus), Ph.D ......................... Wisconsin
Magid, L. J., Ph.D .................................. Tennessee
Magid, R. M., Ph.D .................................. Yale
Mamantov, Gleb (Distinguished Prof.), Ph.D .................. Louisiana State
Pagni, R. M., Ph.D .................................. Wisconsin
Peterson, J. R., Ph.D .................................. California
Schweitzer, George K. (Distinguished Prof.), Ph.D ................. Illinois
Sepaniak, M. J., Ph.D ................................ Iowa State
Smith, W. T. (Emeritus), Ph.D ......................... Ohio State
VanHook, W. A., Ph.D ................................ Johns Hopkins
Wehry, E. L., Ph.D .................................. Purdue
Williams, T. F. (Distinguished Prof.), Ph.D .................. London
Woods, C., Ph.D .................................. NC State
Wunderlich, B. (Distinguished Scientist), Ph.D .................. Northwestern

Associate Professors:

Adcock, J. L., Ph.D .................................. Texas
Alexanderatos, S. D., Ph.D ......................... California
Barnes, C. E., Ph.D .................................. Stanford
Bartmess, J. E., Ph.D ................................ Northwestern
Cook, K. D., Ph.D .................................. Wisconsin
Feigler, C. S., Ph.D .................................. Colorado
Lane, C. A., Ph.D .................................. California
Schell, F. M., Ph.D .................................. Indiana

Assistant Professor:

Shibata, J. H., Ph.D .................................. Washington
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. Eighteen additional hours in courses at the 500 level or above, including at least one course above 500 and one of the following sequences: 510-11-12, 530-31-32, 550-51-52, 570-71-72 and 590-94-95. 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, polymer chemistry, physical 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 6 to 12 hours of graduate credit in Chemistry 601. 2. Participation in seminar (Chemistry 501) during the entire period of graduate study, including the presentation of at least one seminar. 3. Prescribed remedial courses based on performance on entrance examinations. 4. Completion of the comprehensive examination series and defense of an original research proposal to give 2 hours of credit in Chemistry 601. 5. Eighteen additional hours in courses at the 500 level or above, including at least one course above 601 and one of the following sequences: 510-11-12, 530-31-32, 550-51-52-53, 570-71-72-73, and 590-94-95. 6. A final oral examination.

The Ph.D. program with concentration in chemical physics is conducted jointly with the Department of Physics. Requirements depend on the choice of the major department.

Chemistry departmental requirements include passing the above degree requirements in chemistry with concentration in physical chemistry plus 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, coordination and organometallic chemistry. Prereq: 230. Prereq or coreq: 380 or 381. Sp

431 Radioactivity and Its Application (2) Radioactive materials in tracer and therapeutic applications. Radioactive decay, detection apparatus and techniques, tracer procedures, safety precautions in agriculture, biology, medicine, nutrition. Not for credit by chemistry or physics majors or minors. Prereq: Mathematics 122 or equivalent and 1 yr of general chemistry. Sp


471-81 Biophysical Chemistry (3,3) (Same as Biochemistry 471-81)

473-83 Physical Chemistry (3,3) Students may not receive credit for both 471 and 473 nor for both 481 and 483. 473- Properties of gases: first, second, and third laws of thermodynamics, chemical equilibrium; physical phase equilibrium; mixture properties; solutions; introduction to statistical thermodynamics. 483-Kinetics of chemical reaction; introduction to quantum mechanics and applications. 1. Physical structure of atoms and molecules, molecular spectroscopy. Prereq: General chemistry, fundamentals of physics, and calculus. E

479-89 Physical Chemistry Laboratory (2,2) Experiments on topics discussed in 471-81 or 473-83. Prereq or coreq: Corresponding courses 471 or 473 for 479 and 471 or 483 for 489. F,Sp

484 Advanced Physical Chemistry (3) Chemical dynamics, statistical thermodynamics, quantum mechanics of atomic and molecular systems, crystal structure and solid state. Prereq: 481 or 483. Sp

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

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

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

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

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

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

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

520 Chemical Instrumentation (3) Principles of analog and digital systems in chemical instrumentation; practice in design and construction of chemical instruments. Prereq: Consent of instructor.

530 Chemical Bonding (3) Wave mechanical atom, group theory, valence bond theory, molecular theory, ionic, and metallic bonding, ligand field theories, solid state. Prereq: 1 yr of physical chemistry.

531 Characteristics of Inorganic Compounds (3) Descriptive chemistry of elements, structure, reactions, kinetics, mechanisms, equilibria, and spectra of coordinate...
532 Experimental Methods of Inorganic Chemistry (3) Techniques and principles in study of organic reactions; mechanisms; applications to molecular structure, stereochemistry, and reactivity. Prereq: 530. F

540 Nuclear and Radiochemistry (3) Nuclear properties, radioactivity, radioactive decay processes, nuclear reactions and properties of radioactive compounds. Prereq: 540. F

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


552 Organic Reaction Mechanisms (3) Organic reactions of current significance. Prereq: 530-31-32 or consent of instructor. F

560 Selected Topics in Inorganic Chemistry (3) Topics of current significance. Prereq: Two of 5650-51-52 or consent of instructor. May be repeated. Maximum 12 hrs.


570 Quantum Chemistry and Spectroscopy (3) Basic principles of quantum mechanics and their applications to molecular structure, spectroscopy, quantum mechanics, and fluorometry; introduction to group theory. Prereq: 1 yr of physical chemistry. F

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 chemical systems. Prereq: 1 yr of physical chemistry. F

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

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

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

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

601 Chemistry Research Proposal (2) Preparation and oral defense of original written research proposal based on thorough survey of chemical literature. Prereq: Consent of department head. S/NC only. E

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

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

650 Selected Topics in Organic Chemistry (3) Topics of current significance. Prereq: Two of 5650-51-52 or consent of instructor. May be repeated. Maximum 12 hrs.


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

690 Selected Topics in Polymer Chemistry (3) Topics of current significance. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

Child and Family Studies
(College of Human Ecology)

MAJORS DEGREES
Child and Family Studies ................................ M.S.
Human Ecology .................................................. Ph.D.

Connie Steele, Head

Professors:
Cunningham, Jo Lynn, Ph.D. .......... Michigan State
Fox, Greer L., Ph.D. ................. Michigan State
Moran, James D., Ph.D. .......... Oklahoma State
Nordquist, V. Mick, Ph.D. .......... Tennessee
Steie, Connie, E.D. ............. Texas Tech
Twardosz, Sandra (Liaison), Ph.D. .......... Kansas
White, Priscilla, E.D. .......... Tennessee

Associate Professors:
Allen, J., Ph.D. ............... Purdue
Buehler, C., Ph.D. .......... Minnesota
McInnis, Jackie H., Ph.D. .......... Florida State
Tegano, D., Ph.D. .......... Virginia Tech

Assistant Professors:
Catron, C., Ed.D. .......... Vanderbilt
Mallia, Julia, Ph.D. .......... Iowa State
Smith, Dieores, Ph.D. .......... Oklahoma State

The Department of Child and Family Studies encompasses two primary concentrations: child development and family studies. Integration of these areas creates a unique perspective for the study of individuals and families. Each graduate student pursues an individualized program of study in conjunction with a faculty committee to establish a program consistent with individual goals. All programs are characterized by a broad array of coursework, varied research experiences, and opportunities for experiences in applied settings.

Because the doctoral degree is a research degree, students at this level receive substantial preparation in statistics and research methodology. Interested students should contact the department head.

ADMISSION REQUIREMENTS
A completed file for review includes a College of Human Ecology application, Graduate Record Examination (GRE) scores for the general section, and completion of three

Graduate School Rating Forms by individuals who can attest to the potential for graduate education. Forms may be obtained from the department or Dean's Office, College of Human Ecology.

Admission to the program is contingent upon faculty evaluation of GRE scores, undergraduate/graduate GPA, rating forms, and work experience. Prerequisites for admission to the Master's or doctoral program are 9 semester hours of either upper division undergraduate or graduate social science.

THE MASTER'S PROGRAM
An individual program of study may be designed by the student in collaboration with his/her major professor and committee. The program provides for a concentration in either child development or family studies.

Specializations in the child development concentration consist of early childhood education, early childhood special education, early childhood administration, and child development. Specializations in the family studies concentration consist of family life intervention and family science. Thesis and non-thesis options are available in both concentrations. Students should also consider an interdisciplinary minor in geology to provide a lifespan perspective to human development or family studies.

All students in the child development concentration must enroll in CFS 510, 533, and 571. At least 6 hours in a cognate area outside the department must be completed. Thesis students are required to take the following: 3 hours of 500-level research methods, 3 hours of 500-level statistics, 6 hours of CFS courses in the area of concentration, 6 hours of thesis credit and an oral comprehensive examination. Non-thesis students are required to take the following: 3 hours of 500-level research methods, statistical methods, or interpretation of methods and statistics; CFS 564, 565, 9 hours of CFS courses in the area of concentration; and a written comprehensive examination.

Students in the family studies concentration must enroll in CFS 550, 571, and 540 or 560. At least 6 hours in a cognate area outside the department are required. Thesis students are required to take the following: 3 hours of 500-level research methods, statistical methods, or interpretation of methods and statistics; CFS 564, 565, 9 hours of CFS courses in the area of concentration, 6 hours of thesis credit and an oral comprehensive examination. Non-thesis students are required to take the following: 3 hours of 500-level research methods, statistical methods, or interpretation of methods and statistics; CFS 564, 565, 9 hours of CFS courses in the area of concentration; and a written comprehensive examination.

Students in the child development/early childhood licensure must enroll in College of Education courses: 574, 575, 591, and C&I 505. Thesis students are required to take the following: 3 hours of 500-level statistics; CFS 510, 512, 571, and 3 hours selected from CFS 520, 521, 522, 530, 540, 590; 6 hours of thesis credit and an oral comprehensive examination. Non-thesis students are required to take the following: CFS 570 or 3 hours of statistical methods or interpretation of methods and statistics; CFS 564, 565, 9 hours of CFS courses in the area of concentration; and a written comprehensive examination.

Students seeking the M.S. in Child and Family Studies are required to file a plan of
study with the department head after 15 hours of graduate credit have been completed.

THE PH.D. CONCENTRATION

The doctoral program in Human Ecology prepares scholars in the concentration areas of child development and of family studies. The strength of the doctoral program is based on three major components: the integration of child development and family studies within the context of human ecology and related areas, concentration in child development or family studies, and an emphasis on becoming proficient producers and consumers of research. A doctoral program that is concurrently specialized and integrative in nature reflects the complexity of the disciplinary subject matter, provides a broader context to formulate theoretical questions, and broadens the empirical literature for addressing those questions.

Requirements include:
1. Minimum 10 credits in child and family studies required foundation courses: 510, 550, 570, 571;
2. Minimum 12 credits in 500- and 600-level courses in child development or family studies, with at least 3 credits in 600-level courses (in addition to the required courses described above);
3. Minimum 6 credits in a cognate area;
4. Minimum 9 credits in graduate-level statistics; with at least 3 of these credits in a more specialized area than a sequence of survey courses;
5. Minimum 3 credits of specialized research methods;
6. Pre-doctoral research project approved by student's committee;
7. College Professional Seminar, Human Ecology 610;
8. Minimum 8 credits of electives;

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state basis. The M.S. in Child and Family Studies is available to residents of Virginia. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
510 Survey of Theory and Research in Child Development (3) Theoretical models and research literature in child development (conception through adolescence); application to research intervention and education. Prereq: 9 hrs of either upper division undergraduate or graduate social science or consent of instructor. F/A
521 Organizations/Management in Early Childhood Education (Designing, implementing, and evaluating physical and human resources in educational environments. Development of skills in environmental organization, interpersonal leadership, and supervision of staff. Prereq: 512 or equivalent or consent of instructor. F/A
522 Naturalistic Interventions for Parents and Teachers of Young Children (3) Common problems faced by parents and teachers; methods available to modify problem behavior. Prereq: 510 or equivalent or consent of instructor. F/A
530 Families of Handicapped Children (3) Developmental nature of families' experiences in caring for handicapped children, especially during infancy and early childhood. Prereq: 510 or consent of instructor.
540 Parent-Child Relations (3) Influence of parents on children, influence of children on parents, reciprocal interaction between parents and children, applications of systems models, child abuse, and impact of divorce on children. Prereq: 550 or equivalent or consent of instructor. F/A
550 Survey of Theory & Research in Family Studies (3) Research issues and literature in family studies; use of family conceptual frameworks, development of theoretical concepts and application to research and family life programs. F
552 Family in Contemporary Social Thought (3) Alternative conceptualizations of family in current social thought. Family of family construction by race, gender, and social class. Sp/A
560 Marital Dysy (3) Communication, power, sexuality, marital stability, satisfaction. Prereq: 550 or equivalent or consent of instructor. F
563 Family Life Education Programs (3) Planning, implementing and evaluating programs in marital, parent-child, and family relationships, and in family planning. Prereq: Consent of instructor. (Same as Home Economics 563.) F/A
564 Practicum in Human Development or Family Studies (3) School and community programs. Education for human development and family living. Prereq: Consent of instructor. S/NC only. E
565 Practicum in Human Development or Family Studies II (3) School and community programs concerned with education for human development and family living. Prereq: Consent of approved and supervised written project. Prereq: 564 and consent of instructor. S/NC only. E
566 Approaches to Family Intervention and Counseling (3) Various theoretical approaches for family intervention and counseling. Structural, strategic, experiential and social learning schools of practice. Effects of intervention from perspective of their impact on family functioning and communication. Prereq: Consent of instructor. (Same as Educational and Counseling Psychology 566.) Sp/A
571 Research Seminar I (1) Selection of topics in research projects. Prereq: Departmental major or consent of instructor. Prereq: 9 hrs of either upper division undergraduate or graduate social science or consent of instructor. F
574 Analysis of Teaching for Professional Development (2) (Same as Education 574.)
575 Professional Internship in Teaching (1) (Same as Education 575.)
580 Special Topics in Human Development or Family Studies (1-3) Research, theoretical, and current issues in child development or early childhood education. May be repeated with different topics. Maximum 6 hrs. E
581 Directed Study in Human Development or Family Studies (1-3) To study with the department head after 15 hours of graduate credit have been completed. May be repeated with different topics. Maximum 9 hrs. E
590 Assessment of Development and Learning in Young Children (3) Theory, empirical research and practices related to measurement of development and learning in young children. F/A
591 Clinical Studies (4) (Same as Education 591.)
600 Doctoral Research and Dissertation (3-15) P/NP only. E
610 Advanced Special Topics in Human Development or Family Studies (1-3) Study of research and theory related to current issues. May be repeated with different topics. Maximum 6 hrs. E
610 Advanced Study in Family Interaction (3) Human communication and conflict management within family context. Theoretical perspectives for familial processes, adjustment, decision making, and coping. Prereq: 550 or equivalent or consent of instructor. F/A
613 Adolescent Development in Families (3) Normative and nonnormative adolescent development: physical, cognitive, moral, social, familial, sexual, and personal growth. Prereq: 510 or equivalent or consent of instructor. F/A
622 Directed Study in Human Development or Family Studies (1-3) Advanced, in-depth individualized learning experiences in specific topics in child development, early childhood education, or family studies. May be repeated with different topics. Maximum 6 hrs. E
630 Advanced Developmental Processes (3) Sociocultural, cognitive/languge development during infancy and childhood. Normative and nonnormative development. Prereq: 510 or equivalent or consent of instructor. May be repeated with different topics. Maximum 6 hrs. F/A
631 Advanced Development of Families (3) Normative and nonnormative adolescent development: physical, cognitive, social, familial, sexual, and personality growth. Prereq: 510 or equivalent or consent of instructor. F/A
632 Advanced Study in Family Interaction (3) Human communication and conflict management within family context. Theoretical perspectives for familial processes, adjustment, decision making, and coping. Prereq: 550 or equivalent or consent of instructor. Sp/A
633 Survey Design and Analysis (3) Analysis of methods and measures used in family science research. Prereq: 550, 571, 3 hrs graduate statistics, or consent of instructor. S/NC only. Sp/A

Civil and Environmental Engineering

(Majors)

Civil Engineering ........................................ M.S., Ph.D.
Environmental Engineering ................................. M.S.
(Ph.D. through Civil Engineering)

Gregory D. Reed, Head

Professors:

Burdette, E. G. (Fred N. Peebles Prof.), Ph.D. .................................................. Illinois
Chatterjee, A., Ph.D. .............................................. NC State
Davis, W. T., Ph.D. ................................................. Tennessee
Ghosh, M. (Goodrich Chair of Excellence), Ph.D. .......................................... Illinois
Goodpasture, D. W., Ph.D. ........................................... Illinois
Greco, W. L., Ph.D. .................................................. Michigan State
Hathington, K. W. (Emeritus), Ph.D. .................................................. Northwestern
Humphreys, J. B. (Emeritus), Ph.D. .................................................. Texas A&M
Miller, W. A. (Granger Prof.), Ph.D. .............................................. Georgia Tech
Reed, G. D. (Laison), Ph.D. ....................................................... Arkansas
Robinson, R. B. (Fishier Prof.), Ph.D. ............................................. Iowa State
Tschantz, B. A. (Condra Prof.), Ph.D. ............................................ New Mexico State
Walker, C. R. (Emeritus), M.S. ...................................................... MIT
Wegmann, F. J., Ph.D. .................................................. Northwestern

Assistant Professors:
Alavian, V. (Adjunct), Ph.D ......................................................... Wisconsin
Bennett, R. M., Ph.D. ................................................................. Illinois
Drumm, E. C., Ph.D. ................................................................. Arizona
Hansen, J. H., Ph.D. ................................................................. Missouri
Hyfantis, G. J. (Adjunct), Ph.D. .................................................... Vanderbilt
Miller, T. L., Ph.D. ................................................................. Tennessee
Moore, A. B., M.S. ................................................................. Tennessee
Nappo, C. J. (Adjunct), Ph.D. ...................................................... Georgia Tech
Richards, S. H., Ph.D. ............................................................... Tennessee
Smoot, J. L., Ph.D. ................................................................. VPI
Tiry, R. F. (Emeritus), B.S. .......................................................... Marquette

Lecturers:
Corum, J. M., Ph.D. ................................................................. Illinois
Lundy, M. E., J.D. ................................................................. Tennessee
Wright, J. M., M.S. ................................................................. Tennessee

The Department of Civil and Environmental Engineering offers degrees leading to the Master of Science and Doctor of Philosophy with a major in Civil Engineering concentrating in construction engineering, environmental engineering, geotechnical/materials engineering, public works engineering, structural engineering, and transportation engineering; to the Master of Public Works Engineering, Structural Engineering, Geotechnical/Materials Engineering, with a major in Civil Engineering concentrating in construction engineering, environmental engineering, geotechnical/materials engineering, public works engineering, structural engineering, and transportation engineering; and to the Master of Science in Environmental Engineering with concentrations in water quality, water resources, air quality, mixed waste management, and waste management.

THE MASTER’S PROGRAM

The Master of Science programs in Civil Engineering and Environmental Engineering are offered to graduates of recognized undergraduate curricula.

Departmental requirements provide that for a major in Civil Engineering, the bachelor’s degree must be in civil engineering, or certain undergraduate prerequisite courses must be taken before admission to candidacy for the Master of Science in Civil Engineering.

Civil Engineering

The Department of Civil and Environmental Engineering offers two options for the Master of Science with a major in Civil Engineering.

**Thesis Option:** A minimum of 30 semester hours, including 6 hours of thesis, is required.

**Non-Thesis Option:** A minimum of 33 semester hours is required. A student's program must include at least 6 semester hours of advanced engineering design courses selected from a list provided by the student's committee.

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

**THE DOCTORAL PROGRAM**

A graduate program leading to the Doctor of Philosophy is offered in Civil Engineering.

Specific departmental requirements for the Ph.D. degree include the following:

1. A minimum of 72 semester hours beyond the bachelor's degree, exclusive of credit for the M.S. thesis. Of this number, a minimum of 24 semester hours in 600 Doctoral Research and Dissertation will be required.

2. A minimum of 24 semester hours of graduate courses in civil engineering, exclusive of thesis or dissertation credit, at least 6 hours of which must be 600-level courses.

3. Supporting courses in related scientific and engineering fields, amounting to approximately 24 semester hours, subject to approval by the student's faculty committee. These related fields will normally include such disciplines as mechanics, chemistry, mathematics, microbiology, physics, and other engineering fields. A minimum of 9 semester hours of mathematics will be required beyond the civil engineering undergraduate requirements.

4. One foreign language if the student's faculty committee feels that a reading knowledge of a foreign language is crucial to the student's research efforts.

5. Upon completion of at least one-half of all coursework, each student must pass a comprehensive examination.

6. After completion of the dissertation, prior to graduation, each student must pass a comprehensive examination administered by a faculty committee.

**ACADEMIC COMMON MARKET**

- An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. program in Environmental Engineering (concentration in air quality or waste management) is available to residents of the state of Alabama. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

**Civil Engineering**

**GRADUATE COURSES**

406 Legal and Ethical Aspects of Engineering (2)
Legal principles underlying engineering work; laws of contracts, torts, real property; problems of professional registration and ethics. Prereq: Senior standing.

421 Portland Cement and Asphallic Concrete (3)
Aggregate properties and tests, tests of Portland cement concrete, mix design methods for concrete and asphalt, concrete admixtures, tests of asphalt and asphalt mixes, and nondestructive testing. Prereq: 321, 2 hrs and 1 lab.

451 Highway Engineering (3) Design, construction, operation, and maintenance of highway facilities; application of various engineering principles and techniques to process of planning, locating and design of highway facilities; both geometric and pavement design. Prereq: 210, 251, 352.

452 Traffic Engineering (3) Characteristics of driver, vehicle, and roadway and their interrelationship; traffic studies; basic considerations of traffic circulation and control, lighting, capacity analysis, roadway side analysis, and design. Prereq: 210, 251, 352.

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

461 Analysis of Framed Structures (3) Maximum stress due to moving loads; load of influences lines; lateral forces due to earthquake and wind; analysis of portal, building frames, and space frames; matrix methods; use of computer in structural analysis. Prereq: Structural Analysis II.

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

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

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

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

494 Urban Drainage Engineering (3) Design and management of stormwater conveyance and control structures. Application of hydrologic and hydraulic principles to designs of drainage systems for urban, strip mining, and highway development; design of inlet structures, ditches, culverts, and detention/treatment basins; application of commonly used computer runoff models; evaluation of land-use on streamflow quantity and quality. Prereq: 390, 395.

495 Water Resources Development and Management (3) Principles of water resources project development planning and management. Institutional framework: water law, evaluation procedures for comparing and selecting among 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 degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

510 Urban Systems: Engineering and Management (3) Various urban systems usually under the responsibility of city manager and/or city engineer: streets, lighting, water, sewerage, refuse collection. Personnel management, finance, public relations. Prereq: 321 and 330.

530 Shear Strength and Earth Slope Stability (3) Shear strength of fine grained soil from perspective of idealized, simple clay. Drained and undrained shear strength and stress-strain behavior of real soils. Laboratory testing. Stability of natural and cut slopes and embankments. Prereq: 335.

531 Soil Stabilization (3) Mechanical stabilization of soils by compaction, drainage, and blending; chemical stabilization of soils, waterproofing and modifying soils and additives. Reinforced earth and stabilization with geosynthetics. Prereq: Introduction to Soil Behavior.


539 Geomechanics Seminar (1) Seminar topics in materials, geotechnical engineering and geomechanics. Graduate student research contributions and practical applications presented by practicing engineers from community. Prereq: Graduate standing and consent of advisor. May not apply toward degree. May be repeated. S/NC only.

540 Construction Management I (3) Management and organization of heavy and building construction projects. Prereq: Construction Methods and Equipment.

541 Construction Management II (3) Management organization of heavy and building construction projects. Prereq: Construction Methods and Equipment.

543 Construction Estimating (3) Project costs, estimating and takeoff techniques, market cost conditions, and feasibility of design to cost. Prereq: Construction Methods and Equipment.


551 Traffic Engineering-Characteristics (3) Univeerse-roadway system; traffic flow modeling; elements of transportation/highway safety. Prereq: Graduate standing.

552 Traffic Engineering-Operations (3) Signs, signals and marketing; short-term operations; controllers; signal timing/pacing; one-way reversible flow; system operations; identification of high-accident locations and system deficiencies. Prereq: 551 or 452.

553 Geometric Design and Layout of Roads and Community Facilities (3) Functional and geometric design and rural and urban roads of all classes; subdivision layout; configuration of urban roads of all classes; techniques for access control, freeway interchanges and street systems; and parking. Prereq: 451 or consent of instructor.

554 Urban Transportation Planning (3) Transportation problems in urban area; systematic planning for identifying existing and future problems; travel surveys and demand models; evaluation of transportation facilities; legislation tools; special topics: urban goods movement; transportation system management. Prereq: 352 or graduate standing.

555 Public Transit Planning (3) Characteristics of transit systems; conventional and parasystems; operational design of transit services; route planning and scheduling; cost analysis; mode choice models; performance evaluation; transit surveys; pricing and financing. Prereq: 554 or graduate standing.

558 Traffic Accident Reconstruction (3) Data collection and analysis as basis for accident prevention on control programs; roadside hard ware design and crash testing. Prereq: 450 or graduate standing.

557 Transportation Planning and Operations with Micro-Computer Applications (3) Transportation system management techniques and application of microcomputers to analysis of transportation actions. Prereq: 555.

559 Planning and Transportation (3) Preparation of transportation as elements of comprehensive development plans. Analysis of relationship between various transportation modes and between transportation and other factors. Use of criteria to establish existing travel patterns, modeling of demand, proposing alternative projects, and evaluation. Prereq: Graduate standing. (Same as Planning 537.)

561 Matrix Formulation of Structural Problems (3) Review of matrix algebra, vectors, solution techniques; direct stiffness analysis of plane structures; general concepts, and structures composed of general members. Prereq: 361.

562 Analysis and Design of Plate Structures (3) Plate bending and buckling, analysis and design of bridge and building floors and structural plate components. Prereq: 361.

563 Statically Indeterminate Structures (3) Deflections of beams and trusses; force methods; moment distribution and other displacement methods; secondary stresses. Prereq: 351.

564 Finite Element Structural Analysis (3) Application of finite element method to structural analysis; plane stress, plane strain, axisymmetric, and three-dimensional elements; use of typical computer programs. Prereq: 561.

565 Structural Dynamics (3) Analysis of free and forced vibrations, and transient response of structures having many degrees of freedom; elastoplastic behavior considered for structural systems; earthquake design and response of structures. Prereq: 561.

566 Structural Reliability (3) Application of probability theory and statistics to evaluating reliability of structures; development of safety factors and probability based design codes. Prereq: Graduate standing or consent of instructor.

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

572 Connections for Structural Steel Frames (3) Design, analysis and behavior of connections for structural steel frames. Simple, rigid and semi-rigid connections; columns bases and column splices. Prereq: 472.

573 Prestressed Concrete (3) Properties of prestressing materials, methods of prestressing, analysis and design of simple and continuous beams and slabs. Prereq: 471.

574 Behavior of Reinforced Concrete Members (3) Moment-curvature and load-deflection relationships for reinforced concrete beams; combined bending and axial load; shear and torsion; relation between research results and specifications for design. Prereq: 471.

575 Repair and Retrofitting of Structures (3) Techniques, methods, and materials for repair and retrofitting of deteriorated or over-stressed structures, foundation underpinning, retrofitting of steel fatigue failures. Prereq: 472.

588 Measurement Science I (3) (Same as Nuclear Engineering 588, Aviation Systems 588, Chemical Engineering 588, Electrical and Computer Engineering 588, Mechanical Engineering 588 and Aerospace Engineering 588.)

590 Special Problems in Civil Engineering (1-6) Enrollment limited to civil engineering students in non-thesis programs. May be repeated. Maximum 6 hrs. S/NC only. E

595 Special Topics (1-4) Problems and topics related to current developments in field. May be repeated. Prereq: Consent of instructor.

596 Special Readings (1-4) Readings related to current development in field. May be repeated.

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

637 Numerical Models for Geologic Materials (3) Numerical models to represent the stress-strain/temperature relationships for soils, rock, and concrete; nonlinear elastic models; classical plasticity models; critical state and capped plasticity models; multiple surface models; determination of parameters from laboratory tests; numerical implementation. Prereq: 530 and Engineering Science and Mechanics 539.

639 Soil Dynamics (3) Behavior of soils and soil-structure systems under time dependent loading; wave propagation in elastic media; principles of seismic reflection techniques; effects of earthquakes and vibrating machines on soils and foundations; dynamic and cyclic soil testing; determination of soil properties. Prereqs: 533, 535, and 555 or Engineering Science and Mechanics 431.

651 Analysis Techniques for Transportation Systems I (3) Analysis of trip generation, trip distribution, model split and traffic assignment, employing mathematical, statistical, and computer science techniques. State of the art and new modeling techniques. Prereq: 554 or 558.

652 Analysis Techniques for Transportation Systems II (3) Advanced topics of application of mathematic methods to transportation network modeling and analysis of transportation systems. Prereq: 651.

666 Advanced Structural Reliability (3) Monte Carlo methods, structural system reliability, random processes, dynamic loads on structures. Prereq: 561.

671 Behavior of Steel Bridges and Buildings (3) Behavior, analysis and design of plate girders, columns, and composite members subjected to static and dynamic loading. Prereq: 571.

674 Behavior of Reinforced Concrete Beams and Slabs Strength and behavior of statically indeterminate reinforced concrete beams and slabs; limit analysis; behavior, analysis, and design of reinforced concrete structures; yield line theory; finite element solutions, and ACI Code Method. Prereq: 574.

691 Special Topics in Civil Engineering (3) Selected advanced problems of current interest. Prereq: 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

508 Seminar (1) Reports on current research in environmental engineering at UTK. Prereq: Graduate standing.

510 Environmental Protection (3) Managing of water resources, wastewater, air quality, solid wastes, and hazardous materials to promote efficiency and comfort
and to safeguard balances in natural ecosystems. Prereq: Consent of instructor.

520 Open Channel Hydraulics (3) Open channel flow principles, properties, and classifications; uniform and gradually varied 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: Civil Engineering 390.

522 Floodplain and Urban Flood Management (3) Review of national, regional, and local flood problems; state of the art flood damage reduction alternatives: structural and non-structural; Institutional responses: policies, programs, organizations, regulations, and legal aspects; floodplain hydrology and hydraulics, HEC-1, HEC-2: floodway enclosure, flood hazard zone and damage potential determinations; cast studies. Prereq: Civil Engineering 390 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: Civil Engineering 390.


530 Stormwater Modeling (3) Systems approach to stormwater modeling. Hydrologic components, linear and nonlinear systems integrated into mathematical models of flow systems. Review and application of commonly used deterministic and parametric computer models. Prereq: Civil Engineering 395.

535 Ground Water Hydrology (3) Dynamics of flow and contaminant transport in porous media; hydrodynamics, dispersion, flow systems, layered soils, unsaturated flow, and groundwater contaminant transport phenomena. Analytical and numerical solution of flow and 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 applications to transportation and facilities planning, construction and operation. Prereq: Consent of instructor.

541 Remote Sensing Data Acquisition and Analysis (3) Active and passive sensors; automated analog and digital analysis and interpretation systems; image enhancement and classification techniques for color aerial photo and thermal imagery applications to environmental pollution and stress assessment. Prereq: Consent of instructor.

551 Physicochemical Unit Processes (3) Theory and design application in water and wastewater treatment. Prereq: Civil Engineering 380, and Civil Engineering 390.

552 Biological Treatment Theory (3) Theory and design application of biological processes to treatment of wastewater and solid wastes. Prereq: Civil Engineering 380. 2 hrs and 1 lab.

553 Aquatic Chemistry (3) Theoretical, applied and analytical chemistry related to generation, measurement and treatment of environmental contaminants. Prereq: Chemistry 130. 2 hrs and 1 lab.

554 Environmental Engineering Chemistry (3) Application of chemical principles in analyzing physical, chemical, or biological applications 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 waste problems; collection systems; disposal of design systems: landfill, incineration, and composting, design of resource recovery systems; current and future regulations. Prereq: Senior standing.

556 Hazardous Waste Management (3) Analysis and design of operations and processes for hazardous waste disposal and processing; regulations analysis; industrial applications. Prereq: Graduate standing or consent of instructor.

570 Air Quality Management/Pollution Control (3) Introductory course on concepts of air pollution, analysis of relationships among sound, meteorology, effects; stack sampling: emission control systems. Prereq: Consent of instructor.

571 Design of Air Pollution Control Systems (3) Design and evaluation of systems used to control emission of gaseous and 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 air quality data. Prereq: 570.

573 Sampling of Air Pollutants (3) Standard sampling methods for particulate and gaseous air pollutant emissions from industrial processes; ambient air monitoring instrumentation/techniques. Prereq: 570.

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

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/NC only.

595 Special Topics (1-4) Problems and topics related to current developments in field. May be repeated.

596 Special Readings (1-4) Readings related to current developments in field. May be repeated.

620 Advanced Surface Water Hydrodraulics (3) Advanced topics in surface water hydraulics; solutions in S. Venn equations of unsteady flow for complex channel situations; dam breach modeling. Prereq: 520.

630 Advanced Stormwater Modeling (3) Advanced topics in stormwater modeling; stormwater quality modeling; advanced applications of available stormwater computer models. Prereq: 530.

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 in air, water, and earth in solids in environment. Methods of assessing risk posed by presence of those chemicals. Prereq: 551.

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

691 Special Topics in Environmental Engineering (3) Selected advanced problems of current interest. Prereq: Consent of instructor. May be repeated.

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 departments of classical literature, and the development of background for the appreciation of Greek or Roman life and literature.

GRADUATE COURSES


405-06 Selected Readings from Greek Literature (3,3) For advanced students in Greek, plays, historical writings, poetry of ancient Greece in original Greek. Prereq: 401-402 or consent of instructor. May be repeated. Maximum 9 hrs. Sp

414 Cicero and Techniques of Latin Prose Composition (3) For advanced students in Latin, practice in prose composition, writings of Cicero the model. Prereq: 351-352 or consent of instructor. Sp

422 Seminar in Classical Studies (3) Field of classical studies today; recent achievements in areas of both philology and archaeology; impact of decipherment of Linear B; new understandings of culture and politics of "golden age" of Pericles and Augustus; classical studies and academic profession on both high school and college levels. May be repeated. Maximum 6 hrs.

431-32 Selected Readings from Latin Literature (3,3) For advanced students in Latin, oratory, historical writings, poetry of ancient Rome in original Latin. Prereq: 351-352 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 6 hrs.

462 Roman Law (3) Development of Roman law through examination of cases from writing of Roman jurists, world's first legal professionals. Understanding legal institutions in relationship to Roman society. Roman property and contract law.

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

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

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

561 Special Topics in Classical Civilization (1-3) Advanced tutorial work in Greek and Roman authors in English translation; problems in cultures of Greece and Rome. May be repeated. Maximum 9 hrs. Letter grade or S/NC.

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

(College of Communications)

MAJOR

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

Professors:
Ashdown, Paul G., Ph.D............. Bowling Green
Crook, James A., Ph.D.............. Iowa State
Everett, George A., Ph.D............ Iowa
Howard, Herbert H. (Liaison), Ph.D. Ohio
Littmann, Mark, Ph.D. .............. Northwestern
Miller, M. Mark, Ph.D............... Michigan State
Singletary, Michael W., Ph.D....... Southern Illinois
Swan, Norman R., Ph.D............. Missouri
Taylor, Ronald E., Ph.D............. Illinois

Associate Professors:
Bower, Dorothy, Ph.D. ............... Wisconsin
Caudill, C. Edward, Ph.D. .......... North Carolina
Hovland, Roxanne, Ph.D. .......... Illinois
Hoff, Barbara A., Ph.D. ............. Ohio
Stankiev, Michael J., Ph.D. ......... Illinois
Ziegler, Diya, Ph.D. ................. Southern Illinois

Assistant Professors:
Buchman, Joseph, Ph.D. .......... Indiana
Hoy, Maria, Ph.D. ................. Oklahoma State
Lucarelli, Susan M., Ph.D. ...... Tennessee

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: Assistant Dean for Graduate Studies, College of Communications, 426 Communications Building, The University of Tennessee, Knoxville, TN 37996-0347.

ADMISSION REQUIREMENTS

Applicants must meet admission requirements of The Graduate School. In addition, they must complete the Graduate Record Examination, rating forms, and application forms as required by the College of Communications. Minimum requirements for admission to full potential candidate status normally include a 3.0 (4.0 system) grade-point average in undergraduate studies and scores above the fiftieth percentile in verbal and quantitative aptitude on the Graduate Record Examination. All application materials are screened by an admissions committee authorized by the faculty of the College of Communications.

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

A baccalaureate degree in communications or a related field is recommended. Admission is possible with other baccalaureate degrees. However, all applicants without the appropriate background are required to take up to 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 Master's or Doctoral Committee of the College of Communications.

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

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs offered by the University of Tennessee at Knoxville. The M.S. program is available to residents of Arkansas, Kentucky, and Louisiana. The Ph.D. program in Communications is available to residents of the states of Florida, Georgia, Kentucky, Louisiana, Maryland, South Carolina, Virginia, or West Virginia. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

ACADEMIC STANDARDS

A student in the College of Communications whose graduate grade-point average, not including incomplete grades, is below 3.0 at any time after the end of 12 hours of graduate credit will be placed on probation. A student on probation will be dropped from the program unless his or her cumulative graduate grade-point average is 3.0 or higher at the end of the probationary period. The probationary period is defined as the next 12 semester hours of graduate coursework attempted that is specified in the student's degree program. Exceptions to this policy may be made only with the approval of the Assistant Dean. For the College of Communications on the recommendation of the student's faculty committee.

THE MASTER'S PROGRAM

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

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

Degree Requirements

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

1. Ten hours of core courses—Communications 510, 512, 540, and 550, the first three of which must be taken during the first two semesters of the student's program, except with written approval of the Assistant Dean for Graduate Studies for the College.
2. Twelve hours within one department of the college, at least 6 hours at the 500 level or above. An internship, if needed, is included.

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), including a thesis seminar, 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, or Journalism 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 subsequence 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.

After completion of the formal program of coursework and research for the thesis option, the student must pass an oral examination conducted by his/her graduate committee. The non-thesis option requires a written comprehensive examination and an oral defense of the project.

THE DOCTORAL PROGRAM

The Ph.D. with a major in Communications is intended to prepare scholars for teaching, research, administration, and service in the field of mass communications.

The program is interdisciplinary, consisting of a required core curriculum and recommended courses outside the College in the related social and behavioral sciences. The program is flexible and will accommodate a wide variety of career goals in communications. New students may be admitted to the program at any time; however, core courses begin only in the fall semester. The Master's degree is not required for entry into or completion of the doctoral program.

Program planning, however, will permit the Master's degree to be earned if desired. Students lacking academic or professional experience in communications will be required to take prerequisite courses. In general, however, the program may be completed within three academic years of full-time study beyond the Bachelor's degree. Those holding Master's degrees should anticipate two or more years of full-time study for completion of the Ph.D.

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

1. A 3.0 (4.0 system) grade-point average in undergraduate studies, or 3.5 for graduate work if applicant holds a Master's degree;
2. above the fiftieth percentile in verbal and quantitative aptitude on the Graduate Record Examination;
3. endorsement by at least three former teachers or professional colleagues; and
4. a statement of the applicant's goals and reasons for pursuing the doctorate. Personal interviews with members of the Ph.D. Admissions Committee are recommended and may be required. Professional experience in some field

Communications 73
of communications is a highly desirable criterion for admission.

A minimum of 88 hours of approved graduate work is required for the Ph.D.

1. Twenty-eight hours of core courses--

   Communications 610, 612, 620, 640, 641; 6 hours of statistics*; and three of the following courses: Communications 622, 632, 642, 652, and 692.

2. Fifteen hours in a primary concentration (advertising, broadcasting, journalism, public relations, or speech communications).

3. Twelve hours in a secondary concentration (outside the College of Communications).

4. Nine hours of electives*.

5. Twenty-four hours of dissertation.

*Specific courses to be taken require the approval/consent of student's advising committee.

Admission to candidacy must be attained at least two semesters prior to graduation and requires successful completion of a written comprehensive examination.

Each doctoral student's progress will be reviewed annually by the Doctoral Committee of the College of Communications. Results will be reported to the student by his/her program advisor, who will convey the committee's recommendation concerning the student's remaining in the program (non-binding) and suggestions for improvement in performance.

Candidates without prior teaching experience must register for Communications 521, 522 in Communications Teaching.

Planned course offerings in the College of Communications for a full calendar year are published the preceding November. This information is available from the Dean's Office, 302 Communications Building, 974-3031. See also courses listed under Advertising, Broadcasting, and Journalism.

GRADUATE COURSES

400 Mass Communications Law and Ethics (3) Legal issues directly affecting the mass media: libel, privacy, free press-fair trial, judicial controls, governmental regulations. Ethical standards and practices of mass media in America. Prereq: Writing for Mass Communication or consent of instructor. E

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

502 Registration for Use of Facilities (3-15) Required for 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 Orientation to Master's Studies (1) Degree and thesis requirements. Committee formation and program planning. Overview of research methods and information sources. Prereq: Consent of instructor or admission to program. S/NC only. F

512 Fundamentals of Media Research (3) Applications of communication research techniques for management. Gathering and analysis of data for assessing media audiences and message impacts. Prereq: Consent of instructor or admission to program. Sp

521 Tutorial in Communications Teaching (1) Experience as teacher under guidance of faculty member. Prereq: Consent of instructor. S/NC only. E

540 Theory for Media Management (3) Selected research hypotheses and theories in literature of mass communications, managerial decision-making. Prereq: Consent of instructor or admission to program. F

550 Seminar in Media Economics and New Technology (3) Electronic and print media ownership, finance and corporate structure. Roles of new technologies and marketing techniques in changing media content and function in future. Prereq: Consent of instructor or admission to program. Sp

560 Seminar in Communications Management (3) Organizational structure and functions of communications corporations; development of objectives, strategies, and tactics. Analysis of financial statements and case studies. Computer-intensive.

590 Project (3) Capstone project under guidance of faculty. Application of principles from previous coursework. S/NC only.

592 Seminar in Mass Communications Issues (3) Contemporary topics in communications. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

597 Independent Study (3) Reading, research or projects on special topics in communications. On individual basis, under faculty supervision. Consent may be repeated. Maximum 6 hrs. E

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

610 Orientation to Doctoral Research (1) Degree and dissertation requirements. Committee formation and program planning. Overview of research methods and information sources. Prereq: Consent of instructor or admission to program. S/NC only. F

612 Fundamentals of Communications Research (3) Universal research process from defining ideas and problems to reporting results. Causal inference and relative strengths of various research designs. Fundamentals and specific applications of most common data-gathering and measurement techniques in communications research. Experimental, survey, content analysis, and experimental techniques. Prereq: Consent of instructor or admission to program. E

620 Seminar in Mass Communications Education (3) Role and scope of mass communications teaching unit, historical perspectives of curricular trends. Teaching methods and instructional objectives; classroom testing and measurement; design of professional curricula, research and extension; program evaluation; grants and contracts in research. Prereq: Consent of instructor or admission to program. Sp

622 Quantitative Research (3) Techniques for evaluation of research design and research measurement. Survey, content analysis, and experimental techniques. Assessment of reliability and validity. Data analysis, hypothesis testing, and inference strategies. Prereq: 612. F

632 Mass Communications History and Historiography (3) Origins and development of mass media in America. Philosophies of history. Historical sources and methods of historical research. Prereq: Consent of instructor or admission to program. F

640 Mass Communications Theory I and II (3) Selected research hypotheses, and theories in literature of mass communication theory. Prereq: Consent of instructor or admission to program. S

641 Mass Communications Theory II (3) Selected topics in theory. Critical evaluation of current theories, derivation of hypotheses, and advanced theory construction. Prereq: 640. Sp

642 Qualitative Research (3) Theory and application of qualitative research methods to social science and communications research. Theoretical considerations underlying symbolic interactionism as translated into research strategies of participant observation, life history, interviewing, archival analysis and case studies. Prereq: 612 or consent of instructor. S

652 Mass Communications Law and Legal Research (3) Legal restrictions under which mass media operate. Finding, interpreting, and organizing sources of legal information. Prereq: 612 or consent of instructor. Sp

692 Advanced Topics in Communications Theory and Methodology (3) Advanced study of communication issues, theories, and methods. May use quantitative, qualitative, historical, and experimental techniques. May be repeated. Prereq: 622, 632, 642 or 652 or consent of instructor. Sp

ADMISSION REQUIREMENTS

General Requirements

Admission requirements of The Graduate School of UT Knoxville apply. In addition, all applicants must furnish three letters of recommendation from individuals who are familiar with their scholastic or professional records.

Requirements for Admission to the Master of Science Degree Program

Applicants must have a baccalaureate degree with coursework in chemistry through organic, mathematics through calculus, physics, and basic biology. More advanced study in

Comparative and Experimental Medicine

(Office of the Vice Chancellor for Academic Affairs)

MAJOR

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

L. N. D. Potgieter, Director

Joint Graduate Coordinating Committee:

Fuhr, J. E., Ph.D., Medical Biology
Lawler, J. E., Ph.D., Psychology
Lozzio, C., M.D., Medical Biology
Potgieter, L. N. D. (Liaison), Ph.D., Veterinary Teaching Hospital
Sims, M. H., Ph.D., Veterinary Teaching Hospital

The Comparative and Experimental Medicine 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 pathology, immunopathology, hematology, infectious diseases, aberrant metabolism, oncology, and genetic disorders. The Ph.D. program is open to approved graduate students seeking training in this area and is especially useful for individuals with professional degrees. For the student with undergraduate biological science background, the Comparative and Experimental Medicine program provides an unusual opportunity to study disease processes common in humans and animals from a multidisciplinary perspective. The scope of this intercollegiate program, which pools faculty resources from both veterinary and human medicine, is broadened by faculty members representing animal science and numerous areas of the life sciences. The interdisciplinary training environment includes such diverse support as facilities and personnel at the Veterinary Teaching Hospital, the Oak Ridge National Laboratory, Knoxville Zoological Park, Hemophilia Clinic, Developmental and Genetic Center, Pharmacokinetics Laboratory, Clinical Virology, Clinical Parasitology, Inflammation Research Laboratory, Hematology and Oncology services, and departments of life sciences.

For specific course listings, see Veterinary Medicine and Medical Biology under Fields of Instruction.
biology such as biochemistry, mammalian anatomy, histology, cell biology, or other appropriate biomedical courses from an accredited university is recommended. Applicants for admission to the Master of Science degree program whose background include no formal training in the biomedical field beyond the baccalaureate degree will be required to score at least 1,000 on the quantitative and verbal portions of the Graduate Record Examination.

Requirements for Admission to the Doctor of Philosophy Program

Applicants generally will be expected to have a Master's degree in one of the biological sciences or a professional degree in one of the medical sciences, (e.g., M.D., D.D.S., Ph.D., D.V.M.). An individual having a baccalaureate degree with a strong background in the physical and biological sciences may be admitted upon presenting evidence of exemplary performance on the Graduate Record Examination.

Exceptional veterinary students at UT Knoxville may be enrolled in the Comparative and Experimental Medicine graduate program but will be listed officially as veterinary students. Such students may take advantage of enlisting in graduate courses during summers and as elective courses in the veterinary program.

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

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. and Ph.D. programs in Comparative and Experimental Medicine are available to residents of the state of Kentucky. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

Computer Science

(College of Liberal Arts)

MAJOR DEGREES

Computer Science M.S., Ph.D.

Jesse H. Poore, Head

Professors:


Associate Professors:

Case, Jeffrey D., Ph.D. Illinois Leuze, Michael R., Ph.D. Purdue MacLennan, Bruce J., Ph.D. Purdue Whitehead, Bruce (UTSI), Ph.D. Michigan

Assistant Professors:

Beck, Micah, Ph.D. Cornell Berry, Michael W., Ph.D. Illinois Blair, Jean R. S., Ph.D. Pittsburgh

Booth, Heather D., Ph.D. Princeton Gregory, Jens, Ph.D. Aalborg (Denmark) Mehta, Dinshah (UTSI), Ph.D. Florida Plank, James S., Ph.D. Princeton Plank, John Q., Ph.D. Stanford Straight, David W., Ph.D. Texas Vanden Zande, Bradley, Ph.D. Cornell Vose, Michael E., Ph.D. Texas

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 System Programming are required for admission. For the master's degree, 30 semester hours of graduate credit are required, of which more than 60 percent must be at the 600 level or above. Graduate 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-level Thesis. Six hours of 500 Thesis may count in the 24-hour requirement at the 500 level or above.

Non-Thesis Option

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

Master's Minor in Computer Science

The graduate minor consists of 511 or its equivalent plus an additional 6 hours of 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 (e.g., college teachers or employers, for whom the student has worked after earning a Bachelor's degree). The department reserves the right to contact these individuals or other knowledgeable people if additional information is deemed necessary or desirable.

2. The student is expected to have taken the GRE verbal and quantitative general test within the past three years and to have these scores sent to The Graduate School.

3. The student should satisfy the same background requirements as for the Master's program. See the departmental brochure for details.

Original research reported in a dissertation of high quality is emphasized. The minimum hour requirements are 24 hours of course 600 Doctoral Research and Dissertation and 24 hours of graduate courses beyond the equivalent of a master's degree (i.e., beyond 30 graduate credit hours) graded A-F. Computer Science 530, 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.

GREAT CouseS

420 Advanced Topics in Machine Intelligence

430 Advanced Topics in Hardware Systems

460 Advanced Topics in Software Systems

470 Advanced Topics in Scientific Computation

471 Numerical Analysis

472 Numerical Algebra

480 Advanced Topics in Theoretical Computer Science

521 Artificial Intelligence

522 Cybernetics

523 Machine Learning

525 Software Engineering

530 Computer Systems Organization

532 Boolean Algebra, Logic Design and Microprocessors

540 Advanced Topics in Machine Intelligence

550 Computer Architecture

560 Advanced Topics in Computer Science

570 Numerical Methods

580 Numerical Analysis

590 Advanced Topics in Theoretical Computer Science

600 Advanced Topics in Scientific Computation

620 Artificial Intelligence

622 Cybernetics

623 Machine Learning

625 Software Engineering

630 Computer Systems Organization

640 Advanced Topics in Machine Intelligence

650 Computer Architecture

660 Advanced Topics in Computer Science

670 Numerical Methods

680 Numerical Analysis

690 Advanced Topics in Theoretical Computer Science

700 Artificial Intelligence

710 Cybernetics

720 Machine Learning

730 Software Engineering

740 Computer Systems Organization

750 Advanced Topics in Machine Intelligence

760 Computer Architecture

770 Advanced Topics in Computer Science

780 Numerical Methods

790 Numerical Analysis

800 Advanced Topics in Theoretical Computer Science

810 Artificial Intelligence

820 Cybernetics

830 Machine Learning

840 Software Engineering

850 Computer Systems Organization

860 Advanced Topics in Machine Intelligence

870 Computer Architecture

880 Advanced Topics in Computer Science

890 Numerical Methods

900 Numerical Analysis

910 Advanced Topics in Theoretical Computer Science

920 Artificial Intelligence

930 Cybernetics

940 Machine Learning

950 Software Engineering

960 Computer Systems Organization

970 Advanced Topics in Machine Intelligence

980 Computer Architecture

990 Advanced Topics in Computer Science

1000 Numerical Methods

1010 Numerical Analysis

1020 Advanced Topics in Theoretical Computer Science

1030 Artificial Intelligence

1040 Cybernetics

1050 Machine Learning

1060 Software Engineering

1070 Computer Systems Organization

1080 Advanced Topics in Machine Intelligence

1090 Computer Architecture

1100 Advanced Topics in Computer Science

1110 Numerical Methods

1120 Numerical Analysis

1130 Advanced Topics in Theoretical Computer Science

1140 Artificial Intelligence

1150 Cybernetics

1160 Machine Learning

1170 Software Engineering

1180 Computer Systems Organization

1190 Advanced Topics in Machine Intelligence

1200 Computer Architecture

1210 Advanced Topics in Computer Science

1220 Numerical Methods

1230 Numerical Analysis

1240 Advanced Topics in Theoretical Computer Science

1250 Artificial Intelligence

1260 Cybernetics

1270 Machine Learning

1280 Software Engineering

1290 Computer Systems Organization

538 Computer Networks (3) Design and operation of networks. Hardware and software systems; communications Subsystems. Prereq: System Programming and 532.


544 Information Storage and Retrieval (3) Organization, storage and retrieval of bibliographic data; analysis of commercial IR system; information analysis and automatic dictionary and thesaurus construction; statistical and syntactic approaches to content analysis. 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: Digital design and probability or statistics.

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


571-72 Numerical Mathematics (3) (Same as Mathematics 571-72.)

573 Finite Difference Methods for Partial Differential Equations (3) (Same as Mathematics 573.)

574 Finite Element Methods (3) (Same as Mathematics 574.)

575 Matrix Theory and Techniques in Numerical Analysis (3) (Same as Mathematics 575.)

576 Sparse Matrix Computations (3) Solution of large sparse linear systems: graph models, reordering techniques, symbolic factorizations, data structures, numerical algorithms, complexity analyses, parallel algorithms. Prereq: Numerical linear algebra.

580 Foundations (3) Finite automata and regular sets, push-down automata and context-free languages, Turing Machines, recursively enumerable sets, undecidability, Cook's theorem and NP-completeness. Prereq: Discrete Structures.

581 Design and Analysis of Algorithms (3) Analysis of algorithms and relevance of analysis to design of efficient computer algorithms. Sorting, searching, graph algorithms, pattern matching, dynamic programming, efficient approximation algorithms.

586 Computability and Computational Complexity (3) Computability by abstract devices, recursively enumerable sets, decidability, NP-completeness, polynomial-time hierarchy. Prereq: 580.

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

594 Special Topics in Computer Science (1-3) May be repeated.

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

620 Advanced Topics in Intelligent Systems (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

630 Advanced Topics in Computer Systems (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

640 Advanced Topics in Databases/Information Retrieval (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

650 Advanced Topics in Pattern/Image Analysis (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

660 Advanced Topics in Software Systems (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

670 Advanced Topics in Numerical Mathematics (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

680 Advanced Topics in Theory and Foundations (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

690 Advanced Topics in Computer Science (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

Curriculum and Instruction

(College of Education)

MAJOR DEGREES

Curriculum and Instruction ... M.S., Ed.S., Ed.D. Education............................. Ph.D.

J. Estill Alexander, Head

Professors:
Alexander, J. Estill (Liaison), Ed.D., ... Kentucky
Allison, C. B., Ph.D............................ Oklahoma
Bellon, Jerry J., Ed.D.......................... California
Blank, Kermit J., Ph.D. ....................... Ohio State
Butefish, William L., Ed.D. ................ Texas Tech
Christensen, Mark A., Ph.D. ............... Kansas
Davis, A. R., Ph.D. ............................ Ohio State
Dessert, Donald J., Ph.D. ................. Maryland
Doak, E. Dale, Ed.D. ......................... Colorado
Frandsen, Henry, Ph.D. ..................... Illinois
French, R. L., Ph.D. .......................... Ohio State
Hipple, Theodore W., Ph.D. ................ Illinois
Huff, P., Ph.D. ............................... Ohio State
Hull, H. N., Ed.S. .............................. Peabody
Jost, Karl J., Ed.D. ........................... Oklahoma
Knight, Lester N., Ph.D. .................... Texas
Mallak, Anand, Ed.D. ....................... Columbia
Mays, N., Ph.D. ............................... Southern Illinois
McIntyre, Lonnie B., Ed.D. ............... Indiana
Myer, M. E., Ph.D. ............................ Florida
Ray, John R., Ed.D. ........................... Tennessee
Roeseke, C. E., Ph.D. ....................... Ohio State
Rowell, C. Glennon, Ed.D. ............... George Peabody
Turner, T. N., Ed.D. ........................ Penn State
Wisniewski, Richard, Ed.D. .............. Wayne State

Associate Professors:
Cagle, Lynn C., Ed.D. ....................... Georgia
Chance, Charles A., Ph.D. ................. Ohio State
DeMarras, Kathleen, Ed.D. ................ Cincinnati
Grant, A. D., Ph.D. ........................... Wisconsin
Hatch, J. Amos, Ph.D. ...................... Florida
Hodge, R. L., Ph.D. ........................... Texas
Ryan, Thomas K., Ed.D. .................. Ball State
Watkins, J. Paul, M.S. ...................... Tennessee
Wiley, Patricia D., Ed.D. ................. Houston

Assistant Professors:
Bardon, Laura M., Ph.D. ................... Maryland
Hendricks, D. A., Ph.D. ..................... Alabama

Graduate programs are designed to improve scholarship and educational competence in a number of areas leading to the Master of Science, the Specialist in Education, the Doctor of Education, and the Doctor of Philosophy with a major in Education.

THE MASTER'S PROGRAM

The department offers two tracks for the Master's degree. Track 1 is for students who are already certified to teach in a curriculum and instruction discipline area or those who are seeking a Master's degree without certification. Track 2 is for students seeking initial licensure. Thesis and non-thesis options are available for both tracks.

Track 1 - Concentrations are available in art education, curriculum and instruction, English education, foreign language education, instructional media and technology, mathematics education, reading education, science education, social foundations, and social science education. The non-thesis option requires the completion of 30 hours of coursework. The thesis option requires the completion of 30 hours, including 6 hours of Thesis 500.

Specific requirements for the concentration in art education are: For the thesis option, Art Education 510, 520, and 593; 3 hours of 500-level elective courses in art history; 3 hours of 400- or 500-level elective courses in studio art; C & I 517, 520; 3 hours selected from C & I 511, 526, 542, 543, 544, 535, 558, 569, or 588 and 6 hours of Art Education 500. The non-thesis option requires Art Education 510, 520, 593 and 590; 3 hours of 500-level elective courses in art history; 6 hours of 400- or 500-level elective courses in studio art; C & I 517, 520; 3 hours selected from C & I 511, 526, 542, 543, 544 and 533 and 3 hours selected from 535, 558, 569 or 588. The non-thesis option culminates in an exhibition of original works of art produced under the direction of art and art education faculty, accompanied by a written analytical and critical essay. This essay must include a philosophical statement, an explanation of process and media for each work presented, and a compositional analysis of each work.

Track 2 - Concentrations are available in art education, elementary teaching and in secondary teaching. For art education, the non-thesis requirements are Art Education 510, 520, 550, and 540; Education 574, 575, 591; C & I 517 and 3 hours selected from C & I 511, 526, 542, 543, 544, 536, 558, 569 or 588 for a total of 36 semester hours. For elementary or secondary teaching, the non-thesis requirements are Education 574 and 591, 6 hours; Internship, 12 hours; specialty methods, 6 hours; and 12 hours of electives as approved by the student's committee, for a total of 36 hours. The thesis option for all concentrations requires 6 additional hours of Thesis 500 for a total of 42 hours.

For both tracks, a comprehensive written examination is required. An oral exam is given over the thesis.

THE SPECIALIST PROGRAM

The Educational Specialist degree program with a major in Curriculum and Instruction encompasses concentrations in the following areas: curriculum, elementary education, English education, foreign language education, instructional media and technology, mathematics education, reading education, science education, social education, social science education.
THE DOCTORAL PROGRAM

The Ed.D. program in Curriculum and Instruction may include concentration upon the following fields: curriculum, social foundations, educational research, elementary education, English education, foreign language education, mathematics education, reading education, science education, social science education.

The Doctor of Philosophy with a major in Education includes concentrations and specializations as listed under Education.

For further information, write the Department of Curriculum and Instruction.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. program (concentration in foreign language education only) in Curriculum and Instructor is available to residents of the state of Louisiana. The Ed.S. program (concentration in reading education only) in Curriculum and Instructor is available to residents of the state of South Carolina. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

Art Education

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E
502 Registration for Use of Facilities (3-15) Required in the Office of Graduate Admissions and Instructor
519 Educational Specialist Research and Thesis (2) May be repeated. Maximum 4 hrs. P/NP only. E
520 Techniques of Research in Education (3) Study and application. May be repeated. Maximum 6 hrs. S/NC only. E
524 Teaching for Creative Thinking and Expression (3) Concentration in kindergarten curriculum. May be repeated. Maximum 6 hrs. S/NC only. E
527 Elementary School Curriculum (3) Examination, development and use of materials for creating active learning environment. Prereq: 443 or equivalent course or consent of instructor. F
528 Techniques of Research in Education (3) Study and application. Prereq: previous course in teaching of social studies or consent of instructor. Sp
530 Production and Critical Analysis of Art (3) Relationship of production and critical analysis of works of art to discipline-based art education.
540 Instructional Materials and Production Related to the Teaching of Art (3) Development and use of instructional aids concerned with all aspects of teaching art: videotapes, audiotapes, slides, charts, and learning packs.
589 Special Topics in Art Education (3-6) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E
589 Independent Study in Art Education (3-6) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

Curriculum and Instruction

GRADUATE COURSES

404 Problems in improvement of Instruction (1-3) Special conferences, workshops, or in-service programs. May be repeated. Maximum 6 hrs. S/NC only. E
421 Elementary and Middle School Science and Social Studies Instruction (3) Methods and materials for teaching science and social studies. Development of functional relationships and entities of two fields. Not open to students with recent course or background in teaching science and social studies. Prereq: Admission to teacher education. F, Sp
422 Elementary and Middle School Teaching Methods (6) Methods and materials (knowledge base) for teaching reading, language arts, mathematics, science, and social studies, content and curricula overview. Unit planning, daily planning, evaluation, etc., and language and concept development.
429 Language Arts Reading Instruction in Elementary and Middle Schools (3) Language and language development as applied to teaching of oracy (listening-speaking) and aspects of literacy (reading process/reading and writing). Prereq: Consent of instructor. F, Sp
430 Elementary and Middle School Developmental Reading Instruction (3) Word recognition (including phonics), comprehension, evaluation, and materials. Prereq: Admission to teacher education. F, Sp
434 Topics in Reading Education (1-6) Prereq: Admission to teacher education and course in reading education. May be repeated. Maximum 6 hrs. E
443 Elementary and Middle School Mathematics Instruction (3) Prerequisites for helping children learn mathematics. Unit planning, daily planning, grouping, general factors related to classroom management. Prereq: Admission to teacher education. May be repeated. Maximum 6 hrs. E
451 Education in Cultural Perspective (3) Contribution of anthropological concepts (primarily concepts of culture) to understanding of education processes, problems, and thought in our society and others.
454 Teaching Strategies and Issues in Social Studies (3) Objectives, techniques, materials, and evaluation; directed observation in public schools, preparation of teaching plans and materials, simulated teaching experiences. Prereq: Admission to Teacher Education Program.
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 Program.
459 Teaching English in the Secondary School (3) Techniques of teaching composition, language, and literature. Prereq: Admission to Teacher Education Program.
460 Teaching Reading and Literature in the Secondary School (3) Approaches for teaching basic reading skills and ways of teaching literature. Sp
461 Developing Reading Skills in Content Fields (3) Techniques for teaching reading and study skills in content areas of school program. Extensive assessment of textbooks. Middle school and high school. E
475 Utilization of Instructional Media (3) Basic concepts of communication and instructional development for improving instruction through use of media. (Same as Library and Information Science 475). E
485 Teaching Mathematics, Grades 7-12 (3) Preparation of teaching plans, evaluation, materials for teaching mathematics; teaching simulation and directed observation in schools. Prereq: Admission to Teacher Education Program.
486 Introduction to Instructional Computing (3) Classroom uses of computers, applications for teachers, overview of computer operation and software for teachers of all grades. F, Sp
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, Sp
502 Registration for Use of Facilities (3-15) Required in the Office of Graduate Admissions and Instructor
505 Elementary and Middle School Teaching Methods (6) Content area teaching and development of students to apply methods. Prereq: 422. Coreq: 575.
507 Teaching Poetry Grades 7-12 (3) Research and theory in application to teaching of poetry. Design of special conferences, workshops, or in-service programs. Prereq: Consent of instructor. Sp
509 Teaching Fiction in the Secondary School (3) Teaching novels and short stories. Sp
515 Seminar (1-3) Curriculum, instructional technology, elementary education, secondary education, or social foundations as related to goals of students' programs. May be repeated. Maximum 6 hrs. S/NC only. E
516 Seminar (1-3) Curriculum, instructional technology, elementary education, secondary education, or social foundations as related to goals of students' programs. May be repeated. Maximum 6 hrs. S/NC only. E
517 Seminar (1-3) Curriculum, instructional technology, elementary education, secondary education, or social foundations as related to goals of students' programs. May be repeated. Maximum 6 hrs. S/NC or letter grade. E
518 Educational Specialist Research and Thesis (2) May be repeated. Maximum 4 hrs. P/NP only. E
519 Educational Specialist Research and Thesis (2) P/NP only. E
520 Techniques of Research in Education (3) Study and application.
521 Teaching Social Studies in Elementary and Middle Schools (3) Planning and techniques. Trends in curriculum, employment of concepts, materials and generalizations, integration of social sciences. Prereq: Course in teaching of social studies or consent of instructor. Sp
522 Teaching Mathematics in Elementary and Middle Schools (3) Instructional strategies for helping elementary school children learn mathematics. Examination, development and use of materials for creating active learning environment. Prereq: 443 or equivalent course or consent of instructor. F
523 Diagnosis and Correction of Children's Difficulties in Learning Mathematics (3) Children's difficulties in learning mathematics and procedures for helping classroom teacher correct difficulties. Prereq: 522 or equivalent course or consent of instructor. F
525 Strategies, Programs and Materials for Teaching Elementary Social Studies (3) Analysis of new and innovative social studies program materials and techniques. Exploration of current trends in social studies education. Prereq: Previous course in teaching of social studies or consent of instructor. Sp
526 Philosophy of Education (3) Truth, knowledge, and valuation in relation to work of schools. F
527 Elementary School Curriculum (3) Examination, evaluation and application of curriculum designs in ele-
mentary school. Trends and issues which affect elementary education. Prereq: Consent of instructor. F, Su.

528 Teaching Language Arts Elementary and Middle School (3) Recent trends and current materials and methods in teaching elementary language arts (except reading). Prereq: Course in language arts or consent of instructor. Sp, Su.

529 Practicum in Diagnosis and Remediation of Difficulties in Learning Mathematics (2) Assessment and practicum experience with children having difficulties in learning elementary school mathematics. Prereq: 523 or consent of instructor. May be repeated. Maximum 4 hrs. Sr.

530 Teaching Reading in Elementary and Middle Schools (3) Trends in methods, materials, basic approaches to skill development and assessment procedures for teaching reading at elementary school level. Prereq: Course in teaching of reading or consent of instructor. F, Su.

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. F.

532 Instructional Research: Analysis and Application (3) Analysis of research on instructor. Translation and application of research findings into instructional performance. Prereq: Consent of instructor. F, Su.

533 Reading in Middle and Secondary Schools: Research and Theory (3) Analysis of components of effective secondary school reading programs. Attention to research and theoretical bases. Prereq: Course in reading education or consent of instructor. Sr.

534 Seminar in Reading Education (1-6) May be repeated. Maximum 6 hrs. E.

535 Curriculum Evaluation and Program Improvement (3) Historical background and importance of educational evaluation in relation to curriculum development. Understanding systematic curriculum evaluation approach and applying it to improve program development and implementation. Prereq: Consent of instructor. E.

536 Psychology of Reading (3) Reading act, relationship between learning theory and reading, role or reading in child's overall intellectual development. Affective and cultural factors. Prereq: 500-level courses in reading education or consent of instructor. F.

537 Diagnosis and Correction of Classroom Reading Problems (3) Procedures, methodologies and materials for diagnosing and correcting classroom reading problems. Prereq: Course in reading education, or equivalent teaching experience, or consent of instructor. Sp, Su.

538 Practicum in Diagnosis of Reading Problems (2) Theoretical and practical applications of specific reading diagnostic instruments; testing of elementary and secondary school students, preparing case study reports, and conducting parent conferences. Prereq: Course in diagnosis and correction of classroom reading problems or consent of instructor. May be repeated. Maximum 4 hrs. Sp.

539 Practicum in Remediation of Reading Problems (2) Application of learning and teaching methodology in working with elementary and/or secondary school students on an individual basis. Prereq: Course in diagnosis and correction of reading problems or consent of instructor. May be repeated. Maximum 4 hrs. Sp.

540 Topics in Improvement of Instruction (1-3) Special conferences, workshops, and inservice programs. May be repeated. Maximum 3 hrs. Sp, Su.

541 The High School Curriculum (3) Identification of problems associated with curriculum study, Tennessee curriculum framework, assessment of trends in programs of local, regional, and national significance. E.

542 Development of Educational Thought (3) Historic and philosophical approaches to lives and writings of influential educators: Plato, Quintilian, Comenius, Rousseau, Pestalozzi, Froebel, Dewey. Prereq: Graduate status and consent of instructor. Sp, Su.

543 Foundations of Educational Policy (3) Relationship between theory, policy, and practice; educational policies that arise from philosophical and practical considerations relative to human nature, to educational purpose, to content of curriculum and to methods and techniques for conducting educational enterprise. F, Su.

544 Survey in Contemporary Philosophies of Education (3) Existentialism, phenomenology, philosophical analysis, Marxism, structuralism, hermeneutics and other philosophies. 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.

548 Topics in International Education (3) Historical, philosophical, and sociological foundations; selected nations and their cultures. May be repeated. E.

550 Assessment and Correction of Language Arts Difficulties (3) Procedures and materials for diagnosing and correcting language arts difficulties; analysis of children's work. Prereq: At least one language arts course or consent of instructor. Su.

552 Developmental Reading Practicum (2) Diagnosing and correcting developmental reading needs. Prereq: Course in diagnosis and correction of reading problems or consent of instructor. May be repeated. Maximum 4 hrs. Sr.

557 The Junior High and Middle School Curriculum (3) Curriculum and instructional design for junior high and middle school. Characteristics of students, curriculum designs, instructional patterns, and organization and structure of junior high and middle schools. Sp, Su.

558 Curriculum Planning and Development (3) Foundations and principles of planning and development. Historical analysis of curriculum theory, principles of planning and development, and classroom applications for improved learning. E.

559 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 history, and family history. Critical reading and evaluation of qualitative research studies. F, Su.

561 Educational Statistics (3) Applications of descriptive and inferential statistics to educational and instructional problems. Use of electronic calculators in educational research. Prereq: One semester of college mathematics, an elementary course in statistics, or consent of instructor. F, Su.

562 Direction and Supervision of Student Teaching (3) Roles and responsibilities of cooperating teachers and student teachers, policies of state departments of education, and requirements of the teaching program; elements of clinical supervision; overview of research. F, Su.

564 Curriculum for Early Childhood Education (K-3) (3) Theoretical foundations and current research in content and skill areas of curriculum for kindergarten-grade 3; application to local school setting. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. Sp, Su.

565 Instructional Trends and Issues in Science Education (3) Analysis of current trends in science instruction. Historical development of elementary, secondary, and community college science teachers, and application of learning theory to teaching biological, physical, and environmental sciences. Prereq: 496, 422, or equivalent.

566 Administering Instructional Media Programs (3) Leadership roles and responsibilities of professional media administrator in variety of organizational settings. F.

567 Application of Theory in Early Childhood Education (K-3) (3) Principles and practices from selected theoretical orientations. Prereq: Course in early childhood education or consent of instructor. May be repeated. Maximum 6 hrs. F, Su.

568 Teacher-Parent-Community Relations (3) Techniques for effective relations between parents and teachers; examination of roles and expectations; parent involvement; volunteer programs; influence of community on educational process. Prereq: Consent of instructor. Sp, Su.

569 Advanced Production of Audiovisual Software (3) Hand and mechanical lettering, flat picture mounting, laminating, overhead projection, audio production, TV studio orientation, sync-taping, multi-screen presentations, and new video technologies. Same as Library and Information Science 569. Sp, Su.

573 Utilization of Educational Television and Radio (3) Television and radio as instructional and training media. Selecting, making and evaluating instructional/ training video and audio tapes. F, Su.

577 Introduction To Data Processing in Curriculum and Instruction (3) Analysis of current activities in educational computing and data processing. Curricular, instructional, and research and classroom management applications from microcomputers to supercomputers. Prereq: Consent of instructor. F, Su.

578 Teaching English as a Second Language (3) Instructional methods. Utilization of assessment procedures to diagnose English linguistic proficiency; materials for non-native speaker in K-12 classroom. Required for Tennessee ESL (K-12) certification. Prereq: Consent of instructor.

580 Techniques for Research in Curriculum and Instruction (3) Fundamentals of research methodology applicable to curriculum and instruction, and related learning theories. E.

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: Undergraduate course in teaching of mathematics. Sr.

582 Teaching Enrichment Mathematics in Middle and Junior High Schools (3) Topics to enrich middle and/or junior high mathematics. Geometrical, laboratory, and problem solving activities. Special attention to metric system. Opportunities for individual projects. Prereq: 581. Su.


586 Teaching Probability & Statistics (3) Teaching of probability and statistics in schools, elementary through college. Probabilities and statistical experiments, demonstrations, and applications. Prereq: 581. F.

587 Teaching Foreign Languages in Secondary Schools (3) Advanced instructional techniques and evaluation procedures; materials analysis and preparation, teaching methods, issues, and research in modern foreign languages and Latin. Prereq: Consent of instructor.

588 Instructional Theory and Design (3) Relationship of curriculum to instruction; examination of instructional and related learning theories; instructional models and techniques. F, Su.

589 Field Experience (1-3) Application of curricular and instructional principles, methods, and materials in schools. Prereq: Program prerequisites and consent of instructor. May be repeated. Maximum 9 hrs. S/NC only. E.


592 Linguistics and the Teaching of English (3) Grammar, usage, semantics, dialectology, history of language, and lexicography. Su.
593 Independent Study (1-3) May be repeated. S/NC or letter grade. E
594 Supervised Readings (1-3) May be repeated. S/NC or letter grade. E
595 Special Topics (1-3) May be repeated. S/NC or letter grade. E
596 Curricular Trends and Issues in Science Education (3) Analysis of elementary and secondary curricular projects for biological, physical, and environmental sciences. Impact of current learning theories on future curriculum development projects. Prereq: 496, 422, or equivalent. Prereq or coreq: 565 or consent of instructor. 
597 Teaching Drama Grades 7-13 (3) Strategies and materials for teaching creative dramas, enacting and writing of plays, reading of scripts. Sp
598 Developing Speaking and Listening Skills Grades 7-12 (3) Teaching approaches to nonverbal communication, interpersonal and group communication, public address and listening. Review of tests and materials. Sp
599 Seminar in Social Studies Education (3) Research, trends, and issues in secondary social studies. Su
600 Doctoral Research and Dissertation (3-15) P/NP only. E
601 Studies in English Education (3) Issues and research in teaching literature. 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. E
604 Seminar in Curriculum and Instruction (1) Required 2 consecutive semesters. S/NC only. E
605 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
606 Research in Elementary Education (3) Analysis of research in elementary education with application to classroom teaching. Prereq: research course. Su
607 Advanced Seminar in the Social Foundations of Education (4) Team-taught interdisciplinary seminar: topics, themes, and issues in curriculum and learning. Reading and discussions based on significant research and scholarly publications. Same as Educational & Counseling Psychology 609.
608 Seminar in Philosophy of Education (3) Selected philosophical issues in education. Prereq: 2 courses in history or philosophy of education. May be repeated with consent of instructor. E
609 Advanced Seminar in Curriculum and Learning (4) Team-taught interdisciplinary seminar: topics, themes, and issues in curriculum and learning. Critical reading of research methodology development in descriptive and survey areas. Sp
625 Using Research for Curriculum Improvement (3) Research methodology; application to descriptive/survey curricular activities. Critical reading of research methodology development in descriptive and survey areas. Sp
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
648 Topics in Sociology of Education (3) May be repeated. Sp
650 Advanced Studies in Early Childhood Education (3) Prereq: 2 graduate courses in early childhood education and consent of instructor. May be repeated. Maximum 6 hrs. S/NC only. E
651 Advanced Studies in Elementary School Language Arts (3) Selected issues in elementary school language arts. Prereq: Graduate course in elementary school language arts or consent of instructor. Sp
652 Advanced Studies in Educational Anthropology and/or Sociology (3) Ethnographic methods applied to formal and informal educational settings. Analysis of selected research in field. Prereq: 451, 2 courses in cultural anthropology, or consent of instructor. Sp
669 Instructional Media Research (3) Identification, location, and collection of developmental and experimental research on instructional media. Application of research. Sp
671 Advanced Educational Statistics (3) Applications of parametric and non-parametric statistical inference to educational and instructional problems. Use of microcomputers in educational research. Prereq: 561. Sp, Su
672 Interpretation and Application Curriculum and Instruction Research (3) Analysis of research in curriculum and instruction, needed methodologies and strategies. Utilization of research to improve curriculum and instruction practice, application of research principles in context of specific professional assignments. Prereq: Consent of instructor. Sp
675 Curriculum Evaluation: Theory and Application (3) Evaluation trends and issues. Theoretical frameworks to design evaluation studies for various educational programs. Sp
676 Curriculum Theory (3) Influential curriculum theories and approaches, implications for structure and design of educational programs. Nature and function of theoretical theory building activities. Prereq: Consent of instructor. E
683 Advanced Studies in Elementary School Mathematics (3) Research in elementary school mathematics. Prereq: Graduate course in mathematics education or consent of instructor. Sp
685 Educational Leadership: Theory and Practice (3) Theories of leadership applied to variety of educational settings. Prereq: Consent of instructor. F, Su
689 Internship (1-3) Experience in application of principles and practices of curriculum development and instructional improvement. Prereq: Program prerequisites and consent of instructor. May be repeated. Maximum 9 hrs. S/NC only. E
693 Independent Study (1-3) May be repeated. S/NC or letter grade. E
694 Supervised Readings (1-3) May be repeated. S/NC or letter grade. E
695 Special Topics (1-3) May be repeated. S/NC or letter grade. E
696 Research Trends in Science Education (3) Analysis of current research trends in science education and implications of such trends within broader educational community. Prereq: 628.

Ecology
College of Liberal Arts

**MAJOR**

**DEGREES**

Ecology

M.S., Ph.D.

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

**Shared Faculty:**
Adams, Marshall, Ph.D., ORNL
Amundsen, C. C., Ph.D., Botany
Bloylock, B. G., Ph.D., ORNL
Boocke, Christine R. B., Ph.D., Zoology
Buckner, E. R., Ph.D., Forestry, Wildlife & Fisheries
Bunting, Dewey L. (Liaison), Ph.D., Zoology
Burghardt, G. M., Ph.D., Psychology
Clebsch, E. E. C., Ph.D., Botany
Cooper, Lee, Ph.D., ORNL
Coutant, C. C., Ph.D., ORNL
DeAngelis, D. L., Ph.D., ORNL
Dearden, B. L., Ph.D., Forestry, Wildlife & Fisheries
Delcourt, Hazel, Ph.D., Geology
Delcourt, Paul A., Ph.D., Geology
Dimmick, Ralph W., Ph.D., Forestry, Wildlife & Fisheries
Drake, James A., Ph.D., Zoology
Eichert, R. J., Ph.D., Zoology
Emanuel, William, Ph.D., ORNL
Etter, D. A., Ph.D., Zoology
Farkas, Walter, Ph.D., Environmental Practice
Fribourg, Henry A., Ph.D., Plant & Soil Science
Gardner, R. H., Ph.D., ORNL
Gehr, C. W., Ph.D., ORNL
Gist, C. S., Ph.D., ORAU
Gittleman, John L., Ph.D., Zoology
Green, L. P., Ph.D., ORNL
Hale, T. S., Ph.D., ORNL
Hale, H. S., Ph.D., ORNL
Hall, J. W. S., Ph.D., Entomology & Plant Pathology
Horn, S. L., Ph.D., Geography
Houston, M., Ph.D., ORNL
Kelly, J. M., Ph.D., TVA
Kimmel, B. L., Ph.D., ORNL
McCarthy, J. F., Ph.D., ORNL
McCormick, J. F., Ph.D., Botany
McCracken, G. F., Ph.D., Zoology
McKinney, M. L., Ph.D., Geology
McLaughlin, S. B., Ph.D., ORNL
Multolland, P. J., Ph.D., ORNL
Nodvin, Matthew, Ph.D., CUPS
Norby, Richard, Ph.D., ORNL
O'Neill, R. V., Ph.D., ORNL
Pagni, R. M., Ph.D., Chemistry
Parker, Charles, Ph.D., ORNL
Pelton, Michael R., Ph.D., Forestry, Wildlife & Fisheries
Pimm, S. L., Ph.D., Zoology
Pliske, C. D., Ph.D., Entomology & Plant Pathology
Post, W. M., Ph.D., ORNL
Reed, M. R., Ph.D., ORNL
Reid, J. B., Ph.D., Geography
Reichle, D. E., Ph.D., ORNL
Rennies, J. C., Ph.D., Forestry, Wildlife & Fisheries
Reynolds, John H., Ph.D., Plant & Soil Science
Riechert, Susan E., Ph.D., Zoology
Rose, K. A., Ph.D., ORNL
Sayer, Gary S., Ph.D., Microbiology
Schrab, S. E., Ph.D., Forestry, Wildlife & Fisheries
Schneider, Gary, Ph.D., Forestry, Wildlife & Fisheries
Smith, W. O., Ph.D., Botany
The Graduate Program in Ecology offers Master of Science and Doctor of Philosophy degrees. This interdepartmental program provides advanced courses in contemporary ecology for students from undergraduate programs in basic and applied biology, social sciences, mathematics, and engineering. Research opportunities in both fundamental and applied ecology are intended to prepare students for academic careers as well as professional positions in industry or government. The Environmental Sciences Division of the Oak Ridge National Laboratory, the National Park Service, and the Tennessee Valley Authority provide advisors and research facilities. The Great Smoky Mountains, Cumberland Plateau, valley and ridge topography, TVA reservoirs and wild rivers provide locally a spectrum of natural habitats and consequent biological diversity that is truly unique. In addition, faculty research programs provide opportunities for student research elsewhere on this continent and abroad.

ADMISSION REQUIREMENTS

Requirements for admission to this program are: (1) admission to The Graduate School; (2) chemistry including organic, mathematics including calculus, and 3 semester hours of ecology at the upper division level (physics highly recommended); (3) departmental application and 3 rating forms; (4) the Graduate Record Examination.

Application forms for admission should be obtained from The Graduate School as well as the Ecology Program. Inquiries concerning the admission requirements should be addressed to the Director, Graduate Program in Ecology, University of Tennessee, Knoxville, Tennessee 37965-1610.

THE DOCTORAL PROGRAM

The requirements for this degree are in general the same as those of The Graduate School. This doctoral program must include Ecology 573, 574, and 610 as designated, or an approved equivalent and one course from an approved list of quantitative methods offerings. A student cannot enroll for dissertation hours until the research proposal has been discussed and approved by the doctoral committee. A foreign language is required.

ADVISORS

Advisors are selected from ecologists on the shared faculty of the University who have competence in the area in which the student expects to work. Entering students should consult early with the director of the program on the choice of a faculty advisor. The Master's committee need not have more than three members. Doctoral committees consist of the major professor as chairperson, one additional member who should have an appointment in the same department, and at least two additional Ecology faculty from other departments.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The Ph.D. program in Ecology is available to residents of the states of Alabama or Texas. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

GRADUATE COURSES

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

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

510 Special Problems in Ecology (1-3) Individual investigations in ecology. May be repeated with consent of instructor. Maximum 6 hrs.

520 Ecology for Planners and Engineers (3) Ecological principles and effects that human-caused changes have on living organisms. Lectures and field trips. Appropriate for students in Planning and Environmental Engineering.

530 Implementation of Environmental Policy (3) Goals and problems of environmental legislation, National Environmental Policy Act; purpose, preparation, and evaluation of environmental impact statements and similar multidisciplinary studies. Prereq: 520 or 573 or course work or experience in environmental law.

552 Development Planning in the Third World (3) (Same as Planning 552.)

555 Environmental Planning (3) (Same as Planning 555.)

561 Environmental Toxicology (3) (Same as Biochemistry 561.)

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

574 Communities and Ecosystems (3) Patterns underlying principles behind short and long-term community and ecosystem organization, dynamics, energetics and nutrient cycling.

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

604 Current Topics in Environmental Toxicology (1) (Same as Biochemistry 604.)

610 Special Topics in Ecology (3) Seminars on advanced topics and recent developments. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

620 Seminar in Ecology (2) May be repeated. Maximum 12 hrs.

635 Environmental Assessment and Sustainable Development in Third World Countries (3) Concepts and methods of environmental impact assessment and risk assessment. Sustainable development concepts and issues in developing countries. The role of risk and impact assessment in achieving sustainable development. Prereq: General ecology or equivalent. (Same as Botany and Planning 635.)

637 Applied Ecology (3) Review of contemporary and historical issues. Analysis of scientific basis of environmental assessment and natural resource management. Analysis of careers and career planning in applied ecology. Prereq: 573-74 or equivalent or consent of instructor. (Same as Botany 637.)

Economics

(College of Business Administration)

MAJORS

DEGREES

Economics ........................................ M.A., Ph.D.

Business Administration ......................... MBA

William F. Fox, Head

Professors:

Bohm, Robert A. (Liaison), Ph.D. ........... Washington (St. Louis)

Bowby, Roger L., 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., Ph.D. ......................... Texas

Davidson, Paul (J. Fred Holly Chair), Ph.D. ............................ Pennsylvania

Feiwel, George R. (Emeritus), Ph.D. ........... McGill

Fox, William F., Ph.D. .......................... Ohio State

Garrison, Charles B., Ph.D. ................. Kentucky

Herzog, Henry W., Ph.D. ....................... Maryland

Jensen, Hans E. (Emeritus), Ph.D. ............ Texas

Lee, Feng-Yao, Ph.D. ............................ Michigan State

Mayhew, Anne, Ph.D. .......................... Texas

Moore, John R. (Distinguished Prof.) (Emeritus), Ph.D. ....................... Cornell

Neale, Walter C. (Emeritus), Ph.D. ............ London

Quindry, K. E. (Emeritus), Ph.D. ............. Kentucky

Russell, Milton, Ph.D. ......................... Oklahoma

Slichtman, Alan M., Ph.D. .................... Washington (St. Louis)

Spiva, George A., Ph.D. ....................... Texas

Associate Professors:

Gauger, Jean A., Ph.D. ......................... Iowa State

Glustoff, Errol, Ph.D. ......................... Stanford

Kahn, James R., Ph.D. .......................... Maryland

Mandy, David M., Ph.D. ....................... Illinois

Mayo, John W., Ph.D. .......................... Washington (St. Louis)

Murray, M. N., Ph.D. .......................... Syracuse

Phelps, Keith E., Ph.D. .......................... Washington

The Department of Economics offers graduate programs leading to the M.A. and Ph.D. The M.A. may be completed by either a thesis or non-thesis option, while the Ph.D. requires successful completion of a dissertation. Applicants to these programs should contact the Director of Graduate Studies, Department of Economics; for further information. The Department also offers an area of concentration.
THE DOCTORAL PROGRAM

Admission to the Ph.D. program is based on previous academic performance and by scores achieved on the general portion of the GRE. Requirements for successful completion of the program consist of the four components listed below:

1. Students are required to complete the following core requirements:
   a. Economic Theory: Microeconomic theory by comprehensive examination or by completion of 511, 512 with a B+ average or higher, and macroeconomic theory by comprehensive examination or by completion of 513, 514 with a B+ average or higher.
   c. Mathematical and Quantitative Economics: 581, 582. The 582 requirement may be waived for students completing 681, 682.

2. Students must achieve a grade average of B or higher over all courses required to fulfill requirements in subparagraphs b and c, or, as an alternative, may petition to satisfy either or both of these two core areas by some other means such as a comprehensive written examination.

3. Students are required to demonstrate their competence by comprehensive examination in two fields of specialization with the approval of the department, at least one of which must be selected from the following: comparative systems, economic development, economic history, economics of labor and human resources, industrial organization, international economics, public finance, and regional and urban economics.

4. Students are required to complete with a grade of C or better two elective economics courses at the 500 level or above, outside the core subject areas and outside the two fields of specialization.

5. Students are required to complete a dissertation, including an oral defense, to give at least 24 hours of graduate credit (600).

BUSINESS ADMINISTRATION CONCENTRATION

For complete listing of MBA program requirements, see Business Administration.

MBA Concentration: Economics

Minimum course requirements are as approved by the area MBA faculty advisor.

GRADUATE COURSES

400 Special Topics (3) Topics vary. Prereq: Determined by department. May be repeated.

413 Macroeconomic Fluctuations (3) Analysis of historical data, methods of analyzing macro-economic fluctuations, theoretical explorations of cycles, and role of monetary and fiscal policies in aggregate economy. Major writing requirement. Prereq: Intermediate Macroeconomics or consent of instructor.


424 Political Economy of World Development (3) Topics vary: Latin America, Asia, Soviet Union and Eastern Europe. Analysis of major economic strategies, policies, and problems. Prereq: 201. This course includes a major writing requirement. May be repeated when topic varies. Maximum 9 hrs.

435 Industrial Organization Analysis (3) Monopoly and competition in United States economy; relationship of market structure, business behavior, and economic performance; major writing requirement. Prereq: 201.


462 Economics of Resources and Environmental Policy (3) Economic analysis of environmental policy and allocation of resources. Benefits and costs of development of natural resources and impacts of growth on environment. Major writing requirement. Prereq: 201.

471 Public Finance: Optimal Government Functions and Expenditure Analysis (3) Problems of collective consumption, externality 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 spring semester during any semester when students use University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

510 Fundamentals of Microeconomics (3) Theory of consumer behavior and demand, theory of production and costs, behavior in imperfectly competitive and monopolistic environments. For non-economics majors. Not available for students with credit for 511. Prereq: 511 or equivalent.

511-12 Microeconomic Theory (3,3) Theory of consumer choice and demand, theory of production and cost, behavior in imperfectly competitive and monopolistic environments. For non-economics majors. Not available for students with credit for 511. Prereq: 511 or equivalent.

513-14 Macroeconomic 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.

526 Economic History of the U.S. (3) Interpretation of American economic structure and policies from colonial times. Prereq: Graduate standing in economics or consent of instructor.

562 Labor Relations and Collective Bargaining (3) (Same as Management 522.)


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

612 Advanced Microeconomic Theory (3) Prereq: 512 or equivalent.

613 Advanced Macroeconomic Theory (3) Prereq: 514 or equivalent.


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.
Course requirements for the M.S. program include:

**Fall Semester**
- Internship: 4 hrs
- Specialty Studies: 6 hrs
- Analysis of Teaching for Professional Development: 2 hrs

**Spring Semester**
- Internship: 8 hrs
- Clinical Studies: 4 hrs

**Post Internship**
- Concentration Area: 12 hrs
- TOTAL: 36 hrs

Prior to the first semester of internship, a student must be admitted to The Graduate School. Prior to the completion of the first semester of internship, a student must be admitted to the Master’s program in the College of Education in which the degree is to be pursued.

THE DOCTORAL PROGRAM

The Ph.D. program with a major in Education provides six concentrations. The departments participating in the Ph.D. program are Curriculum and Instruction; Educational Leadership; Educational and Counseling Psychology; Health, Leisure, and Safety; Human Performance and Sport Studies; Special Services Education; and Technological and Adult Education.

The program requirements, concentrations and specializations are:

**Requirements**
- Minimum Hours

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Minimum Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Area</td>
<td>14</td>
</tr>
<tr>
<td>Foreign or Computer Language (demonstrate proficiency)</td>
<td>6</td>
</tr>
<tr>
<td>General Core Requirements</td>
<td></td>
</tr>
<tr>
<td>- History and philosophy of education, (both areas must be represented)</td>
<td>4</td>
</tr>
<tr>
<td>- Learning theory and curriculum (both areas must be represented)</td>
<td>4</td>
</tr>
<tr>
<td>- Administrative theory</td>
<td>2</td>
</tr>
<tr>
<td>- Trans-college seminar: three consecutive semesters (including summer)</td>
<td>3</td>
</tr>
<tr>
<td>Alternative Core Requirements</td>
<td></td>
</tr>
<tr>
<td>- Courses in philosophy of science</td>
<td>3</td>
</tr>
<tr>
<td>- Trans-college Seminar: three consecutive semesters (including summer)</td>
<td>3</td>
</tr>
<tr>
<td>- Seminar in area of specialization</td>
<td>3</td>
</tr>
<tr>
<td>- Courses in learning theory/group or independent study</td>
<td>3</td>
</tr>
<tr>
<td><strong>Concentrations</strong></td>
<td></td>
</tr>
<tr>
<td>- Primary Concentration: A minimum of 16 hours normally selected from one or two specializations within the primary concentration</td>
<td>16</td>
</tr>
<tr>
<td>- Supporting Specialization: A minimum of 9 hours selected from a specialization in a concentration other than the primary concentration</td>
<td>9</td>
</tr>
<tr>
<td><strong>Cognate</strong></td>
<td></td>
</tr>
<tr>
<td>- A minimum of 6 hours selected from outside the college in addition to the designated research courses</td>
<td>6</td>
</tr>
<tr>
<td><strong>Dissertation</strong></td>
<td>24</td>
</tr>
</tbody>
</table>

EXPERIENCE

Education (College of Education)

**MAJOR**

Education ............................................. Ph.D.

**THE MASTER'S PROGRAM**

The College of Education offers an extended teacher preparation program which features a professional year internship with accompanying coursework. By completing the 24 hours associated with the professional year, a student could complete a Master's degree with 12 more credits for the total of 36 semester hours.

**CONCENTRATIONS**

Administrative Theory and Practice
Specializations:
1. School administration
2. Higher education administration
3. Organizational leadership and policy studies

Theories of Curriculum Development and Foundations of Education
Specializations:
1. Anthropological, historical, philosophical, and sociological bases for educational planning and curriculum
2. Principles and models for planning, developing, and evaluating educational programs
3. Research design for educational programs

Instructional Theory and Practice
Specializations:
1. Principles and models for instructional improvement
2. Elementary and early childhood instruction and practices
3. Secondary/community colleges: (English, foreign language, mathematics, science, social studies education)
4. Elementary: mathematics, science, social studies education
5. Reading education
6. Instructional media and technology
7. Technological and adult education
8. Special education and rehabilitation

Theories and Practice of Educational and Personal Adjustment

Specializations:
1. Counselor education
2. Counseling psychology
3. Educational psychology
4. School psychology

Foundations of Human Movement

Specializations:
1. Exercise Science: Adapted Physical Education
2. Motor Behavior: Motor Control
3. Psychology of Sport
4. Socio-Cultural Foundations of Sport: History
5. Philosophy
6. Sociology

Health Education
Specializations:
1. Public health
2. Safety

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The Ph.D. program in Education is available to residents of the states of Arkansas (concentration in administrative theory and practice only) or South Carolina (concentration in theories and practice of educational and personal adjustment only). Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.
The Department of Educational and Counseling Psychology offers graduate programs leading to the following: Master of Science with a major in Educational Psychology, concentrations in educational psychology and community counseling; Master of Science with a major in Guidance, concentrations in elementary guidance, secondary guidance, and school counseling; Educational Specialist with a major in Educational Psychology and Guidance, concentrations in educational psychology, school psychology, and school counseling; and Doctor of Education with a major in Educational Psychology, concentrations in college counseling education and educational psychology. The department also participates in the college-wide Ph.D. program with a major in Education. The concentration area is theories and practice of educational and personal adjustment with specializations in counselor education, counseling psychology, educational psychology, and school psychology.

Several programs in the department are accredited. The Ed.D. counselor education concentration and the Ph.D. specialization in counseling education are accredited by the Council for Accreditation of Counseling and Related Educational Programs; counseling and school psychology by the American Psychological Association; and school psychology by the National Association for School Psychology. Also, the school counseling and school psychology programs have the approval of the National Council for Accreditation of Teacher Education. The community counseling and school counseling programs are accredited by the Council for Accreditation of Counseling and Related Educational Programs. The program in Educational Psychology has been recognized as a "Designated Program" by the American Association of State Psychology Boards and the Council for the National Register of Health Service Providers in Psychology.

The application deadline for admission varies by program area. February 1 is the deadline for all programs. Some programs also review applications November 1. For information about the various programs of study, write to the department admissions secretary.

THE MASTER'S PROGRAMS

Admission requirements include up-to-date scores from the GRE, the department admissions application form and letters of recommendation. All programs include thesis and non-thesis options. Hour requirements for a major in Educational Psychology, concentration in educational psychology, 36; concentration in community counseling, 60; and for a major in Guidance, 48. The programs in counseling psychology and guidance each require supervised practice and internships experiences working with clients. A final examination is required of all Master's degree students.

THE EDUCATIONAL SPECIALIST PROGRAM

Admission requirements include up-to-date scores from the GRE, the department admissions application form and letters of recommendation. All programs include thesis and non-thesis options. The program in school psychology requires a minimum of 66 hours. When students are admitted to the Ed.S. programs in educational psychology or school counseling, it is assumed that they have completed a Master's degree equivalent to the one offered at UT Knoxville. In this case, the minimum hours beyond the Master's required to complete the Ed.S. are: educational psychology, 24; school counseling, 22. The specialist programs require supervised practice and internship experiences with students or clients, either in the public schools or in community human services agencies. A final examination is required of all specialist students.
residents of the state of South Carolina. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

GRADUATE COURSES

404 Special Topics (1-3) Instructor-initiated course offered at convenience of department on topics of current interest. May be repeated. Maximum 15 hrs. S/NC or letter grade. E

410 Sex Role Development; Implications for Education and Counseling (3) Theories and research concerning development of person's sex role and its relevance in educational and counseling settings. F,Su

431 Personality and Mental Health (3) Various perspectives of mental health with application to education and other social institutions. E

432 The Disadvantaged Student: Psychoeducational Theory and research regarding etiological relevance in educational and counseling settings. F,Su

433 Psychoeducational Assessment (3) Direct, psychometric and interpretive methods in learning environments. Prereq: Admission to school psychology program or consent of instructor, and 525 or equivalent. 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 8 hrs. S/NC only. F,Sp

545 Psychoeducational Consultation (3) Use of two and three-person models of consultation in educational and therapeutic settings based on behavioral, ecological, social learning and cognitive-behavioral theories. F

546 Practicum in Consultation (3) Application of consultation skills to educational settings. Coreq: 545. Sp

549 Internship in School Psychology (1-6) Supervised employment in departmentally approved school psychology internship program. Prereq: Admission to school psychology program and consent of instructor. May be repeated. Maximum 12 hrs. S/NC only. E

550 Introduction to Personnel Programs (3) History, philosophy, professional standards, counselor roles in relation to school and mental health professionals, and ethics of profession. F

551 Theory and Practice of Counseling (3) Philosophical bases of helping relationship; development of counselor and client self awareness; counseling theory/practical techniques. F,Su

552 Career Development: Vocational Theory, Research and Practice (3) Relationship of vocational theory, career development research and societal factors to life career roles. F,Su

553 Career Development: Vocational and Educational Resources (3) Application and use of career and educational resources in personal planning and program development. 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. E

555 Practicum in Counseling (3) Supervised practice and application of counseling skills with individual clients. Prereq: Admission to program, 431, 525, 551 and consent of instructor. May be repeated. Maximum 9 hrs. E

556 Seminar in Community Agency Counseling (1) Observation to promote understanding of counseling, code of ethics, certification requirements, and role identity of community agency counselors. Prereq: Maximum 2 hrs. S/NC only. F,Su

558 Internship in School Counseling (1-6) Supervised postpracticum employment at departmentally 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 postpracticum employment at departmentally 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

560 Models of Classroom Discipline (3) Applications of major models of discipline in development of constructive atmospheres for classroom learning. Sp

561 Development and Operation of School Counseling Programs (3) Management of comprehensive school counseling programs to include needs assessment, program goals and objectives, evaluation and the use of computer-based program management software. Prereq: 550. Sp,Su

566 Approaches to Family Intervention and Counseling (3) Same as Child and Family Studies 566. Sp

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


593 Independent Study (1-15) Independent investigation of problems in educational and counseling psychology. May be repeated. Maximum 15 hrs. S/NC or letter grade. F,Sp

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

602 Directed Research (1-9) 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 department on topics of interest. May be repeated. Maximum 15 hrs. S/NC or letter grade. E

609 Advanced Seminar in Curriculum and Learning (4) Same as Curriculum & Instruction 609.

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) Research, human services, teaching and public policy. Prereq: Admission to doctoral program in psychology, or consent of instructor. (Same as Psychology 635.) Sp

649 Advanced Internship in School Psychology (1-9) Supervised experience as school psychologist in departmentally approved internship site for doctoral level students. Prereq: Enrollment in doctoral level school psychology program and consent of instructor. May be repeated. Maximum 9 hrs. S/NC only. E

650 Seminar in Counselor Education (1) Professional issues related to role and function of counselor educator. Prereq: Admission to doctoral program in educational psychology. May be repeated. Maximum 2 hrs. S/NC only. F

655 Practicum in Counselor Education (3) Supervised practice and application of counseling skills with clients. Prereq: Admission to counselor education program and consent of instructor. May be repeated. Maximum 6 hrs. Sp

659 Internship in Counselor Education (1-6) Supervised employment in departmentally approved internship sites in counselor education. May be repeated. Maximum 12 hrs. S/NC only. E

660 Seminar in Educational Psychology (1) Major professional issues, role and scope of educational psychology as field of study and practice. Prereq: Admission to doctoral program in educational psychology. May be repeated. Maximum 2 hrs. S/NC only. F

661 Education Implications of Neuropsychology (3) Theory and assessment. Common syndromes and their behavioral and cognitive manifestations. Prereq: 516 and 541 or equivalent individual assessment course, or consent of instructor. Sp

662 Applied Research Design (3) Planning of empirical investigations, collection of data, and drawing of inferences from evidence gathered. Prereq: Two-course sequence in statistics. A

663 Scale Construction (3) Development, pilot testing, and revision of attitude inventories, rating scales, and other paper-and-pencil techniques for assessing beliefs, personality characteristics, and opinion. Prereq: 525, and two-course sequence in statistical analysis. A

665 Analysis of Research in Instructional Technology (3) Research on human learning, design of learning environments. Analysis of teacher behavior, text development, computer software design and video presentations. Prereq: 585, 586, 588, and 593. F,Su

668 Practicum in Instructional Planning (3) Development and management of course or program of instruction in educational psychology. Prereq: 565, or consent of instructor. E

669 Internship in Educational Psychology (1-6) Supervised employment in departmentally approved edu-
cational psychology internship sites. May be repeated. Maximum 12 hrs. S/NC only. E


671 Personality and Vocational Assessment (3) Use and interpretation of personality and vocational measures in assessment of clients. Prereq: 525, 552 or consent of instructor. A

672 Psychological Dysfunction (3) Classification methods, dynamics and treatment of dysfunctional individuals in counseling. Prereq: 625 and course in abnormal psychology, or consent of instructor. A

673 Advanced Theory and Practice in Group Counseling (3) Theories and supervised practice. Prereq: 554, 555, and consent of instructor. F

674 Practicum in Counseling Psychology (3) Supervised practice of individual counseling. Minimum 150 clock hrs required each semester. Prereq: Admission to counseling psychology doctoral program, 555, and consent of instructor. May be repeated. Maximum 6 hrs. E

678 Theory and Practice of Counseling Supervision (3) Theory and practice of supervision in counseling. Prereq: 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 (1-15) Independent investigation of problems in educational and counseling psychology. May be repeated. Maximum 15 hrs. S/NC or letter grade. E

Assistant Professors:
Grubb, James J., M.S. ............... Indiana State
High, Katherine N. (Adjunct), Ed.D. ............... Tennessee

Visiting Professor:
Bogue, Grady, Ed.D. ............... Memphis State

The Department of Educational Leadership offers graduate programs leading to the Master of Science with majors in Educational Administration and Supervision and in College Student Personnel (higher education), the Specialist in Educational Administration, the Doctor of Education with a major in Educational Administration and Supervision, and the Doctor of Philosophy with a major in Education. Specializations may be developed in research, major central office positions, the principalship, and in other educational and social agencies.

The Ed.D. program also offers concentrations in higher education and in educational administration and supervision for practicing administrators. The higher education program combines theory and practice in an innovative demonstration of scholarly study and research. A blend of classroom instruction, individualized advising, and supervised practica and internships allows students to develop a specialization in academic administration, community–junior college administration, student personnel administration, financial management, and college teaching. The concentration for practicing administrators focuses on K-12 administrators currently in the field.

For additional information, contact the department head.

ADMISSION REQUIREMENTS

General test of the Graduate Record Examination; writing sample if GRE verbal is below 50th percentile; leadership potential judged by activities in organizations, and rating forms or letters of recommendation. The Ed.D. applicant must also interview with all faculty members on campus or elsewhere. Application deadlines are March 15 and October 1.

THE MASTER'S PROGRAM IN EDUCATIONAL ADMINISTRATION AND SUPERVISION

Thesis Option
A minimum of 33 credit hours including 6 hours of Thesis 500 is required. A major consists of a minimum of 18 hours. An internship is highly recommended but not required. A final oral examination is required with an oral exam at the option of the committee.

Non-Thesis Option
A minimum of 36 credit hours is required with a minimum of 18 hours in the major. An internship is highly recommended but not required. A final written comprehensive examination is required 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. The courses are prerequisites to other courses in the department.

THE MASTER'S PROGRAM IN COLLEGE STUDENT PERSONNEL

This program is designed for individuals interested in entering the field of student personnel administration in colleges and universities and in community or junior colleges. The program has both a thesis and non-thesis option. A minimum of 36 hours, which includes 6 hours of practicum experience, is required in either option.

THE EDUCATIONAL SPECIALIST PROGRAM

Thesis Option
A minimum of 60 hours beyond the baccalaureate degree including 6 hours of Educational Administration and Supervision 518 is required. Six hours must be in a cognate area within the college and 6 hours outside the college. An internship is highly recommended but not required. A written comprehensive examination is given as well as an oral exam over the thesis.

Non-Thesis Option
A minimum of 60 hours beyond the baccalaureate degree including 6 hours of Educational Administration and Supervision 503 is required. Six hours must be in a cognate area within the college and 6 hours outside the college. An internship is highly recommended but not required. A written comprehensive examination is given as well as an oral exam over the problem papers.

THE DOCTORAL PROGRAM

For the Ed.D. program, the minimum hours are determined by the student's doctoral committee. Six to 9 hours must be in a cognate area within the college and 6-9 hours outside the college unless the student has a Master's degree in a field outside the College of Education. Two consecutive semesters of 604 must be taken during residence. An internship is highly recommended but not required. A foreign language requirement is at the discretion of the committee. A written comprehensive examination is given as well as an oral exam over the dissertation.

The Department of Educational Leadership also has an Ed.D. program for practicing school administrators. Please contact the department for further information.

The Ph.D. with a major in Education includes concentrations and specializations as listed under Education.

Educational Administration and Supervision

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

503 Problems in Lieu of Thesis (3-6) May be repeated. S/NC only. E
513 Administrative and Organizational Theory in Education (3) Introduction to the theoretical 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 inter-personal communication and counseling skills, group dynamics, relationships, motivational techniques, conflict resolution, and roles of values, attitudes, and ethics in administration. F, Su

516 Research for School Administrators (3) Descriptive, experimental, and quasi-experimental designs to help students without quantitative backgrounds to read and understand technical professional literature. Introduction to experimental design, statistical analyses, and evaluation procedures. Sp, Su

518 Educational Specialist Research and Thesis (3) May be repeated. Maximum 6 hrs. P/NP only. E

529 Politics of Education and Educational Environments (3) School/community relations in political context of modern, complex society. Administrator and supervisory competencies: political, social, ethical, cultural, and racial environments in which schools operate. Prereq.: M.S. Introductory core or consent of instructor. F, Su

533 Administrative Applications of Micro Computers (3) DOS, word processing, data based management, spreadsheets, 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, Sp

547 Educational Facility Planning (3) Concepts and skills for development, evaluation, construction, renovation, maintenance, and operations of quality educational environments and facilities. Prereq.: M.S. Introductory core or consent of instructor. F, Su

548 Introductory Supervision and Personnel (3) Basic supervisory and personnel concepts and related competencies: building (or micro-organizational) level; interviewing, personnel planning, collecting and maintaining employee information, supervision of instructional and non-instructional personnel, clinical supervision, staff evaluation, and staff development. Prereq.: Introductory M.S. core or consent of instructor. Sp, Su

553 Strategies of Educational Planning (3) Processes for improving decision-making function through use of both quantitative and qualitative planning techniques. Policy analysis, CPM, PERT, Delphi. Prereq.: Introductory M.S. core or consent of instructor. F, Su

554 School Law (3) Logical arrangement of case and statutory materials for public school administrators and teachers; problems concerning law and public education. Prereq.: M.S. Introductory core or consent of instructor. F, Sp

580 Internship in Educational Administration (3) Field experience in appropriate educational setting working directly with administrator. At end of planned program of study. Placement by department assignment. Some on-campus classes in conjunction with 583 or 585. Prereq.: 21 hrs in educational administration and supervision or consent of instructor. E

582 Educational Leadership and District-Level (3) Role of central administrative team; relationships, behaviors, conflicts for developing school system; maintaining effective school organization. At end of planned program of study. Prereq.: 21 hrs in educational administration and supervision or consent of instructor. E

583 Educational Leadership--Principalship (3) Knowledge, skills and relationships for principal to be effective instructional leader. Simulation materials and field-based activities. Preparation of internship and problems paper. At end of planned program of study. Prereq.: 21 hrs in educational administration and supervision or consent of instructor. E

590 Special Topics (1-3) May be repeated. E

592 Field Problems in Educational Administration and Supervision (3) Topic to be assigned. May be repeated. S/N or letter grade. E

593 Independent Study in Educational Administration (3) Prereq.: Consent of instructor. May be repeated. E

595 Elementary Principals Seminar (1-3) For in-service training of elementary school administrators. Developments, problems, programs, and trends of elementary schools and management skills of elementary school administrators. Prereq.: Presently elementary school administrator or consent of instructor. May be repeated. S/N or letter grade. F,Sp

596 Middle School Principals Seminar (1-3) For in-service training of middle school administrators. Developments, programs, problems, and trends of middle schools and management skills of middle school administrators. Prereq.: Presently middle school administrator or consent of instructor. May be repeated. S/N or letter grade. F,Sp

597 Secondary Administrator Seminar (1-3) For in-service training of secondary school administrators. Developments, programs, problems, and trends of secondary schools and management skills of secondary school administrators. Prereq.: Presently secondary school administrator or consent of instructor. May be repeated. S/N or letter grade. F,Sp

599 Doctoral Research and Dissertation (3-15) May be repeated at discretion of student's committee. Maximum 60 hrs. S/N only. E

600 Seminar in Educational Administration and Supervision (3) Current educational issues, problems and research. Required two consecutive semesters during doctoral residency. May be repeated. S/N only. E

605 Advanced Seminar in Administrative Theory (2) Interdisciplinary seminar. Readings selected by faculty for research and scholarly value from early to current classic theoretical studies and current periodical literature in educational administration. Required of Ph.D. students in Education. Prereq.: Doctoral student in Education. F

610 Internship in Educational Administration (3) Opportunity for doctoral students and advanced graduate students to gain experience in performance of critical tasks of educational administration under supervision of practitioner and University representative. May be repeated at discretion of student's committee. Maximum 12 hrs. S/N only. E

611 Current Issues in Educational Administration (1-3) Current topics for practising school administrators, selected each semester and presented by specialists. Prereq.: Presently school supervisor or administrator, or consent of instructor. May be repeated. S/N or letter grade, E

614 Statistical Methods for School Administrators (3) Descriptive and experimental research methods, parametric and non-parametric statistical techniques used in research in educational settings. F

615 Research Designs (3) Statistical methods through multivariate techniques and applications to various research designs. Prereq.: 614 or consent of instructor. Sp

616 Research Methods (3) Overview of descriptive and experimental research designs: data collection, analysis, and interpretation for survey studies and school surveys. Conduct of survey. Prereq.: Basic statistics and computer skills or consent of instructor. E

622 Programs for the Professional Preparation of Educational Administrators and Supervisors (3) Exploring designs and methodology for training school administrators at both pre-service and in-service levels. F

629 Seminar in Politics of Education (3) Political theories and practices as they affect operation of public school systems and higher educational institutions. Interdisciplinary discussions of community power structures and special interest groups, based on literature and research from education, sociology, and political science. Field inquiry. Prereq.: 523, 616 or equivalent or consent of instructor. F

638 Advanced Supervision (3) Supervision at district level; roles, responsibilities, and operations: goal development, instructional supervision, staff development, curriculum development, program evaluation, and personnel evaluation. Prereq.: 548 or consent of instructor. F,Sp

644 Educational Finance and Business Management (3) Contemporary educational financial policies and their influence upon education, nation and citizens. Supervenience learn concept, management of school logistical services. Prereq.: 544 or consent of instructor. F,Sp

646 School Personnel Administration (3) Personnel administration functions for professional and supporting staff in educational organizations. Recruitment, selection, training, placement, personnel policies, employee wage and salary administration, fringe benefits, collective negotiations, human relations, staff development, and staff evaluation. Prereq.: 548 or consent of instructor. F, Sp

653 Seminar in Educational Planning Methods (3) Exploration of alternative futures and advanced planning methodology. Sophisticated planning/forecasting techniques. Prereq.: 553 or consent of instructor. F, Sp

655 State-Federal Relations in Education (3) Interrelationships of federal, state, and local educational policies and organization for education by analysis of traditional, legal, fiscal and functional aspects of educational partnership. Funding partnerships: discussion of grant proposal development processes. Sp, Su

656 Federal Laws of Public Education (3) School law; constitutional foundations as they relate to public education at state and local levels. F

658 Conflict Management (3) Social conflict and its management. Causes of interpersonal, intergroup, and organizational conflict, skills and strategies used to manage conflict, conflict management models associated with different sectors of human activity, and current organizational practices for managing destructive conflict. F

670 Values and Ethics in Educational Leadership (3) Examination of moral and ethical dimensions of work of educational administrators; assistance to current and prospective administrators to deal with dimensions in knowledgeable, reflective and principled ways. (Same as Higher Education 670.)

680 Administration of Complex Organizations (3) Concepts and theoretical formulations to understand, analyze, evaluate, and change complex educational programs and organizations. Prereq.: 513 or consent of instructor. Sp, Su

687 Seminar in Educational Facility Planning (3) Concepts and techniques for evaluating educational facilities, conducting comprehensive school surveys, and developing educational specifications. Prereq.: 547 or consent of instructor. Sp

690 Special Topics (1-3) May be repeated. E

693 Independent Study in Educational Administration and Supervision (3) Prereq.: Consent of Instructor. May be repeated. E

Higher Education

GRADUATE COURSES

455 Seminar in Student Leadership (1) Knowledge and skills in leadership roles for resident assistants, student government leaders, student activities, and other student organizations. Topics to be assigned. May be repeated. S/N or letter grade. 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

503 Problems in Lieu of Thesis (3-6) May be repeated. S/N only. E

530 Special Topics (1-3) May be repeated. E

542 The College Student and the Court (3) Legal precedent affecting student personnel services in public higher education. Student discipline, housing, dress, organization of activities, fees, tuition and related federal regulations. F

543 American Higher Education in Transition (3) History, philosophy, purposes, functions, organizations and programs in American higher education. F
Electrical and Computer Engineering

(College of Engineering)

MAJOR 

DEGREES

Electrical Engineering ....................... M.S., Ph.D.
Joseph M. Googe, Head

Professors:


Associate Professors:


Assistant Professor:

Smith, L. Montgomery (UTSI), Ph.D. .......... Tennessee

Lecturers:

Adams, Raymond K., M.S., Ph.D. ........ Tennessee Martin, Clyde D., Jr., M.S. .......... Tennessee

The Electrical and Computer Engineering Department has a graduate committee to administer, promulgate, and advance the general well-being of the graduate program. The Department of Electrical and Computer Engineering and Engineering jointly offer a Master's degree in the field of fusion energy. Students may have the opportunity to do their Master's thesis at the Fusion Energy Division of the Oak Ridge National Laboratory or at the Plasma Science Laboratory, affiliated with the Electrical and Computer Engineering Department. A limited number of Graduate Research Assistantships are available at each location. Further information about this program is available from the department.

THE MASTER'S PROGRAM

Graduate work leading to the Master of Science with a major in Electrical Engineering may be completed during one academic year of full-time study, or the degree may be obtained in two or three years of study in the evening. Graduate assistantships are available for outstanding students, who may obtain the Master's degree in one calendar year.

Admission Requirements

Students applying for admission to the Master of Science program and who hold a B.S. in Electrical Engineering are considered for admission on an individual basis. The minimum requirement is an undergraduate cumulative grade-point average of 3.0 out of 4.0 and a GPA of 3.0 for the senior year. A TOEFL score of 580 is required for international students.

Students who hold the B.S. or B.A. in a field other than electrical engineering are also expected to have a minimum cumulative grade-point average of 3.0 and a minimum senior year average of 3.0 in that field. These students should also have a background equivalent to that obtained by earning credit with a minimum 3.0 grade-point average in the Electrical Engineering courses normally taken at the 200 and 300 levels in the Bachelor's program in this department, and two senior electrical and computer engineering courses (and any labs associated with them) in the student's area of interest. Students from fields other than electrical engineering who have met the admission standards except for this background will be admitted only as non-degree students until they have completed coursework to provide this background.

Master's Degree Requirements

Specific degree requirements which must be met include:

1. Electrical and Computer Engineering 503 and 504.
2. Six semester hours of graduate credit in mathematics consisting of mathematics courses of 400 level or higher which have been approved by the E.C.E. Graduate Committee.
3. An additional 12 semester hours of 500-level work in electrical and computer engineering courses or 6 semester hours of 500-level work in one area of electrical and computer engineering courses and 6 semester hours of 500-level work in another area approved by the student's Master's committee. The 500-level work in electrical and computer engineering courses must include at least 6 hours in the student's major area.
5. A final oral examination covering the thesis and related coursework.

THE DOCTORAL PROGRAM

The Ph.D. with a major in Electrical Engineering may be pursued in the concentration areas of circuit theory, computers, optics, communication theory, electromagnetic theory, plasma engineering, power systems, solid-state electronics, and control systems. Applicants must submit scores on the General Graduate Record Exam. Specific departmental requirements for the Ph.D. include the following:

1. A Master of Science or Master of Engineering degree.
3. A minimum of 24 semester hours of work in electrical and computer engineering courses at the 500 and 600 levels.
4. A minimum of 9 semester hours of 600-level coursework. At least 3 semester hours of this work must be in an area other than the student's major area.
5. A minimum of 12 hours of mathematics courses approved by the Electrical and
Computer Engineering Graduate Committee. All 12 hours must be 400-level or above, and at least 6 hours must be at 500-level or above.

3. One foreign language if the student's faculty committee believes it necessary. A reading knowledge of a foreign language is crucial to the student's research efforts.

4. Satisfactory performance on both a qualifying and comprehensive examination. The qualifying examination is prepared by the faculty. The student must pass the qualifying examination the first time it is offered to remain in the Ph.D. program. The qualifying examination is normally taken after the completion of 24 hours of graduate coursework or immediately after completion of a Master's degree. A minimum of 18 hours of graduate coursework must be completed after the student has taken the qualifying examination the first time.

The comprehensive examination is prepared by the student's doctoral committee and consists of a 3-hour written examination in the student's major area, a 2-hour written examination in a related area, and an oral examination. The comprehensive examination is normally taken at least six months after passing the qualifying examination. Part of the comprehensive oral examination will be a defense of a formal written dissertation proposal. The comprehensive examination must be passed and the dissertation proposal accepted by the student's doctoral committee before the student is reported as ready for admission to candidacy for the Ph.D.

5. Participation in departmental seminars.


Many of the electrical and computer engineering courses are offered in the evening. Engineers working in industry are encouraged to participate in the graduate program. Departmental graduate programs are also available at the Space Institute, Tullahoma.

Departmental actions regarding a graduate student may be appealed in writing, first to the Department Graduate Committee and then to the Department Faculty.

GRADUATE COURSES

Note: Courses required in the Electrical and Computer 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 and Computer Engineering except when required by the program.

405 Digital Signal Processing and Filter Design (3) Discrete-time signals and systems, sampling, discrete Fourier transforms, analog filter characteristics, nonrecursive and recursive filter design, and CAD tools for filter design and analysis of linear and nonlinear systems. Prereq: 312.


412 Linear Control System Design (3) Classical and modern techniques for design and compensation of linear feedback control systems. Prereq: Linear System Analysis 331.

413 Passive and Active Network Synthesis (3) Re-use of network analysis techniques, passive network driving point synthesis, transfer function synthesis, approximation theory, topics in active network synthesis. Prereq: 312.


422 Machines (4) Dynamic behavior of rotating machines; transfer functions for common modes of operation of a.c. machines; response to different waveforms in supply; describing equations for a.c. machines and their numerical solutions. Includes laboratory experiments and projects. Prereq: Electric Energy System Components.

423 Power Electronics (4) Principles and characteristics of power semiconductor devices, single-phase and polyphase phase-controlled converters, converter control, ac phase controller, voltage-fed inverter and dc-dc converter principles, industry applications. Includes laboratory experiments and projects. Prereq: Electric Energy System Components.


431 Digital and Analog Integrated Electronics (4) Basic processing and fabrication of active and passive components for monolithic integrated circuits; characteristics of bipolar, CMOS and JFET transistors in typical analog and digital integrated circuit designs; standard digital logic circuits including TTL, ECL, Schottky, NMOS, CMOS, and GaAs gates and arrays, design concepts for op-amps, comparators, references, regulators, and other linear functions. Includes laboratory experiments and projects. Prereq: Electric Circuits.

432 Analog Signal Processing Electronics (4) Transducer signal conditioning and digital and analog integrated circuits; operational, instrumentation, and isolation amplifiers, rs and logarithmic converters, multipliers, and function generators, integrated circuit applications; active filters, feedback control, operational amplifiers, modulation and demodulation, sample and hold, and comparators. Includes laboratory experiments and projects. Prereq: Electric Circuits.

433 Electronic Amplifiers (4) Feedback amplifier principles; wideband linear amplifier design; radio frequency and audio power amplifier design; linear regulated power supply design; oscillator principles. Includes laboratory experiments and projects. Prereq: Electric Circuits.


442 Antennas and Propagation (3) Linear antennas, arrays, other simple antennas. Antenna gain, impedance, communication link parameters. Wave propagation in earth bound free space, earth's troposphere, ionosphere. Reflections from earth; effects on link reliability. Prereq: Fields.

443 Microwave Circuits and Electronics (3) Scattered wave description of circuits; isolators and amplifiers, coupled lines and power dividers, phase shifters. Loading and interconnection of systems. Power generation and amplification by switching, filtering and multiplexing devices. Transmission line and waveguide components. Includes laboratory experiments and projects. Prereq: Fields.


451 Microprocessors in Computer Engineering (4) Project-oriented course using microcomputer kit having monitor system and development system with cross assemblers, file management, and emulation capability. Interfacing and hardware/software trade-offs in interrupt driven applications. Term grade dependent on number of projects completed, homework solutions, and engineering notebook. Includes laboratory experiments and projects. Prereq: Introduction to Logic Design of Digital Systems.


453 Data Acquisition Systems (4) Digital-to-analog conversion techniques; Quantizing and R-2R ladder networks; error analysis of D/A converters; sample hold circuits, analog-to-digital conversion techniques; open loop system design; closed loop systems; digital signal processing; closed loop systems; digital signal processing; digital data systems; dual slope and successive approximation; error analysis of A/D converters; accuracy, linearity, drift, dynamic range, frequency response, gain, ground shielding; automatic testing of A/D and D/A converters; device service routines; signature analysis. Includes laboratory experiments and projects. Prereq: Introduction to Logic Design of Digital Systems and Electronic Circuits.

454 Open System Interconnection Reference Model Protocols (3) OSI reference model based networks. MAP and TCP; material from ISO standards, draft international standards and IETF working group papers. IEEE standards, MAP and TCP. Special lab work on MAP 2.x and 3.0 network support for programable logic controllers and personal computers using Manufacturing Automation Protocols and TOP: material from ISO standards. OSI network and Internet. Special projects with manufacturing emphasis including use of Factory. C language programming background required. Prereq: Introduction to Logic Design of Digital Systems or consent of instructor.

461 Plasma Magneto-hydrodynamic Engineering (3) MHD approximation; MHD waves and instabilities; MHD in complex geometries and in steady-state plasma; applied plasma technology; applications to fusion, energy, industry, and astrophysics. Prereq: 361.

462 Plasma Kinetic Theory Engineering (3) Kinetic theory; beam-plasma system; driven waves in plasma; transport in multiple beam systems; collisionless beam plasma and Landau theory; microwave generation in plasmas and traveling wave tubes; free electron masers in circular geometry; gyrotrope and orbitron. Design of plasma devices. Prereq: 361: 461 or consent of instructor.

463 Introduction to Fusion Energy (3) High temperature plasma physics relevant to fusion plasmas, principles of fusion reactors, and engineering and physics constraints on fusion reactors. Prereq: Introduction to Plasma Engineering for ECE majors, or consent of instructor. (Same as Nuclear Engineering 463.)

464 Introduction to Fusion Energy II (3) Continuation of 463. Principles and phenomenology of tokamak reactor, magnetic confinement fusion concepts, advanced fusion fuels, fusion technology, plasma engineering, and fusion reactor design studies. Design project which integrates material in 463 and 464. Prereq: 463 or consent of instructor. (Same as Nuclear Engineering 464.)

469 Plasma Laboratory (1) Experiments and design project illustrating material covered in 461 and 462.

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; realizations for control system instrumentation. Prereq: 518.

521 Power Systems Analysis I (3) Matrix-vector representations of power networks, sequence modeling of power system components, unevenly and stochastically loaded systems; 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 disturbances; analysis of matrix systems with multiple realizations of power systems. Prereq: 521.

523 Power Electronics and Drives (3) Forced commutated inverters, advanced PWM techniques, current-fed inverters, design, optimization, control of induction machines, parameter variation, control principles of synchronous machines.

524 High Voltage Systems (3) Phenomena, generation, measurement practices and insulation in high voltage systems. Testing, surge and arc control, shielding, reliability. Prereq: 421.

528 Advanced Electrical Machines I (3) Fundamental processes of electromechanical energy conversion; application in conventional devices. Differential equations for rotating machinery; generating or driving machines.

529 Advanced Electrical Machines II (3) Park's transformation and two-axis model, transient behavior of isolated and interconnected rotating machines. Prereq: 528.

531 Advanced Analog Electronics I (3) Physical operation of modern electronic devices; semiconductor devices: diodes, bipolar transistors, J-FETs, and MOS-FETs. Small-signal equivalent circuits and noise models of active devices. Project laboratory. Prereq: 431, 432, 433, or consent of instructor.


542 Radiation and Propagation (3) Linear antennas, loop antennas, aperture antennas, optical transfer function. Canonical problems of modern geometrical theory of diffraction (GTD) and wave electromagnetic optics approximation, and accounting of far fields and near fields due to edge and surface diffraction. Horn, lens, and reflector antennas; computations of radar cross-section. Prereq: 541.


545 Introductory Microwave Networks and Components (3) Scattering and transfer representation for multipoles: unilateral and bilateral microwave and millimeter wave devices. Component and system parameter measurement techniques. Microwave diodes, transistors, thyristors, oscillators and amplifiers, frequency sweep oscillators, test time devices, parametric devices, mixers, switches.


552 Digital System Design II (3) State identification and structural realizations of sequential machines. Digital system architecture design: microprogramming and interrupt control. Prereq: 551.

561 Plasma Diagnostics I (3) Principles of active, passive, interferometric and noninterferometric diagnostic methods in low, medium, and high temperature plasmas of interest in fusion research. Laboratory safety, data reduction and presentation, microprocessor based data handling and analysis, and reduction of time series data. Prereq: 461, 463, or consent of instructor.

562 Plasma Diagnostics II (3) Laboratory instruction in operation of plasma diagnostic instruments in plasma science laboratory, experience with high voltage, vacuum, RF, and digital data handling techniques. Prereq: 561. (Same as Nuclear Engineering 561.)

563 Plasma Engineering (3) (Same as Nuclear Engineering 563.)

564 Fusion Technology (3) (Same as Nuclear Engineering 564.)

565 Industrial Plasma Engineering I (3) Low temperature plasma physics relevant to industrial applications: krypton and argon based systems, microwaves, lasers. Lasers in communication and instrumentation, laser cutting and welding, interaction of laser beams with matter, gaseous discharges, and electron, ion, and plasma sources. Prereq: Graduate standing or consent of instructor.

566 Industrial Plasma Engineering II (3) Continuation of 565 to include applications in solids, semiconductors, deposition of functional films, plasma deposition and etching, space propulsion systems, plasma chemistry, plasma lighting devices, insulating and capping of materials, advanced plasma processing with low power arcs, and related topics. Prereq: 565 or consent of instructor.

571 Pattern Recognition (3) Decision-theoretic and structural approaches to pattern recognition. Deterministic and stochastic decision rules, feature extraction, and representation, syntactic and semantic methods. Prereq: 471 or consent of instructor.


573 Vision and Sensing for Robotics and Automation I (3) Acquisition, processing, integration, and interpretation of a wide range of image, tactile, and non-visual sensory information. Sensing modalities as applied to automated and teleoperated robotic systems. Prereq: Consent of instructor.

574 Vision and Sensing for Robotics and Automation II (3) Aspects of robot programming and motion using various sensing modalities. Selected topics from current literature. Prereq: Consent of instructor.


588 Measurement Science I (3) (Same as Nuclear Engineering 588.) and (Same as Mechanical Engineering 588.) and (Same as Electrical Engineering 588.) and (Same as Civil Engineering 588.) and (Same as Computer Engineering 588.) and (Same as Aerospace Engineering 588.)

598 Graduate Seminar (1) Topics of interest discussed in weekly seminar. May be repeated. Maximum 6 hrs. S/NC or letter grade.
I

599 Special Topics (1-3) May be repeated. Maximum 9 hrs.

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


612 Advanced Systems Theory (3) Game theory, dual control problem, hierarchical systems, and information structures. Prereq: 611.


614 Optimal Control (3) Deterministic and stochastic dynamic programming in continuous and discrete time, minimum principle and matrix minimum principle, computational methods in optimal control. Prereq: 611.

617 Special Topics in Systems Theory I (3) Topics of current interest to students and faculty: large scale systems, model order reduction, algebraic and geometric system theories, and advanced design methods. Prereq: 503 and consent of instructor.

618 Special Topics in Systems Theory II (3) Topics of current interest to students and faculty: large scale systems, model order reduction, algebraic and geometric system theories, and advanced design methods. Prereq: 617.

621 Modern Techniques for Electric Energy Systems I (3) Analysis of electric energy systems. Prereq: Consent of instructor.


623 Advanced Power Electronics and Drives (3) Phase-controlled cycloconverters, cycloconverter-fed ac drives, resonant converters, vector and scalar control of synchronous machines, static Kramer drives, static Scherbius drives, VSCF generation, modern control theory in ac drives.

624 Electrical Insulation (3) Principles, testing, and case studies. Basic principles of aging, losses, charging, conduction, and breakdown in vacuum, gas, liquid, solid, and composite insulation systems. Testing with low-noise instrumentation, pulse height analysis, optics, acoustics, and ultrasonic techniques. Advanced statistics and distribution parameter effects. Case studies drawn from active research, power systems, electronic circuit devices, shielding, and stress grading. Prereq: 503, 504, and consent of instructor.

631 Advanced Topics in Electronic Instrumentation I (3) Based on particular interests of students. Fundamental physical processes in instrumentation transducers: thermoelectric, magnetoelectric, electromechanical, and quantum-mechanical devices. Prereq: 551-52 and consent of instructor.


633 Advanced Topics in Information Science I (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.

634 Advanced Topics in Information Science II (3) Structure of algebraic and probabilistic codes; linear codes, convolutional codes, error-correcting codes, decoding methods; identification schemes: deterministic, stochastic, and hierarchical methods. Prereq: 633.

651 Computer-Aided Design of VLSI Systems I (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: 611.

663 Advanced Plasma Physics I (3) Basic concepts of high temperature plasma physics. Magneto-hydrodynamical 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. (Same as Physics 563.)

664 Advanced Plasma Physics II (3) Plasma heating and radiation phenomena. Advanced topics of current interest. Must be taken in sequence. Prereq: 663.

671 Image Processing and Robotics I (3) Three-dimensional scene modeling and recognition, multi-sensor systems. Prereq: 572 or 573 or consent of instructor.

672 Image Processing and Robotics II (3) Stereo vision, shape theory. Prereq: 671.

673 Image Processing and Robotics III (3) Time-varying imagery, path planning and navigation. Prereq: 672.

681-82 Quantum Electronics (3, 3) Prereq: Consent of instructor.

691 Advanced Graduate Seminar (1) Research in department. May be repeated. S/NC or letter grade.

692 Special Topics (1-3) Advanced topics of current interest to Ph.D students in Electrical Engineering. May be repeated. Maximum 5 hrs.

---

**Engineering Science and Mechanics**

(The College of Engineering)

### MAJOR DEGREES

**Engineering Science**

M.S., Ph.D.

T. G. Carley, Acting Head

Professors:

- Antar, B. (UTSI), Ph.D.
- Baker, A. J., PE, Ph.D.
- Caruthers, J. E. (UTSI), Ph.D.
- Carley, T. G. (Liaison), PE, Ph.D.
- Forrester, J. H., PE, Ph.D.
- Fried, D. (UTSI), Ph.D.
- Kim, K. H., Ph.D.
- Krieg, R. D., Ph.D.
- Landes, J. D., PE, Ph.D.
- Lee, C. W. (Emertus), Ph.D.
- McCay, T. D. (UTSI), PE, Ph.D.
- Pih, H. (Emeritus), PE, Ph.D.
- Remnyuk, C. J. (Emertus), Ph.D.
- Scott, W. E., Ph.D.
- Shahrak, F. (UTSI), Ph.D.
- Shobe, L. R. (Emertus), Ph.D.
- Snyder, W. T., Ph.D.
- Soliman, O., PE, Ph.D.
- Stoneking, J. E., PE, Ph.D.
- Wasserman, J., PE, Ph.D.
- Weitsman, Y. J., Ph.D.

**Associate Professors:**

- Boulet, J. A. M., Ph.D.
- Caruthers, J. E. (UTSI), Ph.D.

**Research Professor:**

- Moriarty, T. F., PE, Ph.D.

**Assistant Professors:**

- Brooks, G. N., Ph.D.
- Gezeaux, J. L., Ph.D.
- Hopkins, Scott, W. E., Ph.D.
- Holmes, J. R. (Emertus), Ph.D.
- Houghton, J. M., Ph.D.
- Snyder, W. T., Ph.D.
- Soliman, O., PE, Ph.D.
- Stoneking, J. E., PE, Ph.D.
- Wasserman, J., PE, Ph.D.

**Graduate Programs**

Graduate programs leading to the degrees of Master of Science and Doctor of Philosophy with a major in Engineering Science are available to graduates of recognized curricula in engineering, mathematics, or one of the physical or biological sciences. Program concentrations include solid mechanics, fluid mechanics, computational mechanics, biomedical engineering, and optical engineering (UTSI only). In each of these concentrations, interdisciplinary programs are arranged to meet individual needs or interests. Each applicant is advised as to any prerequisite courses before entering a program; the student's program of study must be approved by his/her advisory committee, and must comply with the requirements of The Graduate School. The student's major professor may be selected from a department other than the Department of Engineering Science and Mechanics; however, at least one member of the student's graduate advisory committee must be on the faculty of the Department of Engineering Science and Mechanics.

A departmental application is required in addition to The Graduate School application. The names and addresses of four references must be included with the departmental application.

The flexibility and interdisciplinary aspect of the program concentrations are intended to be of particular interest to prospective students currently employed in research, development, or design activities and whose interests in continuing education (either full-time or part-time) lie at one of the interfaces between science and engineering or can best be met by interdisciplinary study in engineering. The department's course offerings and research activities are also intended to meet the needs of students who seek preparation for employment in engineering areas requiring specialization in mechanics or in related interdisciplinary studies such as biomechanics.

---

**THE MASTER'S PROGRAM**

Two M.S. options are offered: option I requires a thesis, while option II does not. The second plan is restricted to those students who have had significant engineering professional work experience.

In option I, a minimum of 30 semester hours including the thesis is required. In option II, a minimum of 33 hours is required. The requirements include the following:

- **Mathematics**
  - I
  - II

- **Engineering courses** (Major concentration may include but is not restricted to courses offered by the Engineering Science and...**
Mechanics Department.) 12 18

Related courses (May include additional courses in mathematics, computer science, or the physical and life sciences as well as engineering courses.) 6 9

Thesis 6 9

*Engineering courses under option II may include advanced laboratory work or special problem work, for example, Engineering Science and Mechanics 581 or analogous courses in other departments.

A final examination is required under both options covering graduate coursework and the thesis.

THE DOCTORAL PROGRAM

Specific departmental requirements for the Ph.D. Include:
1. 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.
2. 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.
3. 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.
4. Attendance and participation in graduate seminars and colloquia.
5. Two doctoral examinations must be passed to be admitted to candidacy for the Ph.D. in Engineering Science.

After being admitted as a potential candidate for the Ph.D., a qualifying examination must be taken at the first offering after the student has either completed a Master's degree or completed 24 semester hours of graduate credit. The purposes of qualifying examinations are:

a. To determine the qualifications of the student to continue the Ph.D. program, and
b. To identify the areas of strengths and weaknesses to guide the student's graduate coursework and research.

The qualifying examination will be administered by the department's Graduate Studies Committee. The examination will be written and will cover at least four graduate level subject areas. One subject area will be mathematics, and the others will be designated by the student subject to the approval of the department's Graduate Studies Committee.

The comprehensive examination is to be taken by students within 6 credit hours of completion of graduate coursework required for the Ph.D. degree. This examination is to be administered by the student's advisory committee and shall consist of both a written and an oral portion.

After successfully passing the qualifying and comprehensive examinations, the student must present the Ph.D. dissertation research proposal to the student's advisory committee and receive committee approval of the proposal before being admitted to candidacy for the Ph.D.
532 Vibrations (3) Vibrations of discrete and continuous systems, Modal Analysis. Engineering applications. Prereq: Undergraduate vibrations course.


536 Advanced Engineering Acoustics (3) Introduction to theory and application of acoustic analysis; vibration of continuous systems, plane and spherical waves, transmission phenomena, radiation and scattering. Resonance, filters, absorption mechanisms, microphones, sonar transducers. Prereq: 431 or 435.

539 Continuum Mechanics (3) Cartesian tensors, transformation laws, basic continuum mechanics concepts; stress, strain, stress-strain relations, and conservation laws for mass, momentum, energy. Applications in solid and fluid mechanics.

541 Fluid Dynamics (3) Kinetic, kinetic and thermodynamic properties of fluids. Development of rate deformation laws; mass, momentum and energy conservation relationships; non-dimensionalization. Applications of Euler and Navier-Stokes equations: exact solutions, potential flow, transonic, boundary layer approximations; coupled heat mass transfer models. Coreq: 556.

542 Fluid Dynamics II (3) Development of basic concepts and governing equations for turbulence and turbulent field motion. Formulation for correlation function, energy spectra, diffusion. Introduction to turbulent transport processes, in wall turbulence, engineering turbulence closure models; examination of modern numerical and experimental methods. Prereq: 541.


553 Computational Solid Mechanics (3) Finite element analysis techniques in structural mechanics and elasticity, nonlinearities. Two and three-dimensional formulations; isoparametric elements, numerical quadrature. Equilibrium, compatibility, strain energy; matrix iteration techniques. Applications in beams, plates and shells; use of representative computer programs in networked computer environments (e.g., CAD, graphics, solids modellers, data base management. Prereq: 551.

557 Computational Mechanics Seminar (1) Current developments in computational fluid/thermal/structural mechanics. For departmental thesis students only. May be repeated.

559 Computational Mechanics Laboratory (1) Introduction to networked computer/engineering work station environment for CAD/graphics/engineering numerical analysis. Coreq: 551.

562 Experimental Mechanics of Composite Materials (3) Specimen composition for orthotropic, and transversely isotropic materials; analysis of composite laminate and laminate stress and strain transformation; laminate plate theory; fiber, matrix, fiber-matrix interface, and composite mechanical properties (tensile, flexure, compressive, shear); physical properties; notch-tip stress field, stress intensity factor, notch sensitivity; strain energy release relations; composite fracture toughness; failure modes. Lab. Prereq: 557 or consent of instructor. (Same as Materials Science and Engineering 562.)


566 Optical Engineering I (4) Wave optics; scalar diffraction theory; introduction to Fourier optics; ray or geometric optics; introduction to paraxial design methods; introduction to aberrations.

567 Optical Engineering Laboratory I (2) Laboratory in support of Optical Engineering I. Prereq or coreq: 566.

568 Optical Engineering II (4) Statistical optics; spon- taneous and induced emission; black and gray body radiation; incoherent, partial and totally coherent radiation; mutual coherence function; detectors; radiometry. Prereq: 566.

569 Optical Engineering Laboratory II (2) Prereq: 567. Coreq: 568.

571 Biomechanics of Hard and Soft Tissue (3) Introduction to terminology, physiology, and analytical meth- ods for mechanics of living tissue. Continuum mechanics analysis of thin and soft tissue, biological fluid flows. Flow properties of blood, cerebrospinal fluid, microcirculation, bioviscoelasticity of fluids and solids, mechanical properties of blood vessels; skeletal, heart and smooth muscle; bone and cartilage. Research paper.


575 Applied Artificial Intelligence (3) (Same as Nuclear Engineering 575.)

576 Expert Systems in Engineering (3) (Same as Nuclear Engineering 576.)

577 Neural Networks in Engineering (3) (Same as Nuclear Engineering 577.)

581 Special Topics in Engineering Mechanics (3) Mechanics problems related to recent developments. Prereq: Consent of instructor. May be repeated with consent of department.

588 Measurement Science I (3) (Same as Nuclear Engineering 588, Aviation Systems 589, Chemical Engi- neering 586, Civil Engineering 588, Electrical and Com- puter Engineering 586, Mechanical Engineering 586 and Aerospace Engineering 588.)

589 Measurement Science II (3) (Same as Nuclear Engineering 589 and Aviation Systems 599.)

600 Doctoral Research and Dissertation (3-15) P:NP only; E: D: A.

621 Analysis and Design of Thin Shell Structures (3) Geometry of surfaces, derivation of thin shell theory for arbitrary shell geometry; selected applications of theory in structural engineering. Prereq: 525 or Civil Engineer- ing 562.


624 Viscoelasticity (3) Viscoelastic constitutive relations; isothermal boundary value problems; wave propa- gation in viscoelastic materials; stability problems; deter- mination of material properties. Prereq: 523 and 533, or Polymer Engineering 541.

625 Computational Plasticity and Creep (3) Theoretical and numerical models used to describe plastic and creep behavior in finite element structural models. Perfect plasticity, kinematic and isotropic hardening; Mroz, mechanical sublayer, and two-surface models; volumet- ric plasticity models, traditional creep models and unified creep-plasticity models. Numerical algorithms, including error maps, and plane stress plasticity algorithms in parallel. Prereq: 539 or 532, and 553.


633 Advanced Vibrations (3) Free and forced vibration of strings, beams, membranes, plates and shells. Pro- portional and nonproportional damping; Modal analysis, frequency, domain and residues. Structural properties and diagnostics and applications to process utilization. Prereq: 523, and 553.


645 Theory of Turbulence (3) Mathematical descriptions of turbulence; isotropic turbulence, energy spectra. Kolmogoroff's hypothesis, large and small eddy struc- ture for turbulent flows; turbulent diffusion by continuous movement; applications to turbulent jets, wakes, pipe flow, and boundary layers. Prereq. 542. (Same as Aero- space Engineering 645.)

651-52 Advanced Topics in Computational Fluid Dynamics (3) Approximation theory, analysis of accu- racy, convergence, and stability for smooth and non- smooth solutions; shocks, artificial dissipation; two- and three-dimensional, compressible viscous and inviscid flows; potential, Euler and complete Navier-Stokes de- scriptions; mixed subsonic-supersonic flows. Algorithm constructions: finite difference, element, approximate factorization, vector splitting, finite volume, generalized coordinate and adaptive grids; steady flows including second-order turbulence closure. Thin layer and parabolic Navier-Stokes equations; multi-dimen- sional, turbulent and reacting flows. Computer project. Prereq: 552.

653-54 Advanced Topics in Computational Solid Mechanics (3) Fracture mechanics; singularity solu- tions; 3-D, non-linear constitutive problems, variable stiff- ness, initial strain and initial stress methods, plasticity- creep; unified creep-plasticity theory; geometrically non- linear problems, large deflection, stability; shell struc- tures; analysis of accuracy, convergence, adaptive grids. Prereq: 553.

657 Computational Mechanics Seminar (1) Current developments in computational fluid/thermal/structural mechanics. For departmental thesis students only. May be repeated.

671 Advanced Topics in Applied Artificial Intelli- gence (3) (Same as Nuclear Engineering 671.)

681 Advanced Topics in Engineering Mechanics (3) Advanced problems in mechanics, group or individually. Prereq: Consent of instructor. May be repeated with consent of department.

English

MAJOR

DEGREES

English .................. M.A., Ph.D.

D. Allen Carroll, Head

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

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

Language Requirement: Evidence of proficiency in one foreign language, to be fulfilled in one of the following ways:
1. Completion of the second year of a language at college level with a grade of C or better.
2. Completion of French 302 or German 332 at UT Knoxville with a grade of B or better.
3. Passing of the regular Ph.D. foreign language examination as currently administered at UT Knoxville.
4. Passing the Graduate Student Foreign Language Test (GSFLT) as currently administered at UT Knoxville.

Writing Projects: One of the following:
- A comprehensive research paper or a dissertation.
- A creative project, such as a creative work of non-fiction prose.
- A comprehensive examination, followed by a one-hour oral examination.

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 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 DOCTORAL PROGRAM
Requirements
A student must successfully complete a program of study, normally 6 full semesters as outlined below, approved by the candidate's committee or the Director of Graduate Studies in English.

Coursework: At least 51 semester hours beyond the B.A. to include at least 21 semester hours at the 600 level; at least 15 semester hours at the 500 level or above (only 3 hours of 593 Independent Study may be applied toward the M.A.); and a special three-hour course in teaching composition; and 12 additional hours at any level, including the 400 level. Up to 6 of these additional hours may be taken in some 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 for and writing of the dissertation. The research and dissertation will be directed by a faculty member of the department and approved by a doctoral committee of three or four other faculty members.

Language Requirement: A language requirement met in one of the following ways:
1. Two languages approved by the Director of Graduate Studies in English. The requirement for each language may be fulfilled by (a) completion of French 302 or German 332 with a grade of B or better; (b) completion at UT Knoxville of any two courses on the 300 level or above in the foreign language or literature with at least a grade of B in each course; or (c) passing the Graduate Student Foreign Language Test (GSFLT) as currently administered at UT Knoxville; or (d) passing the Graduate Student Foreign Language Test (GSFLT) as currently administered at UT Knoxville; or (e) passing the Graduate Student Foreign Language Test (GSFLT) as currently administered at UT Knoxville.

THE MASTER'S PROGRAM
Requirements
Coursework: A minimum of 24 semester hours in English beyond the B.A., to include 6 hours at the 600 level; 12 additional hours at the 500-600 level (Only 3 hours of 593 Independent Study may be applied toward the M.A.); and 6 hours for graduate credit at any level, including the 400 level. This coursework includes the following:

- A minimum of 24 semester hours of required coursework.
- At least 12 semester hours of 500-level courses. Students must take at least 9 hours of writing at the 500 level or above (only 3 hours of 593 Independent Study may be applied toward the M.A.); and a special three-hour course in teaching composition; and 12 additional hours at any level, including the 400 level. Up to 6 of these additional hours may be taken in some 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.

Coursework: A minimum of 24 hours at the 600 level.

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

Language Requirement: A language requirement met in one of the following ways:
1. Two languages approved by the Director of Graduate Studies in English. The requirement for each language may be fulfilled by (a) completion of French 302 or German 332 with a grade of B or better; (b) completion at UT Knoxville of any two courses on the 300 level or above in the foreign language or literature with at least a grade of B in each course; or (c) passing the Graduate Student Foreign Language Test (GSFLT) as currently administered at UT Knoxville; or (d) passing the Graduate Student Foreign Language Test (GSFLT) as currently administered at UT Knoxville; or (e) passing the Graduate Student Foreign Language Test (GSFLT) as currently administered at UT Knoxville.

THE DOCTORAL PROGRAM
Requirements
A student must successfully complete a program of study, normally 6 full semesters as outlined below, approved by the candidate's committee or the Director of Graduate Studies in English.

Coursework: At least 51 semester hours beyond the B.A. to include at least 21 semester hours at the 600 level; at least 15 semester hours at the 500 level or above (only 3 hours of 593 Independent Study may be applied toward the M.A.); and a special three-hour course in teaching composition; and 12 additional hours at any level, including the 400 level. Up to 6 of these additional hours may be taken in some 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 for and writing of the dissertation. The research and dissertation will be directed by a faculty member of the department and approved by a doctoral committee of three or four other faculty members.

Language Requirement: A language requirement met in one of the following ways:
1. Two languages approved by the Director of Graduate Studies in English. The requirement for each language may be fulfilled by (a) completion of French 302 or German 332 with a grade of B or better; (b) completion at UT Knoxville of any two courses on the 300 level or above in the foreign language or literature with at least a grade of B in each course; or (c) passing the Graduate Student Foreign Language Test (GSFLT) as currently administered at UT Knoxville; or (d) passing the Graduate Student Foreign Language Test (GSFLT) as currently administered at UT Knoxville; or (e) passing the Graduate Student Foreign Language Test (GSFLT) as currently administered at UT Knoxville.

THE MASTER'S PROGRAM
Requirements
Coursework: A minimum of 24 semester hours in English beyond the B.A., to include 6 hours at the 600 level; 12 additional hours at the 500-600 level (Only 3 hours of 593 Independent Study may be applied toward the M.A.); and 6 hours for graduate credit at any level, including the 400 level. This coursework includes the following:

- A minimum of 24 semester hours of required coursework.
- At least 12 semester hours of 500-level courses. Students must take at least 9 hours of writing at the 500 level or above (only 3 hours of 593 Independent Study may be applied toward the M.A.); and a special three-hour course in teaching composition; and 12 additional hours at any level, including the 400 level. Up to 6 of these additional hours may be taken in some 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.

Coursework: A minimum of 24 hours at the 600 level.

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

Language Requirement: A language requirement met in one of the following ways:
1. Two languages approved by the Director of Graduate Studies in English. The requirement for each language may be fulfilled by (a) completion of French 302 or German 332 with a grade of B or better; (b) completion at UT Knoxville of any two courses on the 300 level or above in the foreign language or literature with at least a grade of B in each course; or (c) passing the Graduate Student Foreign Language Test (GSFLT) as currently administered at UT Knoxville; or (d) passing the Graduate Student Foreign Language Test (GSFLT) as currently administered at UT Knoxville; or (e) passing the Graduate Student Foreign Language Test (GSFLT) as currently administered at UT Knoxville.
Language (offered in alternate years only). For the other 3 hours, the student may either complete the history of the language sequence or choose one other course in language taught in the Department of English at the 500 or 600 level and approved by the Director of Graduate Studies in English. These courses will not count toward the minimum number of courses for the 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 other related areas.

Residence Requirement: Two consecutive semesters as a full-time student. For students not on teaching assistantships, full-time consists of 9 or more hours of coursework for 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 Canterbury Tales and Troilus and Criseyde in Middle English.

404 Shakespeare I: Early Plays (3) Shakespeare's dramatic achievement before 1601. Reading and discussion of selected plays from romantic comedies, including Twelfth Night, English histories, including Henry IV, and early tragedy, including Hamlet.

405 Shakespeare II: Later Plays (3) Shakespeare's dramatic achievement between 1601 and 1613, Reading and discussion of selected plays from great tragedies, including Othello, problem plays, including Measure for Measure; and dramatic romances, including The Tempest.

406 Renaissance Drama (3) English theatre between 1590 and 1640 through reading of representative plays by Shakespeare's contemporaries: Marlowe, Webster, Jonson.

409 Spencer and his Contemporaries (3) Principal achievements in prose and poetry of sixteenth century authors; Spenser, Wyatt, Marlowe, More, Sidney, and Bacon.

410 Milton, Donne and their Contemporaries (3) Principal achievements in prose and poetry of first two-thirds of seventeenth century; poetry of Milton, Donne, Marvell; and prose of Browne, Bacon, Jonson.

411 Restoration and Eighteenth-Century Poetry and Prose (3) Dryden, Swift, Pope, Johnson, and their contemporaries, major works: MacLeod's, Rape of the Lock, Gulliver's Travels, and Rasselas.

412 British Drama from 1660 to 1800 (3) Playwrights from Dryden and Wycherley to Goldsmith and Sheridan; formal developments: heroic play, cynical comedy, affective tragedy, and exemplary drama.

413 The Eighteenth-Century British Novel (3) Defoe to Austen.

414 Romantic Poetry and Prose I (3) Wordsworth, Coleridge, and Blake; readings from Lamb, De Quincey, and other prose writers.

415 Romantic Poetry and Prose II (3) Keats, Shelley and Byron; readings from Hazlitt, Peacock, and other prose writers.

416 Victorian Poetry and Prose I (3) Tennyson, Pre-Raphaelite, Carlyle, Newman, and Mill.

419 Victorian Poetry and Prose II (3) Browning, Arnold, Hopkins, Hardy, Ruskin, Darwin, and Wilde.

420 The Nineteenth-Century British Novel (3) Scott to Hardy.

421 Modern British Novel (3) Lawrence, Joyce, and Woolf.

422 Women Writers in Britain (3) Literary consciousness and works of women writers in Britain. (Same as Women's Studies 422.)

431 Colonial, Federal, and Early National American Literature (3) From Columbus to Washington Irving.

432 American Romanticism and Transcendentalism (3)

433 American Realism and Naturalism (3)

434 Modern American Literature (3) World War I to present.

435 American Novel before 1900 (3) From earliest sentimental novels through Brown and Cooper, and major figures to 1900: Hawthorne, Melville, Howells, Clemens, and James.


441 Southern Literature (3) Southern writing from colonial period into twentieth century: frontier humorists, local color writers, and Southern literary renaissance.

442 American Humor (3) Early nineteenth century into twentieth century: Mark Twain.

443 Topics in Black Literature (3) Contents vary: particular genres, authors, or theories from 1845 to present: Langston Hughes and Harlem Renaissance, Richard Wright and Gwendolyn Brooks, writing by Black women, International Black literature in English, and Black American autobiography.

451 Modern British and American Poetry (3) From Yeats and Frost to Auden, Stevens, and more recent poets.

452 Modern British and American Drama (3) O'Neill's works as precursors to modern dramatists: Williams, Miller, Abebe, and representatives of Black theater, Bullins and Baraka.

453 Continental Drama (3) Selection of plays (in English translation) by major European writers from late Renaissance to present; twentieth-century achievement.

454 Twentieth-Century International Novel (3) Joyce, Camus, Kafka, Nabokov.

455 Persuasive Writing (3) Persuasive strategies in both student and professional writing. Practice in mastering effective logical and emotional appeals.

460 Technical Editing (3) Editing technical material for publication. Principles of style, format, graphs, layout, and production management. Prereq: 456 and 459, or consent of instructor.

461 Advanced Technical and Professional Writing (3) For students entering careers in industry, education, and government who need technical writing skills. Writing of definitions, process descriptions, sets of instructions, descriptions of mechanisms, recommendation reports, abstracts, proposals, and major reports. Prereq: Junior standing in student's major or consent of instructor.

462 Writing for Publication (3) Principles and practices of writing for publication. Dissertations, theses, articles, and reports in science and technology. Prereq: 459 or consent of instructor.

463 Advanced Poetry Writing (3) Further development of skills acquired in basic writing poetry course. Prereq: 363 or consent of instructor.

464 Advanced Fiction Writing (3) Further development of skills acquired in basic writing fiction course. Prereq: 365 or consent of instructor.

471 Sociolinguistics (3) Study of language in relation to society. Sociolinguistic and theoretical focus. Large-scale units: tribes, nations, social groups. Prereq: 371 or 372 or Linguistics 200 or consent of instructor. (Same as Linguistics 471 and Sociology 471.)

472 American English (3) Phonological, morphological, and syntactic characteristics of major social and regional varieties of American English: origins, functions, and implications for cultural pluralism. Prereq: 371 or 372 or Linguistics 200 or consent of instructor. (Same as Linguistics 472.)

474 Teaching English as a Second or Foreign Language (3) Grammatical structures of English; particular grammatical difficulties of non-native learners of English. Basic phonological structures of English. Teaching grammar and phonology to non-native speakers; contrastive analysis of English with other languages. Prereq: Second year of a foreign language. (Same as Linguistics 474.)

475 Teaching English as a Second or Foreign Language II (3) Second language acquisition theory. Issues in teaching four language skills to learners of English. Materials and methods of teaching and testing: preparation of materials. Observations of and team teaching with experienced staff member. Prereq: English 474. (Same as Linguistics 475.)


481 Studies in Folklore (3) Topics vary. May be repeated with different topic. Maximum 6 hrs.

482 Major Authors (3) Content varies. Concentrated study of at least one of most influential writers in British or American literary history: e.g., Donne, Tennyson, Jane Austen, Whitman, Faulkner, Baldwin or Lawrence.

483 Special Topics in Literature (3) Topics vary. May be repeated. Maximum 6 hrs.

484 Special Topics in Writing (3) Original writing integrated with reading, usually taught by professional author. Topics vary. May be repeated. Maximum 6 hrs.

485 Special Topics in Language (3) May be repeated. Maximum 6 hrs with consent of department. (Same as Linguistics 485.)

486 Special Topics in Criticism (3) Content varies. Theoretical and practical approaches to British and American literature. May be repeated with consent of department. Maximum 6 hrs.

489 Special Topics in Film (3) Content varies. Particular directors, film genres, national cinema movements, or other topics. May be repeated with consent of department. Maximum 6 hrs. (Same as Cinema Studies 489.)

495 Introduction to Rhetoric and Composition (3) Historical, theoretical, and empirical modes of inquiry in rhetoric and composition and implications for teaching of composition.

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

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

505 Teaching Freshman Composition (3) Introduction to teaching Freshman English through study of various techniques and philosophies of composition. Required of all first-year teaching associates.

506 Introduction to Literary Research (3) Critical examination of aims of English studies, profession of English teacher, theory of literature, and methods of research: collecting of information, evaluation of material, and transmitting of results of scholarship.

507 Applied Criticism: The Rhetoric of Literary Forms (3) Study and application of ways in which major critics have analyzed form in poetry and prose fiction.
Entomology and Plant Pathology

(College of Agricultural Sciences and Natural Resources)

MAJOR

Entomology and Plant Pathology ................................  M.S.

Carroll J. Southards, Head

Professors:

- Bernard, Ernest C., Ph.D. ................. Georgia
- Gerhardt, Reid R. (Liaison), Ph.D. ......... NC State
- Hilly, James W., Ph.D. .................... Ohio State
- Johnson, Leander F. (Emeritus), Ph.D. ...... Louisiana State
- Lambdin, Paris L., Ph.D. ................... VPI
- Pless, Charles D., Ph.D. ................. Clemson
- Southards, Carroll J., Ph.D. .............. NC State

Associate Professors:

- Grant, Jerome F., Ph.D. ................. Clemson
- Gwin, Kimberly D., Ph.D. ............... NC State
- Reddick, Bradford B., Ph.D. ............. Clemson
- Windham, Mark T., Ph.D. ............... NC State

Assistant Professor:

Owley, Bonnie H., Ph.D. ...................... NC State

The Department of Entomology and Plant Pathology offers a graduate program leading to the Master of Science with a concentration in entomology or plant pathology. Students in entomology may specialize in crop entomology, medical and veterinary entomology, insect biology, insect pest management, or biological control. Students in plant pathology may specialize in fungal, stem, and soil-borne diseases, plant pathology, 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, 6 hours; (3) general inorganic chemistry, 6-8 hours; (4) organic chemistry, 3 hours. In addition, three completed rating forms and a written statement of career goals and interest in entomology or plant pathology are required.

Degree Requirements

The program requires a written thesis based on original research and the completion of a minimum of 24 hours of coursework for graduate credit, approved by the student's advisory committee. Included in the course requirements are two acceptable seminar presentations for 1 hour each. An oral final exam must be passed to the satisfaction of the advisory committee after the thesis has been completed. A minor is not required but may be selected at the option of the student. The minor will include at least 6 hours and 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.

GRADUATE COURSES

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

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

510 Plant Disease Fungi (4) Morphology, taxonomy, biology, and genetics of plant pathogenic fungi; isolation and identification of plant pathogenic fungi. Prereq: 313 or consent of instructor. 2 hrs and 2 labs. F,A

511 Plant Disease Diagnosis (3) Diagnosis of plant diseases, disease symptoms, causal agents and control measures. Prereq: 510 or consent of instructor. 1 hr and 2 labs. Su,A

512 Soil-Borne Plant Diseases (3) Causal agents, host-parasite-soil environment interactions, epidemiology, and control of soil-borne plant diseases. Prereq: 311 or 312 and 1 lab. F,A

515 Physiology of Plant Disease (3) Biochemical and physiological events involved in host-pathogen interactions. Mechanisms of disease resistance. Prereq: Introduction to plant physiology and pathology, or consent of instructor. E

520 Plant Parasitic Nematodes (4) Morphology, taxonomy, ecology, and management of plant parasitic nematodes, host-parasite relationships. Pre
Environmental Practice

(Major of the College of Veterinary Medicine)

MAJOR DEGREE

Veterinary Medicine ................. D.V.M.

L. N. D. Potgieter, Head

Professors:

Farkas, W. R., Ph.D. ................. Duke
Oliver, J. W., D.V.M., Ph.D. ....... Purdue
Potgieter, L. N. D., Ph.D. ........... Iowa State
Reed, C. F. (Emeritus), D.V.M. .... Ohio State

Associate Professors:

New, J. C., D.V.M. ................. Texas A&M
Patton-McCord, S., Ph.D. ......... Kentucky
Reinemeyer, C., D.V.M., Ph.D. .... Ohio State
Rohrbach, B. W., V.M.D. ......... Johns Hopkins
Schroeder, E. C., D.V.M. ............ Michigan State
Schultz, T. W., Ph.D. ............... Tennessee

Assistant Professors:

Frazier, D., D.V.M., Ph.D. .......... NC State

Hahn, K. A., D.V.M. ............... Purdue
Orozco, S. E., D.V.M., Ph.D. ....... Ohio State
Ramsey, E. C., D.V.M. .............. California (Davis)

Clinical Associate:

Clyde, V. L., D.V.M. ............... NC State

Post-Doctoral Research Associate:

Alansari, H. M., Ph.D. ............ Kansas State
Kania, S., Ph.D. .................... Florida
Kelch, W. J., D.V.M. .............. Michigan State
Kennedy, M. A., D.V.M., Ph.D. .... Tennessee

Pathologist:

Petersen, M. G., D.V.M. ............ Colorado State

See Veterinary Medicine for program description.

GRADUATE COURSES

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

501 Special Topics in Environmental Medicine (1-3)
Aberrant metabolism, pharmacokinetics studies, toxicokinetic studies, epidemiology and techniques in molecular biology: atomic absorption, gas chromatography, ultra centrifugation, extractive techniques and radioimmunoassay. Prereq: Consent of instructor. May be repeated. S/NC only. E

502 Registration for Use of Facilities (3-15) Required toward degree requirements. May be repeated. S/NC only. E

503 In Vitro Evaluation of Toxicity (3) Principles and techniques in in vitro evaluation of toxicity, mutagenesis, carcinogenesis, and teratogenesis. Prereq: Biochemistry 561 and consent of instructor. Sp,A

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

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

530 Wildlife Diseases (3) (Same as Wildlife and Fisheries Science 530.)

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

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

607 Diagnosis and Pathogenesis of Virus Diseases of Domestic Animals (3) Advanced study of virus diseases important to domestic animals: virus biology, pathogenesis, pathology and diagnosis technical training in virus diseases diagnosis. Prereq: Cellular and Comparative Biochemistry, and Advanced Topics in Biochemistry, Virology and Virology Lab, or Microbiology-Veterinary Medicine 811-812: 3 hrs and 1 lab. Sp,A

610 Advanced Topics in Environmental Medicine (1-3) Current and future research methodology, laboratory situations, recent advances in instrumentation in analytical techniques for environmental medicine. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

Finance

(College of Business Administration)

MAJOR DEGREES

Business Administration ............... MBA, Ph.D.

Harold A. Black, Head

Professors:

Black, Harold A. (James F. Smith, Jr., Prof.), Ph.D. .......... Ohio State
Dottorweich, William W. (Emeritus), Ph.D. .......... Pennsylvania
Philipobatos, G. C. (Distinguished Prof.), Ph.D. .......... New York
Shirens, Ronald E., Ph.D. ......... UCLA
Wansley, James W. (Clayton Chair of Excellence), Ph.D. .......... South Carolina

Associate Professors:

Auxier, A. L., Ph.D. .......... Iowa
Boehm, T. P., Ph.D. .......... Washington (St. Louis)
DeGennaro, R. P., Ph.D. .......... Ohio State
Ehrhardt, M. C., Ph.D. ............ Georgia Tech
Wachowicz, J. M., Jr., CPA, Ph.D. .......... Illinois

Assistant Professors:

Collins, M. Cary, Ph.D. .......... Georgia
Daves, Phillip R., Ph.D. .......... North Carolina
Gunthorpe, Deborah L., Ph.D. .......... Florida
Stern, Mitchell B., Ph.D. .......... Virginia

BUSINESS ADMINISTRATION CONCENTRATIONS

For complete listing of MBA and Ph.D. program requirements, see Business Administration. MBA Concentration: Finance. The curriculum offers courses for those interested in careers in corporate financial management, security analysis and investments, banking and financial institutions, and real estate.

Minimum course requirements are three courses: Finance 521, plus two courses from the following: 511, 512, 522, 531, 532, 581, or 582. A fourth finance course of the student's choice is strongly advised. Courses selected must be approved by the Finance Department MBA advisor.

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 toward degree requirements. May be repeated. S/NC only. E

511 Contemporary Issues in Corporate Finance (3) Selected topics in financial management, recent developments that have significant impact on strategic issues in financial management. Capital budgeting, financial and ownership structure, dividend policy and corporate growth and control. Prereq: Business Administration 504 and 505 or consent of instructor.

512 Problems in Financial Management (3) Readings and seminars that apply finance technology to real-world investment, financing, and asset management problems. Prereq: Business Administration 504 and 505 or consent of instructor.
theory and evidence of behavior of security returns with interest rate theory, financial market microstructure, variance, capital asset pricing, efficient set theorems, markets, capital market imperfections, and market dynamics. Analysis of term structure. Money and bond markets. Prereq: Business Administration 504 and 505 or consent of instructor.


532 Financial Institutions (3) Analysis of management policies of financial institutions; asset, liability and capital management, Legal, economic and regulatory environment and implications for management. Financial institution structure and competition and changing trends in U.S. financial system. Prereq: Business Administration 504 and 505 or consent of instructor.

551 Financial Management of a New Enterprise (3) Financial issues associated with formation, control, and long-term planning of new enterprise. Acquisition of venture capital. Prereq: Business Administration 504 and 505 or consent of instructor.

561 Real Estate Investment and Finance (3) Financial and market analysis used to make real estate investment decisions. Effects of variety of financing options on rate of return on income-producing properties. Effect of various financing options on consumer's decisions to purchase. Relationship between primary and secondary mortgage markets and impact of those markets on cost and availability of funds for real estate lending. Effects of government intervention (taxation, subsidization, and regulation) in both real estate and mortgage markets. Prereq: Business Administration 504 and 505 or consent of instructor.

599 Special Topics in Finance (1-3) Topics vary. Prereq: 501 or consent of instructor. May be repeated. Maximum 6 hrs.

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


642 Seminar in Finance II: Theory of the Firm (3) Financial theory of firm and financial decision making under conditions of uncertainty, equilibrium models of firm. Option pricing, agency theory, capital structure, economic of information, and dividend policy.

651 Advanced Seminar in Finance I (3) Recent theoretical and empirical developments in micro-finance literature. Topics vary. May be repeated. Maximum 6 hrs.

652 Advanced Seminar in Finance II (3) Recent theoretical and empirical developments in macro-finance literature. Topics vary. May be repeated. Maximum 6 hrs.

Professors:
Collins, J. L., Ph.D. ................................ Maryand
Draughon, F. A., Ph.D. .................................. Georgia
Jaynes, H. O. (Liaison), Ph.D. ............................ Illinois
Melton, S. L., Ph.D. ........................................ Tennessee
Miles, J. T. (Emeritus), Ph.D. ............................ Wisconsin
Overcast, W. W. (Emeritus), Ph.D. ....................... Iowa State
Penfield, M. P., Ph.D. ...................................... Tennessee

Associate Professors:
Biswal, R. N., Ph.D. ....................................... Massachusetts
Christen, G. E., Ph.D. ..................................... Maine
Lowndes, H. D., Ph.D. ..................................... Kansas State
Mount, J. R., Ph.D. .......................................... Ohio State

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

Graduate School rating forms or letters of recommendation from at least three people are required. Respondents should be familiar with the applicant's scholastic ability and professional potential.

THE MASTER'S PROGRAM
Applicants must have a B.S. in food technology, food science or a related scientific field.

Thesis Option
1. Prior to research for the thesis, the student must develop a detailed written research proposal. Registration for 6 hours of 500.

2. In addition to the thesis requirement, a minimum of 24 semester hours of graduate coursework is required. This must be approved by the student's committee and a minimum of 14 hours must be courses numbered above 500. The committee may require additional coursework if the student's progress or background indicates such need.

3. All students are required to take 2 hours of 501 Seminar in their program and are expected to attend this course and participate in discussions during their Master's program. Completion of 510 or equivalent is also required.

4. Students will be required to take a written comprehensive examination covering their coursework. In addition, an oral, final examination covering the problem and coursework is required. The oral examination will be held on the Knoxville campus.

THE DOCTORAL PROGRAM
1. Completion of a Master's degree in the field, or a closely related field, or passing a special qualifying examination is required for admission. Scores on the GRE aptitude test are also required.


3. A minimum of 72 hours beyond the Master's degree, excluding credit for the Master's thesis, is required. Of this, 24 semester hours must be 600 Doctoral Research and Dissertation.

4. All candidates must complete 501 (2 hrs.) and are expected to attend 501 during their Ph.D. program.

5. 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

301 Food Chemistry I (3) Reactions of proteins, enzymes, and additives in foods. Physicochemical interactions and food materials. Prereq: Chemistry 110 or equivalent. 2 hrs and 1 lab. F

311 Food Chemistry II (3) Reactions of inorganic compounds, carbohydrates, lipids and vitamins in foods. Prereq: Chemistry 110 or equivalent. 2 hrs and 1 lab. Sp

320 Food Microbiology (2) Physical, chemical and environmental factors moderating growth and survival of foodborne microorganisms, pathogenic and spoilage microorganisms affecting quality of foods and their control. Prereq: Microbiology 210. Coreq: 429. F


330 Sensory Evaluation of Food (3) Principles and methods of sensory evaluation of foods. Prereq: Basic statistics. 2 hrs and 1 lab. F

441 Preservation of Food (3) Prevention of deterioration and spoilage of foods. Methods of preservation. Prereq: Agricultural Engineering Technology 422. 2 hrs and 1 lab. Sp

451 Dairy Products II (3) Science and technology of processing dairy products. Chemical, physical, and microbiological changes that occur during manufacture. Prereq: Principles of Chemistry. Introduction to Organic and Biochemistry, General Microbiology, 2 hrs and 1 lab. F

460 Meat Products Technology (4) Processing methods for making cured, smoked, fresh, frozen and formed products. Effects of processing methods on product char-
acoustics. Prereq: 350 or consent of instructor. 3 hrs and 1 lab. Sp,A

470 Food Crop Products (3) Food products from plants; types, planting, mechanics, quality attributes, and utility. Prereq: 3 hrs biological science. 2 hrs and 1 lab. Sp,A

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: 410 or 411 or equivalent. 2 hrs and 1 lab. Sp,A

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. E

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

503 Problems in lieu of Thesis (2-3) May be repeated. SNC only. E

510 Instrumental Analysis of Food (3) Modern instrumental methods for control of food manufacturing processes. Prereq: 410-11. 2 hrs and 1 lab. F

511 Color and Flavor of Foods (3) Chemical basis, measurements, and reactions involved in color and flavor changes in foods. Manufacture and application of materials used to modify color and flavor. Prereq: 410-11. 2 hrs and 1 lab. F

520 Food and Industrial Fermentations (3) Microbiology, biochemistry, and technology of food-related fermentations involving dairy products, meat, cereals, fruits, and vegetables. Production of food ingredients and by-product utilization. Prereq: 420-29, 440. Biochemistry 410 or equivalent. 2 hrs and 1 lab. Sp,A

521 Advanced Food Microbiology (3) Microorganisms in foods, their identification, characterization, and relationship to food processing. Isolation of microorganisms from foods and plant material. Prereq: 420-29. 2 labs. Sp,A

540 Food Product Development (3) Art science and technology of developing and marketing new food products. Prereq: 440. 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 biological aspects of food processing. Prereq: 460. 2 hrs and 1 lab. Sp,A

560 Oilseed Products (3) Chemistry and technology of oils and oil ingredients produced from oilseeds. Prereq: 410-11 or equivalent. 2 hrs and 1 lab. Sp,A

590 Special Topics in Food Technology and Science (1-3) Critical reviews of current research and development concerns of food industry. May be repeated. Maximum 9 hrs. F,Sp

593 Directed Studies (1-3) Research on non-thesis topics chosen by student and major professor. Supervised experience in food industry or governmental laboratories. May be repeated. Maximum 6 hrs. E

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

601 Seminar (1) Reports and directed discussion on research topics from current literature. May be repeated. Maximum 3 hrs. F,Sp

620 Food Toxicology (2) Basic and applied concepts in food toxicology; toxicological aspects of processed foods. Mode of action, prevention and control of food toxicants in food supply. Prereq: 410-11, 521, or consent of instructor. Sp,A

640 Advanced Food Processing (3) Role of controlling treatments in modification of food properties; texture, flavor and color characteristics. Prereq: 440, 510, 511 or consent of instructor. Sp,A

Forestry, Wildlife and Fisheries
(Weber College of Agricultural Sciences and Natural Resources)

MAJORS/DEGREES
Forestry……………………………M.S.
Wildlife and Fisheries Science ………M.S.

George T. Weaver, Head

Professors:
Barrett, J. W. (Emeritus), Ph.D.……Syracuse
Buckner, E. R., Ph.D.……………… NY State
Core, H. A. (Emeritus), Ph.D.………..Syracuse
Dimmick, R. W., Ph.D.…………………Washington
Hill, T. K., Ph.D.……………………..Auburn
Little, R. L., Ph.D.…………………NY State
McCooe, C. E. (Adjunct), D.F.……Duke
Ostermeier, D. M., Ph.D.………..York State
Pelton, M. R., Ph.D.…………………..Georgia
Schneider, G., Ph.D.…………………Michigan State
Sharp, J. B. (Emeritus), D.P.A.………..Harvard
Small, G. (Adjunct), Ph.D.……………..Tennessee
Strange, R. J., Ph.D.…………………..Oregon State
Stumbo, D. A., Ph.D.…………………Minnesota
Thor, E. (Emeritus), Ph.D.……………NC State
Weaver, G. T. (Liaison), Ph.D.………..Tennessee
Wilson, J. L., Ph.D.…………………..Tennessee

Associate Professors:
Dearden, B. L., Ph.D.………………Colorado State
Hay, R. L., Ph.D.…………………..NY State
Hopper, G. M., Ph.D.…………………..VPI
King, M. M., Ph.D.…………………..Utah State
Nodvin, S. C. (Adjunct), Ph.D.………..Cornell
Rennie, J. C., Ph.D.…………………..NY State
Schlarbaum, S. E., Ph.D.……………..Colorado State
Smith, K. G. (Adjunct), Ph.D.……………Utah State
Wells, G. R., D.F.…………………..Duke
Winston, P. M., Ph.D.………………….Iowa State

Assistant Professors:
Buehler, D. A., Ph.D.…………………..VPI
Clark, J. D. (Adjunct), Ph.D.………..Arkansas
Fly, J. H., Ph.D.…………………..Michigan
Smith, E. R. (Adjunct), Ph.D.………..Tennessee
VanMiegroet, H. (Adjunct), Ph.D.………..Washington

Graduate study leading to the Master of Science with Majors in Forestry and in Wildlife and Fisheries Science is offered by the Department of Forestry, Wildlife and Fisheries. The Master of Science in Business Administration with a concentration in forest industries management is available for qualified students. This degree program is offered by the College of Business Administration with participation by the Department of Forestry, Wildlife and Fisheries. The Doctor of Philosophy with a specialization in forest biology, wildlife science, or fisheries science can be achieved through the University's intercollegiate graduate program in Ecology.

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 also have taken the Graduate Record Examination (GRE). 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.

Thesis Option
1. Prior to research for the thesis, the student is required to develop a detailed written research proposal. Registration for 6 hours of Thesis (Forestry 500 or Wildlife and Fisheries 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 shall be from outside the department. In addition to the thesis requirement, a minimum of 24 hours of graduate coursework is required. This work must be approved by the graduate 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 courses to be selected in consultation with the student's committee in their programs. This is required of each graduate student in residence fall semester.
4. An oral examination covering the thesis and coursework is required.

Non-Thesis Option (Forestry only)
1. Thirty-five hours of graduate coursework of which 23 must be at the 500 level or above is required.
2. A graduate committee of no fewer than 3 faculty members will be selected. At least one member shall be from outside the department. The committee will meet and schedule the student's program during the first semester in residence.
3. Three hours of Forestry 511 are required.
4. Nine hours of coursework in the department must be at the 500 level or above exclusive of Forestry 511.
5. Final comprehensive written and oral examinations shall be taken upon completion of no fewer than 28 hours of approved study.
6. A concentration in managing natural resource organizations is available under the non-thesis option with a major in Forestry. The minimum core requirements include: Forestry 511, 570, and six additional hours of Forestry courses to be selected in consultation with the student's committee; Political Science 564, Management 504, and Planning 550. Fourteen hours of elective coursework are selected with the faculty advisor.

Forestry

GRADUATE COURSES
422 Forest and Wildland Resource Policy (3) Policy formulation; criteria for policy determination; forest and wildland law and regulation; theory of conflict resolution; formal and informal resolution. Prereq: Senior standing. F
423 Wildland Recreation Planning and Management (3) Planning processes, master and site planning, site
design projects; management strategies, methods of visitor and recreation site management; case studies. Weekend field trips. Prereq: 321, 323, Ornamental Horticulture and Landscape Design 280, or consent of instructor. 2 hrs and 1 lab. 1 yr

433 Wood Composites and Gluing (3) Principles of adhesion; wood adhesives; fundamentals of plywood and composite panel manufacturing. Evaluation resin properties; bonding strength and durability. Prereq: 331, and 380, or consent of instructor. 2 hrs and 1 lab. 2 yrs

434 Measurement and Marketing of Wood Products (3) Measurement systems used for sale and transfer of wood products. Application of market principles and analysis to wood products markets and economic structure of wood products industry. Prereq: 431, 433 and 435 and Forestry, Wildlife and Fisheries 313, or consent of instructor. 2 hrs and 1 lab. 2 yrs

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

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

511 Problem Analysis in Forest Resources (3) Problem identification and solution in forest resources management. Identify, analyze and prepare written report. Topic and report must have approval of graduate committee. Available only to students in 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/NC only. F

520 Advanced Forest Tree Biology (3) Growth, reproduction, and physiology of trees; forest ecology; variability and taxonomy of forest trees. Prereq: Graduate standing in forestry or biological science, or consent of instructor. Sp,A

530 Advanced Forest Resource Management (3) Analysis of forest management problems as exemplified in public agencies and private firms. Forest organization and computerized regulation systems; financial and operational planning tools. Prereq: Consent of instructor. Maximum 6 hrs. E

540 Genetics in Forestry (3) Genetic improvement of forest trees, selection of superior phenotypes; field testing for genetic variability; tree breeding; development of seeded orchards; hybridization; tree cytology and tissue culture; use of geostatistics in forest planning and conducting forest genetics research. Prereq: Silvicultural methods and Biology 220 or consent of instructor. Sp,A

550 Recreation Planning for Forests and Associated Lands (3) Planning process for recreation development on forests and associated lands; analysis and critique of specific contemporary alternatives. Overnight field trips. Prereq: Senior level in forest recreation or consent of instructor. F,A

555 Forest Recreation Research Methods (3) Evaluation of research methodologies through readings and case studies; techniques of research resource monitoring and research; current research trends in wilderness recreation. Prereq: 321 or equivalent and statistics. F,A

560 Industrial Forestry I (3) Economic structure of forest products industries. Identification and analysis of industry structure and markets, domestic and foreign. Current trends and considerations in the forest products industries; impacts on short term and strategic planning. Prereq: Senior level forest management or consent of instructor. F,A

565 Industrial Forestry II (3) Evaluation of alternative strategies for firms in industry. Role of timber and timberland in integrated firm from standpoint of financial and strategic evaluations for different levels of self-sufficiency in sawmills, pulp mills, and industrial structure; impacts of aspect of fee and leasehold interests. Other financial and institutional arrangements affecting forest management and marketing for private, industrial firms. Prereq: Senior level forest management or consent of instructor. 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 organization. Prereq: Undergraduate level policy and administration and policy or consent of instructor. F,A

590 Advanced Silviculture (3) Silvicultural characteristics, silvicultural practices and systems applied to commercially important hardwoods and softwoods. In-depth analysis of silvicultural principles, involved and tools used, prescribed fire, pesticides, in regeneration and management; computer modeling of stand dynamics, structure, growth yield. Prereq: Undergraduate level silviculture course or consent of instructor. 2 hrs and 1 lab. Sp,A

580 Forest Instruments and Equipment (3) A survey of forest instrumentation and equipment. Prereq: Consent of instructor. 3 hrs and 1 lab. F

585 Advanced Forest Biometry (3) Application of sampling techniques to forest inventory; fixed and variable plot sampling; line sampling; Poisson sampling, regression estimators; multistage and multistage sampling. Growth and yield prediction for even-aged and uneven-aged stands. Prereq: 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. E

593 Independent Study in Forestry (1-4) May be repeated. Maximum 6 hrs. E

Forestry, Wildlife & Fisheries

GRADUATE COURSES

410 Wildlife Habitat Evaluation and Management (3) Ecological relationships between wildlife and habitat. Evaluation, modeling, and management of wildlife habitat effects of land-use practices on wildlife habitat. Weekend field trips. Prereq: Principles of Wildlife and Fisheries Management or General Ecology, 2 hrs and 1 lab. F

416 Planning and Management of Forest, Wildlife and Fisheries Resources (3) Integrated forest and wildlife resource management systems. Forest land management plans and analyzing case studies including conflict resolution. Applicable to majors in Forestry and Wildlife and Fisheries. Prereq: Senior standing 1 hr and 2 labs. Sp

525 Management of Forestry, Wildlife and Fisheries Resources (2) Current technologies and management strategies concerning wise use of forestry, wildlife, and fisheries resources necessary for decision making and implementation. Prereq: 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 six weeks. Sp

535 Environmental Impacts to Natural Ecosystems (3) Current environmental problems impacting natural ecosystems: climatic change, acidic deposition, air pollution, species declines, and introductions of exotic species. Management methodologies to mitigate environmental problems. Overnight field trips. Prereq: 416 or equivalent or consent of instructor. Sp

540 Seminar on Integrated Resources Management in Biosphere Reserves (2) MAB program, UNESCO-supported global conservation initiative. Analysis of integrated resources management practices that demonstrate concept of sustainable development. Environmental policy and application of science to management practice. Sp

570 Management & Policy of Forest Resource Organization (3) Theory and application of management as applied to natural resource organizations: institutional

Wildlife and Fisheries Science

GRADUATE COURSES

440 Wildlife Techniques (2) Methods of wildlife damage control, forest, farmland, wetland wildlife habitat management, identification of wildlife field signs, wildlife capturing techniques and management plan preparation. Weekend field trips. Prereq: Principles of Wildlife and Fisheries Management or consent of instructor. 1 hr and 1 lab or field. F

442 Fisheries Techniques (2) Active and passive sampling techniques for fish and aquatic organisms; population estimation methods; fish handling and transport; food habits analysis; marking and tagging techniques; age determination and incremental growth analysis; stream assessment; equipment and instrumentation usage and maintenance; statistical analysis 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 fishes: population estimation, age, growth and biological assessment, and stocking. Prereq: Forestry, Wildlife and Fisheries 317 or Biology 230, and 6 hrs of mathematics. 2 hrs and 1 lab. Sp

444 Ecology and Management of Wild Mammals (3) Biology and ecological characteristics of game mammals and endangered mammals. Current principles and practices of wild mammal management. Prereq: Forestry, Wildlife and Fisheries 317 or Biology 230. 2 hrs and 1 lab. 1 week, 1 weekend field trip. 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: Forestry, Wildlife and Fisheries 317 or Biology 230. 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 perspectives of ethical behavior in practices of wildlife and fisheries management. Lectures, panel discussions, and case studies. Team taught. Prereq: Senior standing. Sp

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

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

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. Sp,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 and consent of instructor. Sp

530 Wildlife Diseases (2) Necropsy of birds and mammals for diagnosis of various diseases and analysis of preparing pathological materials in field and laboratory. Investigative procedures concerning wildlife diseases. Prereq: 1 yr biology. 444 or 445, or consent of instructor. (Same as Environmental Practice 530.) Sp,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) Detailed characteristics, assumptions, and current technologies for
500 Fish Physiology (3) Mechanisms of circulation, excretion, osmoregulation, and neural/hormonal control of these systems in fishes. Practical applications of fish physiology in water pollution assessment, fish culture and management. Prereq: Senior or graduate standing in biological sciences. Sp,A

555 Fish Culture (3) Principles, concepts and techniques of culturing economically important fish and shellfish species. Prereq: 443 or consent of instructor. 2 hrs. and 1 lab. Sp,A

590 Advanced Topics in Wildlife and Fisheries Science (1-3) Recent advances and concepts, research and lab. Sp,A

593 Independent Study in Wildlife and Fisheries Science (1-4) May be repeated. Maximum 6 hrs. E

French
See Romance Languages

Geography
College of Liberal Arts

MAJOR DEGREES

Geography ........................................ M.S., Ph.D.

Sidney R. Jumper, Head

Professors:
Aiken, Charles S., Ph.D. ................. Georgia
Beli, Thomas L., Ph.D. ................. Iowa
Foresta, Ronald, Ph.D. ................. Rutgers
Hammond, E. H. (Emeritus), Ph.D. ....... California
Paludan, C. T. (UTSI), Ph.D. ................ Denver
Ralston, Bruce, Ph.D. .................... Northwestern
Schmude, Theodore H., Ph.D. ........... Wisconsin
Wilbanks, T. J. (Adjunct), Ph.D. ............ Syracuse

Associate Professors:
Blasing, T. J. (Adjunct), Ph.D. ............. Wisconsin
Brinkman, Leonard W., Jr., Ph.D. ......... Wisconsin
Brown, Marilyn (Adjunct), Ph.D. .......... Ohio State
Pulsipher, Lydia, Ph.D. ................. Southern Illinois
Reider, John B., Ph.D. ..................... Louisiana State

Assistant Professors:
Harden, Carol P., Ph.D. ................. Colorado
Liu, Cheng (Adjunct), Ph.D. .............. Tennessee
McKeown-Ice, Rosalyn (Adjunct), Ph.D. ... Oregon

The department offers the Master of Science and Doctor of Philosophy degrees. The Master's degree emphasizes development of professional competence as a geographer and offers opportunities to gain substantial depth in a concentration or a major technique. An emphasis in geographic information systems is available for students who have appropriate backgrounds in mathematics and computer science. The doctoral program is for those who have demonstrated proficiency in conducting independent research. The department is particularly well-qualified to direct research in geography of the natural environment (biogeography, biological conservation, geomorphology), spatial analysis (especially transportation and location analysis), Latin America, the American South, and urban geography. Graduate concentrations include nonmetropolitan areas, land use, urban geography, transportation geography, geography of resources, geography of development, and regional and historical geography of the United States.

THE MASTER'S PROGRAM

The department offers the thesis or 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 doctorate is a research degree and is granted only to those who demonstrate proficiency in conducting independent research. Students must have a broad foundation and understanding of the discipline; these should have been achieved in a comprehensive Master's program. Course requirements for the degree shall be determined by the student's faculty committee in accordance with specific interests and needs. The program must include 504, 515, 519, 599, 9 hours of 600-level seminars, and (at each offering during residency) 501. A minimum of 12 hours must be earned in related fields outside the department. Competence in cartography and quantitative techniques is required. Additional tools, including languages, will be required as appropriate to the student's areas of research specialization. Examinations required for admission to candidacy include a written comprehensive; written examinations on two special fields; and an oral examination on the student's program, the special fields, and the dissertation proposal. Also required is a final oral examination on the dissertation and on other aspects of the program as determined by the student's doctoral committee.

ACADEMIC COMMON MARKET

An agreement among southern states for shared graduate programs allowing full-time residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The Ph.D. program in Geography is available to residents of the states of Alabama, Arkansas, Mississippi, South Carolina, Virginia, or West Virginia. The Master's program is also available to residents of Texas and Virginia. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

GRADUATE COURSES

411 Computer Mapping and Geographic Information Systems (3) Conception, management, and presentation of digital data for spatial analysis and cartographic data structures. Prereq: 310 and knowledge of computer language or consent of instructor. 2 hrs and 1 2-hr lab.

412 Cartographic (3) Cartographic techniques applied to design, compilation, and reproduction of maps and other graphics. Prereq: 310 or consent of instructor. 2 hrs and 1 2-hr lab.

413 Remote Sensing: Types and Applications (3) Principles and uses of remote sensing imagery, digital data, and archival data; use of interpretation and mapping techniques. Prereq: 310 or consent of instructor.

415 Quantitative Methods in Geography (3) Geographical application of statistical techniques, point pattern analysis, and areal units. Prereq: Mathematics 115 or two semesters of calculus or consent of instructor.

421 Geography of Folk Societies (3) Geographical study of folk culture, traditional material culture and rural settlement examples from eastern North America and selected foreign areas. Prereq: 101-02 or 320 or consent of instructor.

422 Historical Geography of the United States (3) Survey of changing human geography of the United States during four centuries of settlement and development, changing population patterns, development of agricultural regions, and the patterns of urban-industrial development. Prereq: 361 or consent of instructor.

433 The Land-Surface System (3) Characteristics of surface form, water, vegetation, and surface materials, and their regional interrelationships. People as evaluators and agents of change. Prereq: Geography of the Natural Environment or consent of instructor.

434 Climatology (3) General circulation system leading to world patterns of climates. Climatic change and modification, and interrelationships of climate and human activity. Prereq: Geography of the Natural Environment or consent of instructor.

435 Biogeography (3) Changing distribution patterns of plants and animals on 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.

437 Urban Geography (3) Geographical perspectives. Prereq: Geography of the Natural Environment or consent of instructor.

441 Urban Geography (3) Concepts and theories concerning development and significance of systems of cities and internal morphology of cities. Prereq: 101-02 or 141 or 340 or consent of instructor. (Same as Urban Studies 441.)

443 Rural Geography (3) Geographical appraisal of rural areas of the United States: small towns and urban fringes. Problems and potentials of rural America. Prereq: 101-02 or 141 or 340 or consent of instructor.

445 Geography of Resources (3) Study of factors related to variations in resource availability from time to time and the their effects on human activities and economic development. Prereq: 101-02 or 141 or 340 or consent of instructor.

449 Geography of Transportation (3) Examination of transportation systems, their effects on trade patterns, land use, location problems, and development. Prereq: 141 or 340 or consent of instructor.

450 Process Geomorphology (3) Same as Geography 450.

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

501 Colloquium in Geography (1) Discussion of departmental research, current research literature, and general topics. Registration required of resident graduate students whenever offered. May be repeated. Maximum 4 hrs. Prereq: May be applied toward graduate degree. S/NC only.

502 Registration for Use of Facilities (3-15) Required of resident graduate students whenever offered. May be repeated. Maximum 6 hrs. May be applied toward graduate degree. S/NC only.

503 Registration for Use of Facilities (3-15) Required of resident graduate students whenever offered. May be repeated. Maximum 6 hrs. May be applied toward graduate degree. S/NC only.
Geological Sciences

Geology

MAJOR

DEGREES

Harry Y. McSween, Head

Professors:
Broadhead, Thomas W., Ph.D. ... Iowa
Hatcher, Robert D., Jr. (Distinguished Scientist), Ph.D. ... Tennessee
Kopp, Otto C., Ph.D. ... Columbia
Labolka, Theodore C., Ph.D. ... Caltech
McLaughlin, Robert E. (Emeritus), Ph.D. ... Tennessee
McSween, Harry Y., Ph.D. ... Harvard
Misra, Kula C., Ph.D. ... Western Ontario
Taylor, Lawrence A., Ph.D. ... Lehigh
Walker, Kenneth R. (Carden Prof.). Ph.D. ... Pittsburgh
Walls, James G. (Emeritus), Ph.D. ... North Carolina

Associate Professors:
Byerly, Don W., Ph.D. ... Tennessee
Clark, G., Michael, Ph.D. ... Penn State
Delcourt, Paul A., Ph.D. ... Minnesota
Driese, Steven G., Ph.D. ... Wisconsin
Dunne, William M. (Liaison), Ph.D. ... Bristol
McKinney, Michael J., Ph.D. ... Yale
Williams, Richard T. II., Ph.D. ... VPI&SU

Assistant Professors:
McKay, Larry D., Ph.D. ... Waterloo
Mora, Claudia I., Ph.D. ... Wisconsin

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 university work, two rating forms or letters of recommendation, and GRE scores, including the subject exam in geology (or in another area if geology was not the area of previous university-level concentration). Students are not normally admitted under provisional or non-degree status.

Prerequisite for both degrees is a Bachelor's degree, including coursework in mineralogy, optical mineralogy, petrology, stratigraphy, paleontology, structural geology, and field geology. One year each of coursework in calculus and chemistry and one year of coursework in biology, physics, or statistics are also required. Applicants lacking any of these may be admitted, but the deficiencies must be removed within the first year without graduate credit. Substitutions may also be allowed.

THE MASTER'S PROGRAM

The department offers the thesis option in the Master's program. Graduation requires successful oral defense of a written thesis and a minimum 3.0 GPA in all graduate coursework.

Course requirements are a minimum of 30 semester hours, including:
1. Six hours of Thesis 500.
2. Registration in 595 during the first two years in residence. Two hours may be counted toward the 30-hour minimum. This requirement may be waived in unusual circumstances.
3. Sixteen hours of geology courses, with at least 14 hours of the 500 or 600 level, including at least one course from each of the following groups:
   - Group I: 510, 530, 560, 580.
   - Group II: 521, 525, 545, 546, 550, 557, 561.
   - Group III: 570, 571, 576, 577.
4. Four 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, completion of all course requirements with a minimum 3.0 GPA, completion of the language requirement, and successful oral defense of the dissertation.

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

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

The student must demonstrate a reading knowledge of a foreign language in which there
is a body of geologic literature, as approved by the student's dissertation committee.

GRADUATE COURSES

401 Quantitative Methods in Geology (3) Applications of calculus and differential equations to problems in earth sciences. Examples of diffusion equation in hydrogeology; wave equations in seismology; mechanical modeling and boundary conditions in structural geology and tectonics. Prereq: The Dynamic Earth or Earth, Life, and Time, 2 semesters of Calculus.

410 Advanced Mineralogy (3) Crystal chemistry of rock-forming and accessory minerals; electromagnetic radiation and crystalline solids. Optical properties of minerals, visible and infrared spectroscopy, and x-ray diffraction. Laboratory exercises emphasize thin section and x-ray diffraction methods of mineralogy. Prereq: 310. 2 hrs and 1 lab.

420 Paleocology (4) Principles of ecological analysis as applied to fossils and fossil assemblages: data collection and interpretation. Laboratory designed around preparation of scientific reports based on field and laboratory analysis. Writing emphasis course. 3 hrs and 1 lab.

421 Invertebrate Paleontology I (3) Survey of preservational processes and geologically important representatives of Protista, Porifera, Cnidaria, Bryozoa, and Brachiopoda. Evolutionary biology, skeletal structures, ecology, and stratigraphic distribution. Prereq: 320 or consent of instructor. 2 hrs and 1 2-hr lab.

422 Invertebrate Paleontology II (3) Survey of "higher invertebrates": Arthropoda, Crustacea, Mollusca, Annelida, Echinodermata, Graptozoa, Conodonta, Chordata. Functional morphology, skeletal structures, ecology, and stratigraphic distribution. Prereq: 320 or consent of instructor. 2 hrs and 1 2-hr lab.

426 Paleobotany and Palynology (3) Evolutionary history of terrestrial plant life through examination of fossil record of macrobotanical remains, spores, and pollen grains. Origin and diversification of Gymnosperms and Angiosperms and modern descendants in floristic provinces through geologic time. Prereq: 102; Botany 310-20 or consent of instructor. (Same as Botany 426.) 3 hrs and 1 lab.

440 Field Geology (6) Summer field course for advanced undergraduate geology majors and first-year graduate students in geology. Field trip to various parts of the state. Prerequisites: Field study at Geology Field Station and requires full time of student. Synthesis of major aspects of geological sciences in societal context. Field techniques demonstrated, practiced, and applied to solution of geologic problems. Prereq: Completion of major core courses and consent of instructor.

445 Regional Geology of the United States (3) Evolution of geologic provinces within U.S., integration of several types of geologic data. Prereq: 305 or 375. 3 hrs and 1 lab.

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.) 1.2 hrs and 1.2 lab.

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: 12 hrs of geology courses. 2 hrs and 1.3-hr lab or field period.


471 Fieldwork in Geophysics (2) Geophysical investigations applied to solution of problems in tectonics, hydrogeology, or environment. Summer field course off-campus. Prereq: 470 or consent of instructor. 20 or 2 or 2 or 2 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. Interdependence of change and vegetational responses during last 2.5 million years. Prereq: Consent of instructor.


501 Aqueous Geochemistry (4) Introduction to and applications of equilibrium thermodynamics to surface environments; geochemistry of natural water, weathering reactions, and early sediment diagenesis. Prereq: Chemistry 120-30. 3 hrs and 1 lab or seminar.

531 Stable Isotope Geochemistry (3) Theoretical aspects of isotope fractionation and applications to geologic systems. Isotope exchange, variations in natural waters, diagenetic, hydrothermal and metamorphic systems. Prereq: General Chemistry or equivalent.


560 Geochemical Analysis (3) Collection and treatment of geological data using electron microprobe, x-ray fluorescence, and atomic absorption spectrophotometric techniques. Prereq: 310 or consent of instructor. 2 hrs and 1 lab.

570 Advanced Structural Geology (4) Current topics in structural geology and tectonics of mountain belts; recent developments. Prereq: 330 or equivalent, or consent of instructor. 3 hrs and 1 lab or seminar.

571 Regional Tectonics and Structural Geology (3) Major subdivisions of earth's crust and processes that form them. Comparison of internal structure of mountain chains and how they function in increasing continental crust. Examples from different parts of world. Prereq: Structural geology or consent of instructor.

572 Plate Tectonics and Cogeny (4) Tectonic development of oceanic plates: historical aspects of plate tectonic theory; current literature and ongoing research for both modern and ancient examples. Prereq: 370 or consent of instructor. 3 hrs and 1 seminar.

575 Regional Geomorphology (3) Development of physical earth from solar nebula to present. Formation, composition and evolution of hydrosphere, crust, mantle, and core. Interdependence of change and vegetational responses during last 2.5 million years. Prereq: Consent of instructor.

580 Ore Petrology (3) Detailed study of selected ore deposits; petrology of ore-gangue assemblages. Prereq: 480 or consent of instructor. 2 hrs and 1 2-hr lab.

585 Special Problems in Geology (1-3) Directed study or special topics. Prereq: Consent of instructor. May be repeated. Maximum 10 hrs.

588 Foreign Study (1-15) See page 32.

591 Off-Campus Study (1-15) See page 32.

593 Independent Study (1-15) See page 32.

594 Field Problems in Geology (1-2) Literature study and seminars on specific regions of geologic interest, supplemented by extended field trip. Prereq: Consent of instructor. May be repeated. Maximum 8 hrs.

595 Selected Topics in Geology (1) Presentation of graduate, faculty, and visiting scientist research. Registration required each semester except summer for resident full-time graduate students. S/N only.

600 Doctoral Research and Dissertation (3-15) P/NP only. E 610 Seminar in Paleontology (3) May be repeated with consent of department. Maximum 9 hrs.
German and Slavic Languages
(Ph.D. in Modern Foreign Languages)

MAJORS DEGREES
German ........................................ M.A.
Modern Foreign Languages ................ Ph.D.
David E. Lee, Head

Professors:
Falen, James E., Ph.D. ......................... Pennsylvania
Fiene, Donald M., Ph.D. ......................... Indiana
Kratz, Henry (Emeritus), Ph.D. ........ Ohio State
Osborne, J. C. (Liaison), Ph.D. ............ Northwestern
Rice, Martin P., Ph.D. ............................ Vanderbilt
Rittenhoff, Ursula C. (Emeritus), Ph.D. .... Connecticut

Associate Professors:
Hodges, Carolyn R., Ph.D. ................. Chicago
Lauckner, Nancy A., Ph.D. ............... Wisconsin
Lee, David E., Ph.D. ............................ Stanford
Mellor, C. J., Ph.D. ............................... Chicago

Assistant Professor:
Moser, Beverly, Ph.D. ............................ Georgetown

The Department of Germanic and Slavic Languages offers two advanced degrees: the Master of Arts in German and the Doctor of Philosophy in Modern Foreign Languages. Inquiries should be addressed to the head of the department.

THE MASTER'S PROGRAM
The department requires a minimum of 30 semester hours including 15 hours of coursework numbered 500 and above and 6 hours of thesis 500.

THE DOCTORAL PROGRAM
The Ph.D. in Modern Foreign Languages is offered jointly by the Department of Germanic and Slavic Languages and the Department of Romance Languages and requires advanced training in at least two foreign languages.

Admission Requirements
Applicants must have completed a B.A. in either French, German or Spanish to be accepted into this program. Both graduates of institutions in the United States and those with undergraduate degrees from institutions outside the United States must have a grade point average of at least 3.0. Consideration will also be given to applicants who do not have an undergraduate degree in one of the three foreign languages but do have the equivalent of an undergraduate major in one of them.

Degree Requirements
Candidates must complete a minimum of 63 semester hours of coursework beyond the Bachelor's degree in addition to 24 hours of doctoral research and dissertation. Two tracks are available.

1. First Concentration: French, German, or Spanish. It consists of a minimum of 39 semester hours beyond the Bachelor's degree, distributed as follows:
   - A maximum of 6 hours of 400-level classes taken for the M.A. may be applied.
   - A minimum of 21 hours at the 500 level (exclusive of thesis hours) including French 584 (3), German 560 (3), or Spanish 550 (3); German 512 (3), French 512 (3), or Spanish 512 (3); French 515-16 (2,2) or German 530 (3).
   - At least 12 hours at the 600 level (exclusive of dissertation hours).

2. Second Concentration: French, German, Italian, Russian, or Spanish (different from the first concentration). It consists of at least 18 hours of courses beyond the Bachelor's degree, at least 12 of which must be at the 500 or 600 level.

3. Cognate Field: Six hours must be in graduate courses numbered 400 and above in a field outside the department of the first concentration but related to the student's principal area of research. If the cognate field is yet a third foreign language, a reading proficiency exam will be administered after completion of the 6 cognate hours by the language section concerned.

4. Additional requirements for both tracks: A student must demonstrate competence in the languages of both the first and second concentrations by taking a test in each language. The test will include reading, writing, listening, and speaking, and should be completed by the time the student reaches 40 hours of study beyond the bachelor's degree. Standardized examinations that may be used for this purpose include applicable portions of either the National Teachers Examination, the MLA Examination for Teachers and Advanced Students, or the proficiency standards of the United States Foreign Service Institute (FSI). If the student has not chosen a third language as his or her cognate area, basic competence (determined by a reading examination with translation into English administered by the department concerned) in a third language is required. If the student's first and second languages are Romance languages, the third language should be chosen from another language family.

5. Comprehensive examination on the language and literature of the first and second languages must be passed before the student may be admitted to candidacy. The candidate is required to defend his/her dissertation in an oral examination. Central emphasis is put on the doctoral dissertation as a final test of the candidate's scholarly qualifications.

Graduate Teaching Assistants in the program should have the opportunity and will be strongly encouraged to instruct at least two foreign languages, subject to staffing needs.

Doctoral students are strongly encouraged to reside and study abroad and will be assisted in identifying potential sources of financial support (e.g., Fulbright, McClure, Rotary fellowships) for additional courses, see Romance Languages.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The Ph.D. program in Modern Foreign Languages is available to residents of the state of Alabama or Kentucky. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

German

GRADUATE COURSES

331-32 Elements of German for Upper-Division and Graduate Students (33) 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.

420 Selected Topics in German Literature from 1750 to the Present (3) 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, Linguistics 425, and Russian 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 changes, language families, Proto-Indo-European, and other proto languages. Prereq: 6 hrs of upper division foreign language courses (excluding courses in translation or graduate reading courses). (Same as Russian 426, French 426, Spanish 426, and Linguistics 426.)

433 Structure of the German Language (3) Contrastive English-German segmental and suprasegmental phonemes, contrastive English-German linguistic structures, selected topics in advanced German grammar and syntactic analysis. Prereq: 6 hrs of upper division German language courses (excluding courses in translation or graduate reading courses). (Same as Linguistics 436.)

436 History of the German Language (3) Development of German language from Indo-European through Proto-Germanic, Old High German, Middle High German to New High German. Internal and external linguistic history of German speech. Prereq: 6 hrs of upper division German language courses (excluding courses in translation or graduate reading courses). (Same as Linguistics 436.)

485 Business German (3) Survey of German used in fields of business, government, administration, and economics. Prereq: 6 hrs of upper-division German excluding courses in translation and graduate courses.

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

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

510 German Phonetics and Advanced Grammar (3) Advanced work in phonetics, pronunciation, and selected topics in German grammar. For teachers and prospective teachers. Prereq: Consent of instructor.

512 Teaching a Foreign Language (3) Practical application of methods for teaching and evaluating basic language skills and foreign language skills, and cultural knowledge through seminars, demonstrations, peer teaching, and observation of foreign language classes. Required of all M.A. and Ph.D. students holding GTA's, except those whose previous training or experience warrants leave by department.

519 Bibliographical Methods (1) Bibliographical methods, major reference works and bibliographical problems in language and literature. 520 Proseminar (2) Advanced training in use of bibliographical and reference tools; illustrative problems; paper preparation.

541-42 Medieval German Language and Literature (3,3) 541—Introduction to Middle High German; 542—Readings in Medieval German Literature.

550 Studies in German Literature (3) Content varies. May be repeated. Maximum 6 hrs.

551 German Humanism, Reformation and Baroque (3) Content varies. May be repeated. Maximum 6 hrs.

552 German Enlightenment, Rococo, and Sturm und Drang (3) Content varies. May be repeated. Maximum 6 hrs.

553 German Classicism and Romanticism (3) Content varies. May be repeated. Maximum 6 hrs.

554 German Realism and Naturalism (3) Content varies. May be repeated. Maximum 6 hrs.

555 Modern German Literature 1890-1945 (3) Content varies. May be repeated. Maximum 6 hrs.

556 Modern German Literature 1945-Present (3) Content varies. May be repeated. Maximum 6 hrs.

550 German Literary Theory and Criticism (3)

561-62 Directed Readings in German Language and Literature (3,3)

571-72 Old Norse Language and Literature (3,3)

591 Foreign Study (1-15) See page 32.

592 Off-Campus Study (1-15) See page 32.

593 Independent Study (1-15) See page 32. Letter grade or S/NC.

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

610 Gothic (3) Phonology, morphology, and syntax of Gothic language. Relationship to Indo-European languages and other Germanic languages. Readings from Gothic Bible.

611 Old High German (3) Phonology, morphology, and syntax of Old High German. Representative readings.

612 Old Saxon (3) Phonology, morphology, and syntax of Old Saxon. Representative readings.

621-22 Seminar in German Literature (3,3) May be repeated. Maximum 18 hrs.

631-32 Seminar in German and Germanic Philology (3,3)

Russian

GRADUATE COURSES

425 Introduction to Descriptive Linguistics (3) (Same as French 425, German 425, Spanish 425, and Linguistics 425.)

426 Methods of Historical Linguistics (3) (Same as French 426, German 426, Spanish 426, and Linguistics 426.)

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.

520 Proseminar (3) Bibliography; methods; illustrative problems; preparation of papers.

521 Works of Dostoevsky in English Translation (3) Crime and Punishment, Brothers Karamazov, and other works. No foreign language credit.

522 Works of Tolstoy in English Translation (3) War and Peace, Anna Karenina, and other works. No foreign language credit.

550 Studies in Russian Literature (3) Content varies. May be repeated. Maximum 9 hrs.

591 Foreign Study (1-15) See page 32.

Health, Leisure, and Safety

Health

Graduate programs are available leading to the Master of Science, the Master of Public Health, the Specialist in Education, the Doctor of Education, and the Doctor of Philosophy with a major in Education. Inquiries should be directed to the department head.

Health
zations from public health or safety as listed under Education.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The Ed.D. program in Health Education is available to residents of the states of Kentucky or West Virginia. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

GRADUATE COURSES

540 Evaluation in Health Promotion and Health Education

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. Sp

520 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. Maximum 3 hrs. F; Sp

510 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.) Su

610 Critical Analysis of Writing and Research (3) Analysis of writing and research in health related areas. F

620 Advanced Research Techniques in Health (3) Advanced theory and techniques of research design and methodologies in health discipline. Prereq: 590, 610. Sp

580 Health Aspects of Gerontology (3) Understanding of biological, psychological and sociological aspects of aging as related to health and well-being of individuals. (Same as Public Health 650.) Su

555 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 the world. (Same as Public Health 660.) Sp

680 Seminar in Health (1) Ramifications of health and health education innovations in relation to evolving field and discipline. Prereq: Advanced standing as doctoral candidate. May be repeated. Maximum 3 hrs. F; 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, health planning/administration, and occupational/environmental health and safety. 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. Appropriate forms are available from the department's program in Public Health. Preferential consideration for admission to degree status shall be given to those with a minimum undergraduate grade-point average of 2.8 and with at least one year of professional experience in a health-related occupation. No provisional students will be admitted. As a restricted program, non-degree admission requires departmental recommendation.

THE MASTER'S PROGRAM

The M.P.H. is a non-thesis program requiring completion of 36 semester hours coursework, including 9 weeks of field practice. Field practice provides a full-time experience with an affiliated health agency or organization offering one or more health programs. Of importance, field practice allows the student to apply academic theories, concepts, and skills in an actual work setting. The student 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.

MINOR IN GERONTOLOGY

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

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.P.H. program in Public Health is available to residents of the states of Arkansas, Florida, Kentucky, Louisiana, or Virginia. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

COURSE REGISTRATION

Graduate students are ineligible to enroll in 500-level public health courses. Non-degree students must obtain permission from department/program head 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 Health in the Work Environment (3) Fundamental activities in field of industrial health aimed at reducing health problems for employees. Workplace health hazards and problems of concern to nurses, medical staff, management, engineers and others in industrial health and safety fields. Prereq: Consent of instructor. May not be taken for credit by occupational health concentration majors. F

480 Special Topics (3) Prereq: Consent of instructor. May be repeated under different topic. Maximum 6 hrs. E

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. Maximum 6 hrs. E

505 Continuing Education in Public Health (1-3) Selected learning activities and experiences in specialized areas of public health utilizing workshop format. May be repeated. Maximum 3 hrs. F

509 Graduate Seminar in Public Health (1) In-depth discussion of timely topics reflecting scope of public health as discipline and its interrelationship with many other academic and professional disciplines. Speakers both internal and external. May be repeated. Maximum 4 hrs. (Same as Nutrition 509, Nursing 509, Physical Education 509 and Social Work 509.) SNCR only. E

510 Environmental and Occupational Health (2) Complexities of personal and ambient environment recognizing health as individual's response to diverse and dynamic world. Principles of occupational safety and health.
Survey of contemporary issues and their implications for healthful living today and in future. F

511 Fundamentals of Industrial Hygiene (3) Occupational health and regulatory requirements: recognition, evaluation and control of workplace health hazards. Pertinent workplace problems and situations. Prereq: 2 yrs of chemistry and biology and consent of department. F


513 Industrial Hygiene Instrumentation and Sampling (3) Instruments and methods for evaluating industrial environment for personal exposure to chemical and physical stressors. Application to air, water, and soil. Lecture, demonstration, and lab. Prereq: 511, MPH (CEHS) major, and consent of department. Sp

514 Industrial Toxicology and Occupational Exposures (3) Principles of industrial toxicology, basic toxic mechanisms, portals of entry, physiologic and biochemically induced responses. Occupational exposure assessment, physical factors and environmental conditions that influence exposure characterization. Prereq: 1 yr of general chemistry and 1 semester of human biology. Sp

520 Public Health Policy and Administration (3) Administrative considerations of community-based health care programs. Policy formulation, political environment and government involvement in health, legal responsibilities, and managerial concepts/techniques/processes. F, Su

521 Organization Theory and Health Care Delivery (3) Administrative and Organization theory relating to health facilities; operation and management of community hospital. Case discussions and problem-solving exercises; managerial functions and skills. F

523 Management in Extended Care Settings (3) Managerial concepts and foundation 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 care, nursing homes, congregate living centers and similar health programs. Prereq: 521 or consent of instructor. Sp

525 Financial Management of Health Programs (3) Financial management concepts and practices applied to health services programs. Fundamentals of budgeting, costing, financing, rate setting, financial reporting and control. Opportunities to apply techniques. Prereq: 520 or consent of instructor. F

530 Biostatistics (3) Application of descriptive and inferential statistical methods to health-related problems and programs. Microcomputer applications, use and interpretation of vital statistics and introductory research methodology. Prereq: Introductory statistics or consent of instructor. F

540 Principles of Epidemiology (3) Distribution and determinants of health-related outcomes in specified populations. Interrelationships of health problems with culture, history of discipline, and scientific and other factors contributing to morbidity and mortality. Historical origins of discipline, hypothesis formulation, research design, data and error sources, measures of frequency and association, epiologic reasoning, disease screening, and injury control. Prereq or coreq: 530, F, 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: 550 or consent of instructor. Sp

555 Health and Society (3) Understanding of social and behavioral factors which influence health status and care in America. Application to behavior in health-related organization. Social and psychological aspects of disease, sociological analysis of health care delivery systems, political economy of health and illness, impact of social movements on health, and social consequences of health legislation. Prereq: 510 or 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

562 Group Processes in Health Planning (3) Application of group process techniques in health planning. Tailoring group processes, leadership roles and techniques to encourage innovation and creativity in health planning groups. Sp

566 Physical Activity and Positive Health (3) Same as Physical Education 566.

569 Fitness Testing, Programming, and Leadership for Diverse Populations (2) Same as Physical Education 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, Educational and Counseling Psychology 585, Nursing 585, Human Performance and Sport Studies 585, Psychology 585, Social Work 585, and Sociology 585.)

587-88-99 Internship (1,3,3,3) Internship (community health education, health planning/administration, or occupational/environmental health and safety) in either approved organizational or research setting under supervision of designated preceptor. Prereq: MPH major, one semester advance notice and consent of major advisor. S/NC only. E

590 Research Methods in Health (3) (Same as Health 590.)

593 Directed Independent Study (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

650 Health Aspects of Gerontology (3) (Same as Health 650.)

655 Seminar in Nation's Health (3) (Same as Health 655.)

660 International Health (3) (Same as Health 660.)
Safety

Graduate programs are available leading to the Master of Science with a major in Safety Education and Service (thesis and non-thesis options) and to the Specialist in Education with a major in Safety Education and Service. The M.S., with thesis and non-thesis options, requires completion of 30 semester hours. The Specialist in Education (Ed.S.) requires 30 semester hours beyond the M.S. An internship and research of a significant safety problem are included as professional development activities.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. and Ed.S. programs in Safety Education and Service are available to residents of the states of Alabama, Arkansas, Florida, or South Carolina. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

GRADUATE COURSES

441 Driver and Traffic Safety Education (4) Preparation of traffic safety instructors for school, colleges, industry and commercial agencies. Students required to teach at least two non-drivers to drive. Valid driver's license required. 3 hrs and 2 labs.

442 Advanced Driver & Traffic Safety Education (3) Development of competence in teaching of driver education through use of simulation, multimedia, and multiple-car driving range. Teaching skills and supervision. 2 hrs and 2 labs.

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 making strategies; and contributions of sports medicine to safety. 3 hrs and 2 labs.

452 General Safety (3) Principles, practices, and procedures in general safety. Safety problems in school, traffic, recreation, industry, home and other public areas. F,S,Su

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

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

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 central agencies that occur in community; findings of current research in behavioral sciences as related to variation incidence of accidents. F

534 Organization, Administration and Supervision of Safety Programs (3) National, state and local level programs; administrative, instructional, and supervisory aspects. Implementation of relevant programs. Sp

535 Emergency Management (3) Civil and defense problems; tornadoes, floods, fires, mass civil disorders, and nuclear and personnel attack by alien countries. Sp

572 Graduate Workshop in Safety (3) Special safety education problems. For advanced graduate students, teachers, supervisors, and administrators. May be repeated. Maximum 12 hrs.

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

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 under the group II doctoral fields.

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

THE MASTER'S PROGRAM

Admission Requirements

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

General Requirements

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

Thesis Option

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

Non-Thesis Option

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

M.A. Fields

United States (colonial to present) Premodern Europe Modern Europe Asia Latin America

Retention and Termination

A 3.0 overall grade-point average is required to remain in good standing. M.A. students must take the M.A. examination no later than the following semester following the completion of 30 hours. A student who fails the M.A. examination must repeat the examination no later than the following semester. A student who fails the examination a second time does not take the examination when required will be dropped from the graduate program.

THE DOCTORAL PROGRAM

Admission Requirements

1. Successful completion of the M.A. degree from an accredited institution.
2. Acceptable scores on the Graduate Record Examination (general and subject).
Residence and Coursework
Before being admitted to doctoral candidacy, a student must:
1. Complete History 510 at UT Knoxville
2. Complete a minimum of 6 related hours outside the department.
3. Spend two consecutive semesters in residence.
4. Complete 9 hours in each of two Group I doctoral fields. (The courses in the non-examined field must be graded A-F. There is no minimum hours requirement for a Group II field. Courses taken to fulfill M.A. requirements may be counted toward this requirement.)
5. Fulfill the foreign language requirement.
6. Complete two 600-level research seminars. (One must be completed at UT Knoxville.) Students who have completed a Master's thesis need complete only one research seminar (must be taken at UT Knoxville), and History 621.
7. Maintain a 3.0 overall grade-point average in graduate work attempted.
8. Complete 21 hours of graduate coursework graded A-F at UT Knoxville beyond that required for the M.A. degree.
9. Except by prior approval of the Director of Graduate Studies, a student's coursework must be at the 500 level or above.

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

Comprehensive Examination
The comprehensive examination is to be taken no later than the semester following the term in which the student has completed the residence, coursework, and language requirements. A student stands examination in one field selected from Group I and one field selected from Group II below. Both parts are 4-hours, written, and taken during the same semester. A general oral exam will be taken following the successful completion of the two written portions. The two written and one oral exams are separate examinations, and Group I must be passed before taking Group II, and the latter passed prior to taking the oral portion. A student who fails any part of the examination must repeat it no later than the following semester. A student will be allowed only one failure on the examination. A second failure, no matter on which part of the examination, will result in termination from the program. Upon successful completion of the residence, coursework, and language requirements, and passing the comprehensive examination, a doctoral student may be admitted to candidacy.

Doctoral Fields
Group I:
1. Premodern Europe
2. Modern Europe
3. United States (colonial to present)
4. East Asia

Group II:
To be defined by the student's doctoral committee from within one of the following fields:
1. Political (U.S.)
2. Socio-Economic
3. International Relations
4. Regional/Local (U.S.)
5. National/Regional (Non-U.S.)

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

GRADUATE COURSES
500 Thesis (1-15) P/NP only.
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 Foundations to Graduate Study in History (3) Assumptions and methods of historians. Required of all candidates for admission. E
532 Topics in Modern Europe (3) Reading seminar: secondary sources on movements and trends that are multinational in focus. Focus varies. May be repeated. Maximum 15 hrs.
533 Topics in European National History (3) Reading seminar: secondary sources on intra-national topics, usually British, Russian, German or French. Focus varies. May be repeated. Maximum 15 hrs.
541 Topics in Early American History (3) Reading seminar: secondary sources on early North American history. Focus varies. May be repeated. Maximum 15 hrs.
542 Topics in 19th- and 20th-Century United States (3) Reading seminar: secondary sources on 19th- and 20th-century United States. Focus varies. May be repeated. Maximum 15 hrs.
551 Topics in the History of Foreign Relations (3) Reading seminar: secondary sources on foreign relations. Focus varies. May be repeated. Maximum 15 hrs.
552 Topics in Military History (3) Reading seminar: secondary sources on military history; military operations, social, economic impact of war and naval strategy in foreign policy. May be repeated. Maximum 15 hrs.
554 Topics in Comparative Social and Economic History (3) Reading seminar: secondary sources on multinational topics, comparatively structured. Focus varies. 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 regional, states and cities of the South. Focus varies. May be repeated. Maximum 15 hrs.
561 Topics in Latin American History (3) Reading seminar: secondary sources in Latin America. Focus varies. May be repeated. Maximum 15 hrs.
562 Topics in Asian History (3) Reading seminar: secondary sources on Asian history. Focus varies. May be repeated. Maximum 15 hrs.
563 Topics in Middle Eastern History (3) Reading seminar: secondary sources on Middle East. Focus varies. May be repeated. Maximum 15 hrs.
571 Historical Editing (3) Seminar to develop practical skills applicable to historical editing.
580 Topics in History (3) Reading seminar: secondary sources for new topics. Focus varies. May be repeated. Maximum 15 hrs.
591 Foreign Study (1-15) See page 32.
592 Off-Campus Study (1-15) See page 32.
593 Independent Study (1-15) See page 32.
600 Doctoral Research and Dissertation (3-15) P/NP only.
621 Directed Readings (3) Directed readings to prepare candidate for doctoral comprehensive examination. May be repeated. Maximum 1 per doctoral field. S/NC only.
632 Seminar in Modern European History (3) Research seminar in primary sources culminating in scholarly paper in Modern European History. Focus varies. May be repeated. Maximum 15 hrs.
641 Seminar in Early American History (3) Research seminar in primary sources culminating in scholarly paper in American history. Focus varies. May be repeated. Maximum 15 hrs.
651 Seminar in Military and Foreign Relations History (3) Research seminar in primary sources culminating in scholarly paper in military or foreign relations history. Focus varies. Not restricted by national grouping. May be repeated. Maximum 15 hrs.
656 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.
680 Seminar in History (3) Research seminar in primary sources culminating in scholarly paper in aspect of history not covered in another 600-level research seminar. Focus varies. May be repeated. Maximum 15 hrs.

Home Economics:
(College of Human Ecology)

MAJOR

DEGREE
Home Economics .................... M.S.

The Master of Science with a major in Home Economics is a college-wide, multidisciplinary program. This degree provides a flexible graduate program for students wishing to pursue in-depth study across subject areas of home economics/human ecology. Teachers, extension personnel, family life educators and other professionals interested in broad-based areas will find that a diversity of subject matter combinations can be tailored to meet individual needs.
ADMISSION REQUIREMENTS

A completed file for review includes the Graduate School application file, College of Human Ecology application, Graduate Record Examination (GRE) scores for the general section or Miller’s Analogy Test (MAT) score, 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 M.S. in Home Economics requires an undergraduate degree in the field of home economics or human ecology.

THE MASTER’S PROGRAM

The M.S. in Home Economics is designed to meet graduate study needs of professionals who work in programs encompassing all areas of home economics. Thesis (33 hours) and non-thesis (36 hours) options are offered. The program includes 6 hours in statistics and/or research methodology, 9 hours in program planning, implementation, and evaluation (may be selected from agricultural extension, home economics education, or other courses approved by committee), 3 hours in the integrative nature of home economics (HE 510), and 9 (thesis option) or 12 (non-thesis option) hours in the College of Human Ecology. At least one course is to be from each department in the college. The thesis option requires 6 hours of Thesis 500, and the non-thesis option requires a creative project (3 hours) and 3 hours of approved electives. An oral/written comprehensive examination will be administered at the end of the program.

ACADEMIC COMMON MARKET

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

Home Economics Education

(College of Human Ecology)

Students pursuing graduate study in home economics education or extension are encouraged to enroll in the multidisciplinary Master’s degree in Home Economics. Home Economics Education courses may be selected to meet requirements of that program. Home economics teachers may choose courses within this area for updating and certification renewal. Graduate coursework in Home Economics Education may also be selected for development of a concentration or minor within other areas of specialization.

GRADUATE COURSES

510 Curriculum in Home Economics (3) Development of home economics educational materials and instruction. Prereq: 420 or equivalent or consent of instructor. F, Sp, A

515 Evaluation in Home Economics Education (3) Assessment of programs and pupil progress; techniques, methods and purposes. Prereq: 420 or equivalent. F, Sp, A

520 Supervision of Home Economics in the Public Schools (3) Program planning, organization and administration of vocational home economics education. Supervision of pre-service and in-service home economics professionals. Prereq: Classroom teaching experience. Su, A

563 Family Life Education Programs (3) (Same as Child & Family Studies 563.)

580 Special Topics in Home Economics Education (1-3) Current issues and trends in home economics. Prereq: Consent of instructor. May be repeated. Su, A

581 Directed Study In Home Economics Education (1-3) Prereq: Consent of instructor. May be repeated. E

Human Ecology

(College of Human Ecology)

MAJOR DEGREE

Human Ecology ........................................ Ph.D.

Graduate study leading to the Doctor of Philosophy with a major in Human Ecology is available in the Departments of Child and Family Studies, Nutrition, and Textiles, Retailing, and Interior Design. Concentration areas are child development, family studies, nutrition science, textile science, and consumer environments. A major challenge of the doctoral program in Human Ecology is to draw upon the basic research generated from the natural sciences, social sciences, humanities, and the arts, and to provide a holistic perspective that contributes to the improvements of individual and family well-being. For example, the physiological chemist may study metabolic-dietary interrelationships and psychologists may study child behavior. But, it is within human ecology that the nutrient needs of the growing child are considered along with the factors that affect the child’s acceptance of different foods. Within the College of Human Ecology, research from one discipline is enhanced by encompassing and utilizing the findings of research from other disciplines.

ADMISSION REQUIREMENTS

A completed file for review includes the Graduate School application file, College of Human Ecology 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

The doctorate 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. Additionally, the college has requirements that include:

1. Selection of a concentration and fulfillment of the requirements as directed by the major professor and approved committee;
2. Minimum of 78 semester hours in courses beyond the baccalaureate degree (exclusive of Master’s thesis), including College Professional Seminar in Human Ecology 610, minimum of 9 semester hours of 600-level coursework (not including dissertation), and 24 semester hours of dissertation.
3. Successful completion of written/oral comprehensive examinations as provided by each department’s procedures and the student’s doctoral committee;
4. Original research project, which culminates in a dissertation;

The doctoral committee shall determine whether a reading knowledge of a foreign language is required.

More specific information about the course of study is given under the individual academic units that administer the Ph.D. concentrations.

CONCENTRATION IN CONSUMER ENVIRONMENTS

The consumer environments concentration is designed to be most appropriate for students with interests in retail and consumer sciences, foodservice and lodging administration or interior design.

Requirements are a minimum of 90 hours including:
1. HEED 530.
2. HE 610.
3. HRA 532, ID 570 and RCS 550.
4. HRA 537 or RCS 590 or ID 590 (2 hours).
5. Minimum 9 hours of statistics and research methods.
7. Twenty-four hours of dissertation.
8. Electives for 34 hours approved by the committees. (Students must take at least 28 hours in one of three specialty areas: foodservice and lodging administration, retail and consumer sciences or interior design; including a minimum of 9 hours required at the 600 level.)

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 Liberal Arts. A cross-listed seminar between contributing programs is designed to integrate experiences from different sources and to demonstrate the multi-faceted nature of working within an aging society.

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. Core coursework needs to comply with the following framework:
1. Coursework. 9 hours required. A variety of coursework may be taken toward satisfaction of this requirement. Courses which are offered on a regular basis include: Health 406, 485, Health...
Human Performance and Sport Studies

(College of Education)

MAJORS

Human Performance and Sport Studies ................................................. M.S., Ed.D.
Education ......................................................................................... Ph.D.

Joan Paul, Head

University Professor:
Kozar, Andrew J., Ph.D. .......................................................... Michigan

Professors:
Capen, Edward K., Emeritus, Ph.D. .......................... Iowa
Howley, Edward T., Ph.D. ....................................................... Wisconsin
Lay, Nancy E., Ph.D. ......................................................... Florida State
Liemohn, W. P., Ph.D. ......................................................... Iowa
Mead, B. J., Ph.D. .............................................................. Purdue
Paul, Joan (Liaison), Ed.D. .................................................... Alabama
Phillips, Madge M. (Emeritus), Ph.D. .......................... Iowa
Watson, Helen B. (Emeritus), Ph.D. .......................... Michigan

Wrisberg, C. A., Ph.D. ....................................................... Michigan

Associate Professors:
Bettel, Patricia A., Ed.D. ......................................................... North Carolina (Greensboro)
DeSensi, J. T., Ed.D. .............................................................. North Carolina (Greensboro)
Jones, Ralph E., Ph.D. ............................................................ Toledo
Morgan, W. J., Ph.D. ............................................................ Minnesota
Namey, Thomas, M.D. .................................................. Washington (St. Louis)

Assistant Professors:
Bassett, David R., Jr., Ph.D. ....................................................... Wisconsin
Boroviak, Patricia C., M.S. .................................................. Tennessee
Kelley, D. R., Ed.D. ................................................................. Georgia State
Lewis, J. L., Ed.D. ................................................................. Tennessee
McCutchen, M. G., Ed.D. ......................................................... North Carolina (Greensboro)

Adjunct Faculty:
Acker, J. E., M.D. ............................................................... Tennessee
Buckles, Tina M., Ph.D. ......................................................... Tennessee
O'Connell, D. G., Ph.D. ........................................................... Toledo

THE MASTER'S PROGRAM

The department offers two tracks for the Master's degree. Track 1 is for students who are already certified to teach or those who are seeking a Master's degree without certification. Track 2 is for students seeking initial licensure. Thesis and non-thesis options are available for both tracks.

Track 1 - Concentrations are available in exercise science (adapted physical education, exercise physiology/fitness), motor behavior, pedagogy in physical education, sociocultural foundations (history, philosophy, sociology), and sport administration/management (an interdepartmental/interdisciplinary concentration with health, Leisure and Safety). The thesis option requires a minimum of 30 hours. The non-thesis option requires 32 hours, including a project. All students must complete a course in research design or statistics and register for two credits of Human Performance and Sport Studies 601.

Track 2 - Requires Education 574, 12 hours; Education 575, 12 hours; Education 591, 4 hours; and specialty methods, 6 hours. Specialty methods courses must be approved by the student's committee and include: one research or statistics course selected from 532, Educational & Counseling Psychology 520 or 521, and one pedagogy course selected from 511, 512, 514, 531, 533, 534, 541, 542, 543, 544, or 553. A Master's degree may be earned by taking 12 additional committee-approved hours from the above listed specialty methods courses for a total of 36 hours. A maximum of 6 hours may be taken outside of Human Performance and Sport Studies with the committee's approval. The thesis option requires 6 additional hours of Thesis 500 for a total of 42 hours.

THE DOCTORAL PROGRAM

The Doctor of Education with a major in Human Performance and Sport Studies is available with the following concentrations:

Exercise science (adapted physical education, exercise physiology/fitness)
Motor behavior
Sociocultural foundations (history, philosophy, sociology)

The Doctor of Philosophy with a major in Education includes the concentrations and specializations listed under Education.

ADMISSION REQUIREMENTS

Applicants are required to complete the departmental application which will be sent to all persons upon their initial inquiry about the program. Specific questions about these programs should be directed to the head of the Department of Human Performance and Sport Studies.

The following retention policy applies to all graduate students seeking a degree in the Department of Human Performance and Sport Studies:

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 departmental 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.

MINOR IN GERONTOLOGY

Graduate students in the Department of Human Performance and Sport Studies may pursue a specialized minor in gerontology. This interdepartmental/interdisciplinary minor gives the student an opportunity for combining the knowledge about aging in American society with his/her major concentration. Please refer to Human Ecology for specific requirements.
Human Performance and Sport Studies

GRADUATE COURSES

405 Sociology of Sport (3) (Same as Sociology 405.)

411 Adapted Physical Education (3) Developmental disabilities, other physical/mental handicaps and variant/invariant characteristics of specific syndromes germane to motor development/programming for those with special education needs.

423 Readings in Physical Education (2) Review of current and classic literature in physical education.

480 Physiology of Exercise (3) Functions of body in muscular work: physiological aspects of fatigue, training and adaptation to environment. Prereq: Human Physiology or general physiology, 2 hrs and 1 lab. (Same as Zoology 480.)

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

501 Special Project (3) Culminating experience for non-thesis major. Research study suitable for publication, or practicum requiring special written work. Prereq: 532.

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

509 Graduate Seminar in Public Health (1) (Same as Public Health 509, Nutrition 509, Nursing 509 and Social Work 509.)

511 Administrative/Supervisory Processes in Physical Education (3) Organizational concepts, management strategies, and supervisory techniques related to physical education programs at all levels.

512 Application of Theory to Curricular/Methodological Decision in Physical Education (3) Application of curricular principles and theories to educational situations for development of curricula and lessons in physical education. Various methodological approaches.

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

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

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

531 Biomechanics of Human Performance (3) Human movement: teaching, coaching and sports medicine. Prereq: 422 or equivalent.

532 Seminar in Research Techniques in Physical Education (3) Evaluate, compare, and contrast research techniques in physical education with consideration for and experiences in appropriate review, design, and analysis procedures, and proposal development.

533 Psychology of Sport (3) Social psychological factors influencing human behavior in sport context; discussion of contemporary theory, research, and methodology. Prereq: General psychology course or consent of instructor.

534 Motor Behavior and Skill Acquisition (3) Topical explanation and application of principles of human movement behavior to acquisition and performance of skills; discussion of current research and methodology.

535 Sport Administration (3) Development of knowledge and analytic skills desirable for middle and upper level managers/administrators in sport business/organization.

541 Special Topics (1-3) Advanced study in selected disciplinary or professional areas of physical education and/or sport. May be repeated.

542 Sociological Aspects of Sport and Physical Education (3) Social and cultural factors influencing sport and physical education: curricular development during historical periods. Prereq: Consent of instructor. (Same as Sociology 542.)


544 Theories of Physical/Movement Education (3) Integration of various theoretical approaches to physical education and sport education within cultural context; research and field work.

553 Advanced Adapted Physical Education (2) Curriculum development and teaching methodologies in programming for child with special education needs. Prereq: 411 or consent of instructor. Coreq: 554.

554 Advanced Adapted Physical Education Practicum (1) Curricula and methodologies implemented in lab in school for handicapped. Coreq: 553.

555 Motor Assessment and Programming for the Child with Special Education Needs (3) Categorization and in-depth referenced tests used in development of individualized education programs for child with special physical education/motor development needs. Testing protocols which purport to get at basis of dysfunction; those which just measure symptoms of dysfunction; efficacy of remediation theories based or related to testing protocols. Evaluation of motor skill in exceptional children and development of remediation techniques which account for children's assessed appropriate for school/parent implementation.

563 Laboratory Techniques in Exercise Physiology (3) Laboratory course in experimental methodology and instrumentation: respiratory and metabolic measurements, blood chemistry, and gas analysis. Prereq: 480; S/NC or letter grade.

565 Advanced Physiology of Exercise (3) Quantitative approach to current and classical questions in exercise physiology. Prereq: 480 and 563.


569 Fitness Testing, Programming, and Leadership for Diverse Populations (2) Clinical experience in selecting, administering, and evaluating exercise tolerance tests on cycle ergometer and treadmill. Individual fitness programs for diverse populations. Practice in leading variety of activities aimed at improved fitness. Prereq: 480 and 414/415. Coreq: 569. (Same as Public Health 568.)

585 Seminar in Gerontology (1) (Same as Human Ecology 585, Educational and Counseling Psychology 585, Nursing 585, Psychology 585, Public Health 585, Social Work 585, and Sociology 585.)

593 Directed Independent Studies (1-3) May be repeated. Prereq: 532 or consent of instructor. S/NC or letter grade.

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

611 Research Seminar in Exercise Physiology (4) Family experience in areas of special interest. May be repeated.

614 Advanced Modern Dance Techniques (3) Participation in research with faculty member whose interests coincide with those of student. S/NC only.

681 Practicum (1-3) Intern experience in areas of major interest. May be repeated.

Dance

GRADUATE COURSES

410 Ballet: Level III (2) Instruction and practice in advanced classical ballet techniques. Prereq: Dance majors and minors or consent of instructor. May be repeated. Maximum 16 hrs.

415 Teaching Creative Dance for Children (2) Theory, methods and materials and practical experience in presentation and integration of creative dance in grades K-6. Mini-teaching experience.

420 Jazz: Level III (2) Instruction and practice in advanced jazz and musical theater dance styles and techniques. Prereq: Dance majors and minors or consent of instructor. May be repeated. Maximum 16 hrs.

430 Modern: Level III (2) Instruction and practice in advanced modern dance techniques. Prereq: Dance majors and minors or consent of instructor. May be repeated. Maximum 16 hrs.

450 Composition III (3) Application of choreographic and production skills culminating in presentation of two works. Prereq: 440 and 445 or consent of instructor.

460 Rhythm and Movement (3) Basic principles, structure, and function of rhythm in dance. Prereq: Consent of instructor.

462 Dance Analysis and Criticism (3) Advanced study of dance analysis. Prereq: Consent of instructor.

465 Dance Notation (3) Fundamentals of movement notation; notation and reading of elementary movement studies.

480 Dance Through the 19th Century (3) Dance of various cultures and society from pre-history through 19th century.

481 History of Dance II (3) Development of dance in theatre, recreation and education during 20th century.

490 Dance in the 20th Century (3) History and philoso-


495 Dance Pedagogy (3) Principles and methods of teaching dance with practical application in mini-teach-
ing experience. Prereq: Upperclass or graduate standing and consent of instructor.

Industrial and Organizational Psychology

(College of Business Administration and College of Liberal Arts)

MAJOR DEGREES

Industrial and Organizational Psychology .......... M.S., Ph.D.

Michael C. Rush (Liaison), Director

Committee:
Dobbins, Gregory H., Management
Fowler, Oscar S., Management
James, Lawrence R., Management
Jenkins, Roger L., Business Administration
Johnson, Michael G., Psychology
Jones, Warren H., Psychology
Ladd, Robert T., Management
Larsen, John M., Jr. (Emeritus), Management
Lounsbury, John W., Psychology
Russell, Joyce E. A., Management
Schumann, David W., Marketing, Logistics & Transportation
Sundstrom, Eric, Psychology
(For complete Faculty Listing, see Departments of Management and Psychology)

The Master's and doctoral programs are offered jointly by the Department of Psychology and the Department of Management. They are 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 programs are administered by a joint committee of the two departments, appointed by the Associate Vice Chancellor and Dean of The Graduate School on recommendations from the two department heads 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 Graduate School and the Director, Industrial and Organizational Psychology Program, 408 Stokely 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: Now students are admitted in fall semester only, and applications must be received by the Graduate Admissions and Records Office by February 1.

General Requirements

At least one year of college mathematics and one course in statistics are required. Ordinarily, an undergraduate grade point average of 3.0 or above is required with no evidence of special weakness in mathematics and physical sciences.

Test scores on each section of the general portion (verbal and quantitative) of the Graduate Record Examination (GRE) are required. Customarily, those students admitted to the program have performed at or above the 69-79th percentile on the general tests. (This corresponds to a raw score of approximately 600 on each of the tests.)

THE MASTER'S PROGRAM

A thesis is required with 6 semester hours of Management or Psychology 500.

The Master's degree can be completed with a minimum of 33 semester hours in the major as follows:
Management 567, 568 or Psychology 517-18; Psychology 557; Statistics 537, 538.

Twelve hours of additional coursework to be selected primarily from the following with the approval of the student's advisor: Management 511, 522, 610; Management/Psychology 625, 626, 627, 638; Psychology 505, 550, 610, 620, 624.

Electives, as approved for an individual's plan of study, may be selected from graduate courses in psychology, social work, sociology, management, education, planning, etc. Students who wish to pursue special research interests aside from their thesis may register for Management 525, 526 (Maximum 6 hrs per term; courses may be repeated) or Management/Psychology 690.

An internship, practicum, or field experience is recommended. A student is expected to be in residence full time one year (two years recommended).

A Master's candidate must pass a final oral examination.

In addition to course requirements, a Master's student must complete a comprehensive examination in general psychology within no more than two years by attaining a score of 630 (or 85th percentile) on the Subject GRE (Psychology-81).

An overall "B" average is required in the course sequence Management 567-68 or Psychology 517-18 to continue in the program beyond the first year.

THE DOCTORAL PROGRAM

Any student in the doctoral program may be required to prepare a Master's thesis by the Industrial and Organizational Psychology Committee. This policy will be implemented by the committee at such time as a review of the student's record suggests that additional data on the qualifications for pursuing a Ph.D. are required.

A dissertation is required with a minimum of 24 semester hours of Management or Psychology 500.

The doctoral degree can be completed with a minimum of 84 semester hours in the major as follows:

Management 557-68 or Psychology 517-18, Psychology 557, Statistics 537-38.

A minimum of five doctoral seminars (15 hours) selected from: Management 610; Management/Psychology 625, 626, 627, 638; Psychology 620, 624. (Five doctoral seminars are viewed as the absolute minimum; more are recommended. Statistics 671 and Psychology 605 are also recommended.)

Electives, as approved for an individual's plan of study, may be selected from graduate courses in psychology, social work, sociology, management, education, planning, etc. Students who wish to pursue special research interests aside from the dissertation may register for Management 525, 526 (Maximum 5 hrs per term; courses may be repeated) or Management/Psychology 690.

An internship, practicum, or field experience is recommended. A student is expected to be in residence full time one year (two years recommended).

Doctoral candidates must pass a final oral examination on their dissertation research.

In addition to course requirements, a doctoral student must attain a score of 650 (90th percentile) on the Subject GRE (Psychology-81) within two years of entry, successfully complete the qualifying examination covering scientific methodology before or during the third fall semester, and successfully complete the comprehensive examination in the areas of the student's major research and professional interests.

An overall B average is required in the course sequence Management 567-68 or Psychology 517-18 to continue in the program beyond the first year.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. and Ph.D. programs in Industrial and Organizational Psychology are available to residents of the states of South Carolina or Virginia. The Ph.D. program is also available to residents of Arkansas or Kentucky. Additional information may be obtained from the Resident Assistant in the Office of Graduate Admissions and Records.

Industrial Engineering

(College of Engineering)

MAJOR DEGREE

Industrial Engineering ......................... M.S.

C. H. Aikens, Head

Professors:
Bontadelli, J. A., Ph.D. ...................... Ohio State
Claycombe, W. W., PE, Ph.D. .............. VPI
DePorter, Elden L., Ph.D. .................. VPI
Doulet, Dan C. (Emeritus), PE, M.S. Tennessee
Emerson, H. P. (Emeritus), PE, S.B. ....... MIT
LaForge, R. M. (Emeritus), PE, M.S. ........ Georgia Tech
Loveless, Howard L. (Emeritus), PE, M.S. ......................... NC State
Industrial Engineering

GRADUATE COURSES


401 Integrated Manufacturing Systems (3) NC and CNC machine tools, robotics and related materials handling systems, hard automation, alternative integrated manufacturing systems, and manufacturing information and control systems. Prereq: 400.


403 Production Facilities Design and Material Handling (3) Design of production facilities: plant layout, analysis and planning for overall moving, packaging and storage of materials. Office layout and service areas. Design of facilities for such diverse groups as hospitals, banking, industry. Prereq: 302, 401.

405 Engineering Economy (3) Methods and problems in selection or replacement of equipment. Decisions among engineering alternatives involving capital recovery, economic life of equipment, and rate of return on investment.


412 Quantitative Methods in Project Management (2) Project planning, scheduling, and control based on network and precedence diagramming methods. Resource allocation and time-cost tradeoff algorithms, multi-project control, computer applications, andPERT methods of handling uncertainty in activity time estimates.

413 Research Methods in Industrial Engineering (3) Methods to collect and analyze data. Process control, statistical modeling of processes, behavior sampling, single subject experimental designs, classical experimental design methods, and time series models of experiments. Validity and reliability concepts as related to measurement and collection of data. Strategies to control variable hypotheses: randomization, matching, blocking, factorial analysis, and building extravariate variables into experiments. Selection of appropriate experimental designs for given research situations and to analyze messy data. Prereq: 300 and senior standing, Statistics 251.


422 Senior Industrial Engineering Problems Analysis (3) Application of industrial engineering to field assignments in local organizations. Problem definitions, analysis and presentation. Prereqs: 402, 403, and 405.


500 Thesis (1-15) S/NC only. E

501 Design Project (1-3) Enrollment limited to industrial engineering students in non-thesis program. May be repeated. Maximum 6 hrs. S/NC only.

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


513 Facilities Planning and Design (3) Material handling techniques, computer-aided layout techniques, application of operation research models, and use of these to design manufacturing facility. Prereq: Production Planning and Scheduling and Introduction to Computer, or instructor's approval.

514 Information Systems II (3) Systems analysis and systems control concepts applied to systems of information. Role of IE in the office and factory of the future. Management support systems, decision support systems, and integrated support systems.

515 Production and Inventory Systems (3) Application of OR techniques to production and inventory systems. Deterministic and stochastic inventory models. Use of mathematical programming for production mix, process selection, and lot sizing and time-cost tradeoff algorithms. Production planning and control, aggregate production planning problems. Application of simple and complex queuing models in manufacturing environment.

516 Statistical Methods in Industrial Engineering (3) Descriptive statistics, probability, techniques of data analysis and interpretation of data generated by manufacturing projects. Prereq: Probability and statistics for scientists and engineers. (Same as Engineering Management 516.)


518 Advanced Engineering Economy (3) Financing and investment functions of firm; deterministic analysis of after-tax cash flow projections; separation theorem and capital budgeting models; stochastic analysis of capacity and investment functions of firm; deterministic analysis of manufacturing projects. Prereq: Statistics and engineering economy. (Same as Engineering Management 518.)


521 Human Factors Engineering Methodology (3)
Background in methodology used by human factors engineering designer and systems analyst. Observational methods, functional task analysis, design aiding techniques, computerized methods, human reliability and human error prediction, training analysis, evaluation of man-machine interface, subjective and objective techniques, scaling techniques, questionnaire and survey design, critical incident technique, consensus techniques (Delphi), accident investigation behavioral instrumentation, performance measurement, statistical techniques in experimental design, and expert systems. Prereq: 520.

522 Optimization Methods in Industrial Engineering
(3) Classical optimization theory. Unidimensional and N-dimensional search techniques, Lagrange relaxation, separable programming, linearization techniques, quadratic programming, and dynamic programming. Prereq: 301 or 537.

525 Air Traffic Control System
(3) Current systems of planes, network programming. Prereq: 301 or 537. Post-optimality analysis, use of LP software, integer programming, and dynamic programming. Prereq: 503 or 537.

526 Dynamic System Simulation

591-92-93 Special Topics in Industrial Engineering
(3,3,3) Individual or group research projects. Prereq: Consent of Instructor. May be repeated.

601 Operations Research Models in Engineering
(3) Mathematical programming techniques applied to capital budgetting; advanced topics in multiple attribute decision analysis; Bayesian analysis of sequential decision making; artificial intelligence in complex decision analysis. Prereq: 518, 523.

602 Nonlinear Programming
(3) Optimization techniques for static and dynamic nonlinear systems subject to various constraints. Applying optimization theory to solve nonlinear optimization problems. Variable metric methods, search methods, constrained nonlinear programming, and penalty function methods. Prereq: 522, 523.

603 Dynamic Programming
(3) Solving multi-stage optimization problems as sequence of single-stage optimization problems. Computational and theoretical aspects of dynamic programming. Decision making under certainty and risk. Prereq: 522.

604 Advanced Topics in Optimization
(3) Multi-stage optimization theory. State increment dynamic programming adaptive programming theory. Prereq: 503.

605 Probabilistic Methods in Engineering Systems
(3) Application of probabilistic methods to selected problems in engineering systems. Prereq: 516.

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.

518 Advanced Engineering Economy
(3) (Same as Industrial Engineering 518.)

531 Motivational Theories and Systems in Various Organization Structures
(3) Motivational theories in technology-based organizations. Impact of various organization structures in relation to organizational use and effectiveness of contemporary organizational systems.

532 Productivity and Quality Engineering
(3) Productivity and quality measures defined and used to analyze current competing and new frontiers 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) Comparison of classical management principles and theory with environment, goals, and practices of other scientific-engineering organizations. Cases to illustrate contemporary problems and environments.

534 Engineering Management Control Systems
(3) Financial and managerial accounting for the engineer/technical manager; accounting fundamentals, transactions recording, understanding financial statements, and management application like costing, budgeting, performance evaluation and control, and ratio analysis.

535 Management of Technology
(3) Challenges to implementing advanced technology equipment, systems, methods in businesses and manufacturing organizations: justifying technology, assimilating change, changing management roles, personnel practices and organizational structure, and dealing with impact of new technologies on business policies and strategic planning.

536 Project Management
(3) Management and control of multifaceted engineering and technological projects. Coordination and interactions between client and various service organizations. Selection of project manager and progress and management, typical problems associated with various phases of project life cycle. Case studies on theories and concepts.

537 Quantitative Methods in Management
(3) Survey of management analysis and control systems through IE techniques. Qualitative and quantitative systems: methods analysis, work measurement, incentive systems, wage and salary development, production and inventory control, facility layout, linear programming, and applied operations research techniques. Not for credit for students with undergraduate degrees in industrial engineering.

538 Industrial Development
(3) Factors other than mechanical or chemical which enter into successful establishment of manufacturing or service enterprise. Organizational and financial planning and evaluation. Case studies on theories and concepts.

539 Strategic Management in Technical Organizations
(3) Analysis of industries: general, market share, financial overview, and decision making for technology based organizations. Relationships between buyers and suppliers, environment, and competitor analysis in global market place.

540 Labor Relations and Collective Bargaining

541 Foundations of Total Quality Management
(3) Basic understanding of TQM in context of fundamental building blocks of effective management: measurement, problem solving, continuous improvement, teamwork, customer focus, and supportive culture.

Interdisciplinary Programs
(Graduate School of Arts)
The College of Liberal Arts offers a series of interdisciplinary undergraduate majors and minors through its Interdisciplinary Programs.

These programs include African and African-American Studies, American Studies, Ancient Mediterranean Civilizations, Asian Studies, Cinema Studies, Comparative Literature, Latin American Studies, Linguistics, 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
421 Comparative Studies in African and Afro-American Societies
(3) Education, religion, and social stratification. Views Afro-Americans and Africans have of each other and concept of Pan-Africanism.

450 Issues and Topics in Afro-American Studies
(3) Problems, topics, issues, and individuals. May be repeated. Maximum 6 hrs.

452 Black African Politics
(3) (Same as Political Science 452.)

461 African Prehistory
(3) (Same as Anthropology 461.)

473 Black Male in American Society
(3) Development of historical images, myths and stereotypes. Impact of critical factors: Black feminism, violence, concepts of masculinity, family, white males, white females, homosexuality, nationalism, and athletics.

483 Afro-American Women in American Society
(3) Historical and contemporary socio-eco-political factors in American society as related to black women. (Same as Women's Studies 483.)

Asian Studies

GRADUATE COURSES
451 Readings in Japanese Literature
(3) Prereq: Mastery of intermediate-level Japanese or consent of instructor. May be repeated. Maximum 9 hrs.

420 French Cinema
(3) (Same as French 420.)

421 Topics in Italian Literature and Cinema
(3) (Same as Italian 421.)

489 Special Topics in Film
(3) (Same as English 489.)

Comparative Literature

GRADUATE COURSES
401-02 Special Topics in Comparative Literature
(3,3) Content varies. May be repeated. Maximum 9 hrs.

Latin American Studies

GRADUATE COURSES
401 Cultural Plurality and Institutional Changes in Latin America
(3) Value systems, behavioral pattern, political parties, role of military, church, educational institutions, dictatorship and nationalism.
402 Latin American Studies Seminar (3) Selected topics. May be repeated. Maximum 6 hrs.

Linguistics

GRADUATE COURSES

400 Topics in Linguistics (3) Content varies. May be repeated. Maximum 6 hrs.

411 Linguistic Anthropology (3) (Same as Anthropology 411.)

420 The Development of Historical Linguistics as a Science (3) Scientific understanding of language change. Emergence of Neogrammarian paradigm from 19th-century intellectual trends. Impact of synchronic, descriptivist, structural, and transformational-generative linguistics on contemporary diachronic theory. Prereq: 6 hrs of courses required for linguistics concentration or consent of instructor.

425 Introduction to Descriptive Linguistics (3) (Same as French 425, German 425, Russian 425, and Spanish 425.)

426 Methods of Historical Linguistics (3) (Same as German 425, French 426, Russian 426, and Spanish 426.)

429 Romance Linguistics (3) (Same as French 429 and Spanish 429.)

430 The Development of Synchronic Linguistics as a Science (3) Development of first synchronic paradigm of linguistics. Impact of social sciences on American descriptivists, Prague School, Transformational-generative theory. Prereq: 6 hrs of courses required for linguistics concentration or consent of instructor.

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.)

485 Special Topics in Language (3) (Same as English 485.)

483 Afro-American Women in American Society (3) (Same as Afro-American Studies 483.)

484 Afro-American Women in American Society I (3) (Same as Afro-American Studies 484.)

Journalism

(College of Communications)

MAJOR DEGREES

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

James A. Crook, Director

Professors:

Adamson, June N. (Emeritus), M.S., Tennessee
Ashdown, Paul G., Ph.D. .................. Bowling Green
Crock, James A., Ph.D. ................. Iowa State
Everett, George A., Ph.D. .............. Iowa
Leiter, B. Kelly (Emeritus), Ph.D. ........ Southern Illinois
Littmann, Mark, Ph.D. ............... Northwestern
Miller, Mark, Ph.D. .................. Michigan State
Singleton, Michael W., Ph.D. ...... Southern Illinois

Associate Professors:

Bowles, Dorothy, Ph.D. ............... Wisconsin
Caudill, C. Edward, Ph.D. .......... North Carolina
Heller, Robert B., M.A. .......... Syracuse
Morrow, Jerry L., Ph.D. ............ Toledo
Pueit, Sammim Lynn, M.S. ........ Tennessee

Assistant Professors:

Foley, Daniel, M.S. ................. Northwestern
Lucarelli, Susan M., Ph.D. ......... Tennessee

The School of Journalism offers a concentration area for the Master's with a major in Communications and participates in the interdisciplinary doctoral program. See Communications for additional information.

GRADUATE COURSES

403 International Communications (3) Development and operations of world mass communications channels and agencies. Comparative analysis of media, media practices, and flow of news throughout world. Print and broadcast systems in terms of relevant social, political, economic, and cultural factors. Relation of communication practices to international affairs and understanding. Sp

412 Opinion Writing (3) Analysis of editorial positions, practices, and pages. Writing of editorials and columns for newspapers, magazines, and company publications, rhetorical devices and use of logic. Prereq: Communications 200, or consent of instructor. Sp

414 Magazine Article Writing (3) Techniques of writing in-depth articles of mass circulation and specialized magazines. Organizing and presenting material, problems in specialized areas: business, science, agriculture, humanities. Prereq: Communications 200, or consent of instructor.

416 Issues in Journalism (3) Topics vary. Prereq: of instructor. May be repeated. Maximum 6 hrs.


433 Advanced Editing (3) Sensitivity to language and editing skills. Headline writing, layout, and production. Prereq: 293.

444 Journalism as Literature (3) Study of writers from 17th century to modern era whose works have endured as classic journalism and literature. Emerging genres called literary journalism: means of cultural reporting with personal narrative style. Prereq: Consent of instructor. Fall

450 Writing About Science, Technology, and Medicine (3) Writing workshop to analyze examples of successful writing and write series of articles for general public based on scientific journals, news conferences, technical meetings, and interviews. Prereq: Consent of instructor. F, Sp

451 Environmental Reporting (3) Writing for media on such environmental issues as strip-mining, water pollution, air pollution, allergens, nuclear power, fossil fuel power, and solid wastes. Presentations from and interaction 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.

456 Science Writing as Literature (3) Survey of important science writing for general public across spectrum of science, engineering, and medicine. Works by authors such as Arthur C. Clarke, Stephen Gould, and Isaac Asimov. Analysis of literary qualities in quest to understand why some science writing succeeds. Prereq: Consent of instructor.

460 Mass Communication History (3) Development of print and role of mass communications in American history. Newspapers, radio, television, and magazines. F

470 Public Relations Campaigns (3) Research, planning and programming, communication and evaluation of public relations campaigns. Oral and written presentation of public relations project from inception to completion. Extensive out-of-class work. Prereq: Public Relations Principles. Sp

480 Journalism in the High School (3) Functions and management of school publications. Prereq: 203 or consent of instructor.

516 Seminar in Journalism Issues (3) Topics vary. May be repeated. Maximum 6 hrs.


525 Public Opinion (3) Role of press in developing and influencing public consensus. Social theories of public opinion and analysis of mass media's response. F

535 Publications Management (3) Problems in management, production, market analysis, and design. Techniques of writing, editing, and presenting comprehensive articles and other material. Regional and specialized magazine and individual editorial projects. Prereq: 420 or consent of instructor.

550 Writing and Editing Projects (3) Specialized writing or editing interests: agriculture, politics, labor, finance, science; technical, general publications. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

571 Seminar in Public Relations (3) Analysis and management of problems of communication between institutions and organizations and their publics. Measurement and evaluation of effectiveness of communication programs. Prereq: 470 or consent of instructor. Sp

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: 293. Advertising 350 or Broadcasting 430 or equivalent.

590 Communications and International Development (3) Relationship between mass communications and...
development of nations. Role of communications media of developed nations in "Third World" regions of globe. Communications as facilitator of international cooperation.

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.

Law

(St. John's College of Law)

MAJOR

DEGREES

Law ........................................J.D., J.D.-MBA, J.D.-M.P.A.

Richard S. Wirtz, Dean

Professors:

Best, Reba, M.L.S ................................... Florida
Cohen, Neil P., LL.M .................................. Harvard
Cook, Joseph G., LL.M .................................... Yale
Dessem, Lawrence J., LL.M ...................... Harvard
Gray, Robert W. (Emeritus), L.L.M .................. George Washington
Hardin, Patrick J., J.D .................................... Chicago
Hess, Amy M., J.D ........................................ Virginia
Jones, Duward S. (Emeritus), J.D .................... North Carolina
King, Joseph H., J.D ...................................... Pennsylvania
Lacey, Forrest W. (Emeritus), S.J.D .................... Michigan
Le Clercq, Frederic S., LL.B ......................... Duke
Lloyd, Robert M., J.D .................................... Michigan
Miller, Charles H. (Emeritus), J.D ..................... Duke
Overton, Elvin E. (Emeritus), S.J.D .................... Harvard
Phillips, Jerry J., J.D ....................................... Yale
Piquet, Chet, M.L.S ....................................... Tennessee
Rivkin, Dean H., J.D ...................................... Vanderbilt
Sebert, John A., J.D ....................................... Michigan
Sewell, Toxicity H. (Emeritus), L.L.M .................. George Washington
Sobieski, John L., J.D ..................................... Michigan
Wirtz, Richard S., J.D ..................................... Stanford

Associate Professors:

Anderson, Gary L., LL.M .................................. Harvard
Asensio, Frances Lee, LL.M ............................ Harvard
Beintema, William J., J.D ............................ Miami
Black, Jerry P., Jr, J.D .................................... Vanderbilt
Bunker, Mary Garrett, J.D ......................... George Washington
Connell, Judy M., J.D .................................... Tennessee
Davis, Thomas Y., J.D .................................... Northwestern
Gray, Gryford B., J.D ...................................... Vanderbilt
Mutter, Carol A., J.D ...................................... Georgetown
Pierce, Carl A., J.D ........................................ Yale
Reynolds, Glenn H., J.D ............................... Yale
Stark, Barbara, J.D ....................................... New York
Stein, Gregory M., J.D ..................................... Columbia
Thompson, James E., J.D ......................... Florida
Wertheimer, Barry M., J.D ......................... Duke

Assistant Professor:

Thorpe, Steven R., J.D ..................................... Mercer

Instructors:

Hoover, Mary Jo, J.D ..................................... Brookln
Moore, Jean, M.A.L.S .................................... Michigan
Wimberly, Phyllis, J.D ..................................... Alabama

The College of Law offers the Doctor of Jurisprudence degree program and a dual program with the College of Business Administration leading to the J.D. and the Master of Business Administration degree. In addition graduate students may be eligible to take a limited number of law courses to count toward a graduate degree.

Current information regarding admission, financial aid, course requirements, academic policies, extracurricular activities, and student services is available in the College of Law Bulletin from the Admissions Office, The University of Tennessee, College of Law, 1505 West Cumberland Avenue, Knoxville, Tennessee 37996-1800. Completed application should be received before February 1 of the year of requested admission.

DEGREE OF DOCTOR OF JURISPRUDENCE

The degree of Doctor of Jurisprudence will be conferred upon candidates who complete, with the required average, six semesters of resident law study and who have 89 semester hours of credit, including all required courses. The required average is 2.0 and that average must be maintained on the work of all six semesters and also for the combined work of the grading periods in which the last 28 credit hours taken in residence were earned. Averages are computed on weighted grades. Grades are on a numerical basis from 0.0 to 4.0. A grade of 0.9 or below is a failure. Eligible law students may receive up to six (6) semester hours of credit toward the J.D. degree for acceptable performance in upper-level courses that materially contribute to the study of law and which are taken in other departments at The University of Tennessee. Course selection and registration are subject to guidelines approved by the law faculty which include the requirement that any such course be acceptable for credit toward a graduate degree in the department offering the course. Refer to the Law Bulletin for current degree requirements.

DUAL J.D.-M.BA DEGREE PROGRAM

The College of Business Administration and the College of Law offer a coordinated dual degree program leading to the conferral of both the Doctor of Jurisprudence and the Master of Business Administration degrees. A student pursuing the dual program is required to take fewer hours of coursework than would be required if the two degrees were to be earned separately.

Admissions

Applicants for the J.D.-M.BA program must make separate application to, and be competitively and independently accepted by, the College of Law for the J.D. degree and the Graduate School and College of Business Administration for the M.B.A. degree, and by the Dual Degree Committee. Students who have been accepted by both colleges may commence studies in the dual program at the beginning of any term subsequent to matriculation in both colleges provided, however, that dual program studies must be started prior to entry into the last 28 hours required for the J.D. degree and the last 16 hours required for the M.B.A. degree.

Curriculum

A dual degree candidate must satisfy the graduation requirements of each college. Dual degree students withdrawing from the dual degree program before completion of both degrees will not receive credit toward graduation from either college for courses in the other college, except as such courses qualify for credit without regard to the dual degree program. For students continuing in the dual degree program, the J.D. and M.B.A degrees will be awarded upon completion of requirements of the dual degree program.

The College of Business Administration will award credit toward the MBA for acceptable performance in a maximum of nine (9) semester hours of approved courses offered by the College of Business Administration. Three of the 9 semester hours must be earned in Accounting 501, 503, or a more advanced accounting course. If College of Law credit is given for such accounting course, the dual degree student may not receive College of Law credit for Accounting for Lawyers (Law College Course 837).

The College of Business Administration will award credit toward the MBA for acceptable performance in a maximum of nine (9) semester hours of approved courses offered by the College of Law.

Except while completing the first year courses in the College of Law, students are encouraged to maximize the integrative facets of the dual program by taking courses in both colleges each year.

Awards of Grades

For grade recording purposes in the College of Law for graduate business courses and in the College of Business Administration for law school courses, grades awarded will be converted to either Satisfactory or No Credit and will not be included in the computation of the student's grade average or class standing in the college where such grades are so converted. The College of Law will award a grade of Satisfactory for a graduate business course in which the student has earned a B grade or higher and a No Credit for any lower grade. The College of Business Administration will award a grade of Satisfactory for a College of Law course in which the student has earned a 2.3 grade or higher and a No Credit for any lower grade. Grades earned in courses of either college may be used on a regular graded basis for any appropriate purpose in the college offering the course. The official academic record of the student maintained by the Registrar of the University shall show the actual grade assigned by the instructor without conversion.

Non-Law Elective Course Credit

Students enrolled in the J.D.-M.B.A degree program may not receive credit toward the J.D. degree for courses taken in other departments of the University except for those taken in conjunction with the dual degree program. Note: Students are advised to consult The Graduate School's degree requirements as stated in the front section of this catalog as well as the requirements for this college.

DUAL J.D.-M.P.A PROGRAM

The College of Law and the Department of Political Science in the College of Liberal Arts offer a coordinated dual degree program leading to the conferral of both the Doctor of Jurisprudence and Master of Public Administration degrees. In this program, a student may earn the 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 course work or an internship for one summer term in addition to taking normal course loads for four academic years.

Admission

Applicants for the J.D.-M.P.A. program must make separate application to, and be independently accepted by, the College of Law for the J.D. degree and the Department of Political Science and The Graduate School for the M.P.A. degree. Applicants must also be accepted by the Dual Degree Committee. All applicants must submit a Law School Admission Test (LSAT) score. An applicant’s LSAT score may be substituted for the Graduate Record Examinations (GRE) as a new score is not required for admission to the M.P.A. program. Application may be made prior to or after matriculation in either the J.D. or the M.P.A. program, but application to the dual program must be made prior to entry into the last 29 semester hours required for the J.D. degree and prior to entry into the last 15 hours required for the M.P.A. degree.

Curriculum

A dual degree candidate must satisfy the requirements for both the J.D. and the M.P.A. degrees, as well as the requirements for the dual program. The College of Law will award a 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 (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.

Dual degree students who withdraw from the program before completion of the requirements for both degrees will not receive credit toward either the J.D. or the M.P.A. degree for courses taken in the other program except as such courses qualify for credit without regard to the dual program.

Awarding of Grades

For grade recording purposes in the College of Law and the Department of Political Science, grades awarded in courses in the other unit will be converted to either Satisfactory or No Credit and will not be computed in determining a student's GPA or class standing. The College of Law will award a grade of Satisfactory for an approved M.P.A. course in which the student earns a grade of B or higher and a grade of No Credit for any lower grade. The Political Science Department will award a grade of Satisfactory for an approved law course in which the student earns a grade of 2.3 or higher and a grade of No Credit for any lower grade. The official academic record of the student maintained by the Registrar of the University shall show the actual grade assigned by the Instructor without conversion.

POLICY FOR GRADUATE STUDENTS TAKING LAW COURSES

Students pursuing a graduate degree in another college may, upon approval of the College of Law and the major chairperson, take up to 6 semester hours of law courses and receive credit toward the graduate degree. The graduate student must register for the law course during regular registration at the College of Law requesting an S/NC grade only. If a 2.0 or above is earned in a law course, an S will be recorded on the transcript. If a student earns below a 2.0, an NC will be recorded, and the course cannot be used toward meeting degree requirements. Grades for law courses will not be reflected in the cumulative average. Law courses may be taken for credit only by students enrolled in a graduate degree program.

Different 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 graduate courses. Refer to section on Grades for the grading scale acceptable toward meeting degree requirements. Cumulative GPA for law courses only will be carried until graduation, at which time both the graduate and the law cumulative will be shown on the permanent record.

PROFESSIONAL COURSES

801 Civil Procedure I (3) Binding effect of judgments, selecting proper court (jurisdiction and venue), ascertaining applicable law, and federal and state practice.

802 Civil Procedure II (3) Pleading, joinder of claims and parties, discovery, trials, verdicts, judgments and appeals. Emphasis on Civil Prols. Procedural

803 Contracts I (3) Basic agreement process and legal protections afforded contracts: offer and acceptance, consideration and other bases for enforcing promises; the Statute of Frauds, unconscionability and other controls of promissory liability. Introduction to relevant portions of Article 2 of the Uniform Commercial Code.

804 Contracts II (3) Continuation of Contracts I. Issues arising after contract formation: interpretation, duty of good faith; conditions, impracticability and frustration of purpose, remedies; the duty of good faith, performance 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 (2) 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, including battery, assault, false imprisonment, infliction of emotional distress, conversion and trespass; privileges and defenses to intentional torts; negligence and defenses to tort liability; standards of care and proof of negligence; immunity and limitations on duties; cause in fact; and proximate cause.

808 Torts II (3) Defenses, including contributory negligence, assumption of risk, comparative negligence, and statutes of limitations; vicarious liability; strict liability; nuisance; products liability; settlement; problems of multiplicity of defendants; damages, especially for recovery for personal injury; law reform; defamation, invasion of privacy, and wrongful legal proceedings; misrepresentation, injunction of falsehood, misappropriation of property, and interference with contract; constitutional torts.

900 Criminal Law (3) Substantive aspects of criminal conduct; general principles applicable to all criminal conduct; specific analysis of particular crimes; defenses to crimes.

910 Property (4) Introductory course treating issues of ownership, possession, and control in the areas of landlord-tenant relations; estates in land and future interests; co-ownership and marital property; real estate sales agreements and conveyances; title assurance and recording statutes; servitudes; and assigned aspects of nuisance law, eminent domain and zoning.

512 Constitutional Law I (3) Judicial review, limits on judicial power; national legislative power; regulation of commerce; power to tax and spend; other sources of national power; separation of powers; federalism; and regulation of commerce; intergovernmental immunities.

513 Evidence (4) Rules regulating introduction and exclusion of oral, written and demonstrative evidence at trials and other proceedings, including relevance, competence, and impeachment, expert testimony, authentication, and judicial notice.

514 Legal Profession (3) Legal, professional and ethical standards applicable to lawyers.

516 Computer-Assisted Legal Research (0) Introduction to major computerized legal data base retrieval systems, LEXIS and WESTLAW. Offered periodically throughout the year. May be taken beginning spring of first year after completion of first draft of appellate brief in Legal Process II. Must be completed satisfactorily prior to end of second year of law study. Prereq: Completion of first draft of appellate brief in 806. S/NC only.

916 Income Tax I (4) What is income; whose income is it; when is it income; how is it taxed (capital gains and losses, income and minimum tax); methods and mechanics of collecting; income, payroll and sales taxes.

211 Administrative Law (3) Administrative agency decision-making processes and judicial review of administrative decisions: procedural standards for informal and formal administrative adjudication and rule-making (attention to federal Administrative Procedure Act); constitutional due process standards in administrative settings; and availability, scope and timing of judicial review of agency actions.

222 Legislation (3) Interpretation and drafting of statutes, legislative process, and legislative power; comparison of judicial views on legislative process with both realities of legislative process and applicable constitutional limitations.

224 Local Government (3) Distribution of power between state and local governmental units; sources of authority for limitations on local government operations; creation of local boundaries, home rule, problems created by fragmentation of local government units; financing of local services; influence of federal programs on local government finance and decision-making.

281 Business Associations (4) Legal problems associated with formation, operation, and dissolution of unincorporated and incorporated business firms; legal rights and duties of firm members (partners and others with whom these members interact in connection with firm's business).
834 Antitrust (3) Federal antitrust laws; monopolization, price-fixing, group boycotts, and anticompetitive practices generally; government enforcement techniques and private remedies.

837 Accounting for Lawyers (2) Basic accounting documents, problems, and techniques to enable law students to understand essential accounting information.

840 Commercial Law (4) Basic coverage of most significant provisions of Uniform Commercial Code: security interests in personal property (Art. 9 of U.C.C. and relevant Bankruptcy Code provisions); commercial paper, including checks, notes and other negotiable instruments (Arts. 3 and 4 of U.C.C.); sales of goods, including coverage of portions of Art. 2 of U.C.C. not covered in Contracts.

841 Commercial Finance Seminar (2) Practical experience in large and medium-sized business transactions, planning of transactions and aids to transactional drafting. Financing techniques: equipment leasing and matched fund lending; current issues in commercial financing, and other important issues not normally covered in Commercial Law. Prereq: 840.

843 Debtor-Creditor Law (3) Enforcement of judgments; bankruptcy and its alternatives for business and consumer debtor; emphasis on Federal Bankruptcy Code.


847 Civil Rights Actions (3) Litigation to vindicate constitutional rights in private actions against the government and its officials under the Bivens doctrine; institutional and individual immunities; relationships between state and federal courts in civil rights actions; and remedies for violations of constitutional and other civil rights.

848 Discrimination and the Law (3) Comparison of race, sex and other invidious discriminatory practices as they affect political participation, education, employment, housing and other social and economic activities; legislative enforcement of post-Civil War Amendments to Constitution.

851 Constitutional Law Seminar (2) Current constitutional law problems.

854 Criminal Procedure I (3) Police practices and constitutional rights of persons charged with crimes; arrest; search and seizure; identification; interrogation and confession; electronic eavesdropping; and right to counsel.

855 Criminal Procedure II (3) Pre- and post-trial procedures in a criminal case: bail; preliminary hearing; grand jury; prosecutorial discretion; discovery; speedy trial; plea bargaining; jury trial; double jeopardy; and post-conviction relief. Federal Rules of Criminal Procedure.

857 Criminal Law Theory (3) Theoretical foundations of criminal law. Prereq: 850.


862 Family Law (3) Survey of laws affecting formal and informal family relationships; premarital agreements; antenuptial contracts; creation of common law and formal marriage; legal effects of marriage; support obligations within family; legal separation, annulment, divorce, alimony, and property settlements; child custody and child support; abortion.

893 Children and the Law (3) Legal relationship between children and their parents and the state: parental prerogatives and children's rights; rights of illegitimates; adoption; temporary and permanent removal of children from their parents by the state; juvenile court procedures.

866 Environmental Law and Policy (3) Study, through methods of public policy analysis, of responses of legal system to environmental problems; environmental litigation; Clean Air Act; Clean Water Act; National Environmental Policy Act; and selected regulatory issues.

867 Environmental Law Seminar (2) Selected topics in environmental law.

869 Natural Resources Law (3) Nature of interests; conveyancing; royalties, grants and reservations, leases, and taxation of natural resources.

873 American Legal History (3) Selected topics in American legal history.

875 Empirical Studies of Legal Institutions (3) Socio-economic and political factors that affect behavior of clients, lawyers, judges and other actors in legal institutions. Empirical studies of subjects: social structure and organization of bar; factors that affect filing, processing and disposition of claims in civil justice system; and factors that affect process of case dispositions in criminal prosecutions; plea bargaining process. Factors that sometimes cause "law in action" to operate differently than "law on the books."

877 Jurisprudence (3) Critical or comparative examination of legal theories, concepts, and problems: legal positivism; natural law theory; legal realism; idealism; historical jurisprudence; utilitarianism; Kantianism; sociological jurisprudence; policy science; and critical studies.

879 Law and Economics (3) Relationship between legal and economic thought, use of economics in legal decision making and legal criticism.

881 Law and Literature (3) Systematic study of literature and its application to legal thought and to accurate, fluent, and creative legal composition.

882 Law, Language, and Reality (3) Intermediate level jurisprudence course. Law as the mind's attempt to defend, direct, and administer human activity; exploration, through methods of epistemology, of ethical values underlying formal legal reasoning and legal concepts.

886 Public International Law (3) Law creating processes and doctrines, principles and rules of law that regulate mutual behavior of states and other entities in international system.

887 International Business Transactions (3) Legal status of persons abroad; acquisition and use of property within a foreign country; doing business abroad as a foreign corporation; engaging in business within a foreign country; expropriation or annulment of contracts or concessions.

889 International Law Seminar (2) Current international law problems. Prereq: 886 or 887.

891 Comparative Law (3) Introduction to civil law systems of France and Germany, focusing on legal institutions, methodology, and aspects of law of obligations and commercial law.

895 Labor Relations Law (3) Political, social and economic influences in development of federal labor relations and collective bargaining systems; legal issues in union and employer unfair labor practices; strikes, lockouts, boycotts, and collective bargaining processes; enforcement of collective agreements; individual rights of employees; federal preemption and state regulation.

896 Employment Law (3) Legal regulation of employment relationship; legal, social and economic influences in employee-employer relationship; employment discrimination; legally prescribed minimum standards of compensation and safety; restraints on termination of employment; regulation of retirement systems.

899 Arbitration Seminar (2) Arbitration of labor agreements: collective bargaining; selected arbitration problems on various topics under collective agreements; and role of lawyers and arbitrators. Prereq: 895.

909 Labor Relations Seminar (2) Selected labor relations law problems. Prereq: 895.

906 Criminal Advocacy (6) Supervised fieldwork, requiring students to assume primary responsibility for defending clients accused of crime in Knox County. Exploration of theory, practice and ethics of interviewing, counseling, planning, investigation and discovery, drafting, negotiation, litigation, and other professional tasks necessary to provide competent representation for clients. Hearings in state and federal courts, or before state and federal administrative officers or judges. Prereq: 809 and third-year standing.

915 Conflict of Laws (3) Jurisdiction, foreign judgments, and conflicts of law.

916 Criminal Law Theory (3) Jurisdiction of federal courts; conflicts between federal and state judicial systems.

918 Remedies (4) Judicial remedies: damages, restitution, and equitable relief; availability, limitations and measurement of various remedies; comparison of contract, tort and property-related remedies.

920 Trial Practice (3) Litigation through simulation, trial problems and preparation: basic trial strategy; professional responsibility; fact investigation and witness preparation; discovery and presentation of evidence; selection and instruction of juries; opening and closing arguments. Written work: pleadings, motions, interrogatories and memoranda. Prereq: 813.

921 Pre-Trial Litigation (3) Civil pre-trial process. Drafting of trial briefs and motions; legal pleading; motions for preliminary injunction, class certification papers, motions to dismiss and for summary judgment; and various discovery papers.

923 Complex Litigation (3) Advanced civil procedure course dealing with special problems that arise in litigation involving multiple claims and multiple parties: peremptory and compulsory joinder; intervention; disposition of duplicative or related litigation; class actions; discovery in large cases; judicial control of complex litigation; res judicata and collateral estoppel problems.

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 role of lawyer in mediation and various discovery, drafting of documents. Relevant ethical issues and techniques of dispute resolution. Not open to students who have taken 504 or 506.

929 Teaching Children the Law (3) Communication of law as basic 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 Transfers (4) Nature, creation, termination and transfer of gift; intestate succession; execution, revocation, probate and contest of wills; creation and construction of various types of future interests; construction of limitations; application of the rule against perpetuities.

937 Estate Planning Seminar (2) Problems of estate planning, relationship to estate planning of law and practice of fiduciary administration, insurance, property, wills, trusts, business, partnerships, corporations, and gifts; drafting of estate plans and implementing documents for hypothetical clients. Prereq: 973. Prereq or coreq: 818 and 335.

940 Land Finance Law (3) Financing devices: mortgagees, deeds of trust and land contracts; systems of priorities; transfer of secured interests when debt assumed or taken subject to security interest; default, exercise of option of redemption and statutory right of redemption; mechanics lien and mechanic's lien; contemporary developments in areas as condominiums, cooperatives, housing subdivisions, and shopping centers.

941 Land Acquisition and Development Seminar (2) Alternative business forms and major documents (notes, deeds, prospectus, etc.) necessary to accomplish acquisition or development of large tracts of land prepared and presented for seminar discussion. Prereq: 940.

943 Land Use Law (3) Land use planning; nuisance, zoning and eminent domain.
Library and Information Science

(Office of the Vice Chancellor for Academic Affairs)

MAJOR

Library Science .................................. M.S.L.S.

Jose-Marie Griffiths, Director
Glenn E. Estes, Assistant Director

Professors:

Estes, Glenn E. (Liaison), M.S.L.S. ..... Kent State
Griffiths, Jose-Mari, Ph.D. .......... London (UK)
Purcell, Gary R., Ph.D. .......... Case Western
Wilson, P. (Emeritus), Ph.D. .......... Michigan

Associate Professors:

Karrenbrock, Marilyn H., Ed.D. ......... Georgia
Pemberton, J. Michael, Ph.D. ......... Tennessee
Robinson, William C., Ph.D. ........... Illinois
Sinkankas, George M., Ph.D. ........... Pittsburgh

Assistant Professors:

Palmquist, Ruth A., Ph.D. .......... Syracuse
Pollard, Richard, Ph.D. .......... Brunei (UK)

The Graduate School of Library and Information Science 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 in Library Science. The program is accredited by the American Library Association.

The mission of the school is to provide excellence in teaching, research, and public service in library and information science. The goals and objectives of the school are:

1. To prepare students to understand the nature of information and the role of the library and other information agencies in the management of information resources, and the facilitation of information transfer. Students will demonstrate:
   1. Knowledge of the historical role of libraries and other information agencies in society.
2. A knowledge of how information flows through contemporary society.
3. An understanding of the role of the librarian and/or information specialist as a mediator between information and the user with an emphasis on the improvement of the quality of information services in response to the needs of society.
4. An understanding of and competence in the selection, acquisition, organization, storage, retrieval, and dissemination of information.
5. An understanding of bibliographic control and knowledge of information sources in various formats and subjects.
6. An understanding of management theory and practice, particularly as they are related to library and information services.
7. A knowledge of research methods sufficient to enable them to engage in effective problem solving.
8. To provide services to the state, region, and nation in association, consulting, and continuing education activities which will promote the development and improvement of information systems and services such that the school's contributions reach beyond its immediate academic programs. The school will provide:
   1. Continuing education for information professionals and, on a selective basis, to persons outside the information field.
   2. Advisory services to libraries and other types of 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

Candidates who have at least a 3.0 average in the junior and senior years will receive first consideration. Applicants are required to take the general test of the Graduate Record Examination. The test should be taken at least one semester in advance of application for admission to the Graduate School. A personal data sheet and three recommendations obtained from the Graduate School of Library and Information Science should be returned to the director of the school. Foreign applicants are required to take the Test of English as a Foreign Language.

MASTER OF SCIENCE IN LIBRARY SCIENCE

The program leading to the Master of Science in Library Science involves a total of 39 semester hours of graduate courses, 18 hours of which form a core curriculum required of all students. Either a thesis or a non-thesis option is available, with 6 hours required for thesis credit. At least 33 hours must be taken in the Graduate School of Library and Information Science, allowing up to 6 hours outside the school with a maximum of 6 from outside the University. Upon completion of the program, all students are subject to a final examination. For students who elect the thesis option, the examination will be a defense of the thesis.
Students who elect the non-thesis option will be given a written comprehensive examination.

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 assistentships are available through the school. Assistantships of this type carry a waiver of tuition and fee; assistance to recipients varies 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.L.S. in Library and Information Science, write to Academic Affairs, Graduate School, Library and Information Science, University of Tennessee, 804 Volunteer Blvd., Knoxville, TN 37996-4330.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S.L.S. program in Library Science is available to residents of the states of Arkansas, Georgia, or Virginia. Additional information may be obtained from the Residence Assistant in the Office of Graduate Admissions and Records.

GRADUATE COURSES

430 History of the Book (3) History of writing and the basis. The M.S.L.S. program in Library Science allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S.L.S. program in Library Science is available to residents of the states of Arkansas, Georgia, or Virginia. Additional information may be obtained from the Residence Assistant in the Office of Graduate Admissions and Records.

475 Utilization of Instructional Media (3) (Same as Curriculum and Instruction 475.)

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 Information Professionals and Their Organizations (3) Variety and prospects of information professions; professional organizations; achievements, responsibilities, goals, and issues. E, Su, A

520 Technical Services I (3) Technical services principles and techniques: acquisition, basic manual and automated cataloging, structure and use of library catalogs, basic subject organization and indexing. E, Su, A

521 Technical Services II (3) Library of Congress subject classification systems and related automated cataloging and cataloging of serials and more difficult materials. Prereq: 520. Sp

530 Information Sources and Services (3) Basic bibliographic and information sources, online databases, interview and search techniques, selection and evaluation of information collections and development and evaluation of services. E, Su, A

531 Sources and Services for the Social Sciences (3) Information sources in social sciences: political science, sociology, psychology, geography, history, anthropological, sources and services in business, education, and law. Prereq: 530. F

532 Sources and Services in Science and Technology (3) Information sources in engineering, physical, and life sciences. Prereq: 530. Sp

533 Sources and Services for the Humanities (3) Information sources in philosophy, religion, fine arts, performing arts, literature, and language, and history. Organization of collections for optimum use. Prereq: 530. Su


540 Research Methods in Library and Information Science (3) Research methods applicable to librarianship and information management. Process and conduct of empirical research; analysis of published research. Prereq: Admission to program or consent of instructor. E, Su, A

550 Library and Information Agency Management (3) Management and organizational concepts applicable to libraries and other information agencies. Prereq: Admission to program or consent of instructor. E, Su, A

551 School Libraries and Media Centers (3) Planning, implementing and evaluating school library programs. Curricular role, role of technology, relationships with district and state services. Prereq: 550 and 560 and consent of instructor. F, Su

552 Academic Libraries (3) Development and present status, mission and objectives within higher education institutions, trends, problems, recurring issues. F

553 Special Libraries and Information Agencies (3) Development and present status, scope and objectives, administrative and organizational problems and techniques. Sp

554 The Library in the Community (3) Application of marketing analysis for planning and policy formulation. Public library focus. Sp

560 Development and Management of Collections (3) Philosophy and process of building and managing collections in libraries and information agencies; environment; community analysis; policy statements; collection evaluation; and preparation of buying lists. Prereq: 530. E, Su, A

561 Contemporary Book Publishing (3) Creation, design, production, marketing, and distribution of materials acquired by libraries; various types of publishers. F

562 Serials (3) Serials collections: selection, acquisition, bibliographic control, storage, maintenance, and public service. Prereq: 560 or consent of instructor. Sp

563 Nonbook Materials (3) Selection, acquisition, acquisition, descriptive representation, storage, utilization, and programming; microforms, films, video, sound recordings, and as information media. F

564 Records Management and Archives (3) Objectives and functional elements of records management and archives programs within various types of organizations, management of creation, distribution, retention, storage, retrieval, protection, and disposition of organizational records regardless of information medium. Sp

569 Advanced Production of Audiovisual Software (3) (Same as Curriculum and Instruction 569.)


572 Resources for Young Adults (3) Critical survey of books and materials for young adults; personal, vocational and recreational needs and interests. Evaluation, selection, and utilization for school and public libraries. Sp

573 Services for Children and Young Adults (3) Philosophy and organization of public and school library services for children and young adults. Reading, listening, and viewing guidance for individuals and groups. Program planning, implementation, and evaluation. Prereq: 571 or 572 or consent of instructor. Sp

574 Adult Materials and Services (3) Fiction and subject categories, popular and standard; reading, listening, and viewing guidance to meet adult interests; development of specialized collections; services for adults. Su

580 Foundations of Information Science (3) Identifies attributes of information; information theory, relevance, use and user studies, bibliometrics, and major components of information retrieval system design. Relates selected research findings to library and information system practice. F, Sp

581 Information in Society (3) Characteristics of an information society, knowledge and information, effects of technological innovation, use and effect of media. Sp

582 Automation (3) Computer concepts and their applications to basic libraries and information centers. E, Su, A

583 Information Systems Analysis and Design (3) Tools and methodologies in library/information agency systems planning and implementation. Role and training of systems analyst, systems study from planning through implementation and evaluation, and related topics. Sp

584 Bibliographic Database Design (3) Design and construction of bibliographic databases, records and their tabular structure, document representation, indexing, abstracting, thesaurus construction and maintenance, and information retrieval. Sp

585 Information Technologies (3) Computer-based and non-computer related media and methods for information storage, retrieval, and transfer within and external to library/information center environment; existing and prototype systems and interfacing of technologies. Prereq: 550 or consent of instructor. Sp

590 Problems in Library and Information Science (3-6) Prereq: Consent of Instructor. May be repeated. Maximum 6 hrs.

591 Supervised Readings in Library and Information Science (3-6) Prereq: Consent of Instructor. May be repeated. Maximum 6 hrs.

592 Seminar in Library and Information Science (3) Prereq: Consent of Instructor. May be repeated with consent of advisor. Maximum 6 hrs.

593 Independent Study (3) Prereq: Consent of advisor. Maximum 6 hrs.

599 Practicum (3) Opportunity to translate theory into practice under guidance of qualified information professionals. Prereq: Completion of core courses relevant to student's practicum design. Written consent of advisor and approval of practicum coordinator. May be repeated with consent of advisor and practicum coordinator. F, Sp

Life Sciences

(Office of the Vice Chancellor for Academic Affairs)

MAJOR DEGREES

Life Sciences ............................................. M.S., Ph.D.

Howard I. Adler (Liaison), Chair

Coordinating Council:
Becker, Jeff M., Cellular, Molecular and Developmental Biology
Richard S. Saudargas, Ethology
Schwarz, O. J., Plant Physiology and Genetics
Dougall, D. K., Biotechnology
Ferkas, W. R., Environmental Toxicology
Vaughan, Gerald, Physiology

The programs leading to the M.S. and Ph.D. degrees in Life Sciences are interdepartmental and intercollegiate programs which augment the programs of individual departments.

The Life Sciences Council supports studies and research in the following concentrations:

- physiology: biotechnology (M.S. only); cellular, molecular and developmental biology; environmental toxicology; ethology; and plant physiology and genetics. Students interested in any of

120 Life Sciences
these areas should contact either the chair of Life Sciences or the director of the area of interest. Each program is overseen by a committee and may have unique admission and graduation requirements.

ADMISSION REQUIREMENTS
1. A Bachelor's degree with a major in a biological, behavioral, or physical science.
2. GRE (general) scores.
3. Three letters of recommendation.
4. Coursework including a year of calculus (differential and integral), one year of chemistry, and a year of physics. Specific course deficiencies may be corrected during the first year.

DEGREE REQUIREMENTS
The Master's degree requires a minimum of 30 semester hours of study approved by the student's committee, a thesis, and an oral examination. Within the biotechnology program only, a non-thesis M.S. option is available. Students choosing this option are expected to complete: (1) two summers' co-op experience in an appropriate industry. An evaluation by supervisor and a written report are required (529, Biotechnology Practicum Cooperative Experience, maximum 4 hrs.); (2) A written report in the form of a scientific paper in an area of specialization chosen by the student and advisor. The minimum requirements for the doctoral degree include at least 6 hours above the 600 level, 24 semester hours of course 600, a pattern of courses approved by the student's committee, a comprehensive examination, a doctoral dissertation, and a defense of dissertation. Individual programs may have additional requirements.

CONCENTRATIONS
Biotechnology
The biotechnology program will prepare students to participate in the wide variety of opportunities presented by the use of living cells and their components for the production of useful materials. This will be achieved at the M.S. level by a prescribed course of study in the biology and biochemistry of cells and molecules; by formal study of cells and of engineering aspects of biotechnology; and by the development of special expertise in areas such as animal embryo manipulation, automated chemical synthesis of macromolecules, bioprocess engineering, bioproducts and biotransformations, liposomes, microscopy and image processing, monoclonal antibodies and hybridoma technology, plant tissue culture, recombinant DNA technology and risk assessment, and modeling. The production of a research thesis or an industrial co-op experience plus an area of specialization will also be an important part of the training experience.

Required courses are Life Sciences 511, 512, 531, and 532.

Environmental Toxicology
The toxicology program provides intensive training in basic toxicological principles and techniques. Courses and research expose trainees to mechanisms of intended and unintended interactions between living systems and potentially toxic agents from the point of view of biochemistry, physiology, ecology, public health, environmental law and regulation, pest management, pollution control and repair, and testing and residue analysis of toxicants.

Required courses are Biochemistry 561, 562, 604; and Life Sciences 610.

Ethology
Ethology is the naturalist study of normally occurring animal and human behavior. The program provides intensive training in basic ethology with specialized studies available in the development, evolution, and physiology of behavior; comparative psychology; human ethology; and behavioral ecology and sociobiology.

Required courses for the Master's are Psychology/Zoology 450, 459; Zoology 524, 583; Statistics 531-32; and Zoology/Psychology 516.

The Ph.D. requirements are the same as for the Master's with the additional requirements of one additional statistics course and six semester hours of courses numbered above 600 approved by student's committee.

Physiology
The interdepartmental program in physiology includes research in the areas of cellular, comparative, developmental, exercise, muscle, neurophysiology, regulatory, or reproductive.

Required courses are Zoology 520, 521, Human Anatomy, Comparative Vertebrate Biology, 420; Biochemistry 410; four 600-level seminars; and a statistics sequence.

Plant Physiology and Genetics
This program provides the opportunity for intensive training and research experience in areas transcending the usual boundaries of botany, biotechnology, and agricultural plant sciences. It devotes itself to seeking solutions of problems concerning the interactions of physiology and genetics in applied and fundamental aspects of plant science.

Required courses are Life Sciences 510; Botany 521, 522; Biochemistry 511, 512; Plant and Soil Science 471 or Zoology 560; Plant and Soil Science 511; Microbiology 410.

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or for time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
509 Biotechnology Seminar (1-2) Topics of importance to biotechnology. May be repeated. Maximum 6 hrs.
510 Special Topics In Life Sciences (1-3) Specializations in biotechnology; cellular, molecular, and developmental biology; environmental toxicology; ethology; plant physiology and genetics; and pathology. May be repeated. Maximum 9 hrs.
511 Advanced Cellular Biology (3) Cell structures and functions at molecular and supramolecular level. Membrane structure, function, and biogenesis; cellular communication; receptors and membrane flow; growth regulation and oncogenesis; plant cell structure and function; contractility and motility; melosis and meiosis; blood and immune cells.
512 Advanced Molecular Biology (4) (Same as Biochemistry 512.)
525 Research Practicum in Life Sciences (1-3) Individual projects for each of biotechnology; cellular, molecular and developmental biology; environmental toxicology; ethology; plant physiology and genetics; and pathology. May be repeated. Maximum 3 hrs.
529 Biotechnology Practicum Co-operative Experience (2) Work experience in commercial organization for students undertaking non-thesis option of biotechnology concentration. Evaluation by supervisor and written report by student. May be repeated. Maximum 4 hrs.
531 Biotechnology Laboratory (3) Growth of microorganisms, analysis of extracellular and intracellular components.
532 Biotechnology Laboratory (3) Pilot scale yeast cultivation, enzyme isolation, purification and characterization. Application of purified enzymes to food production fermentations and fermentation process control.
600 Doctoral Research and Dissertation (3-15) P/NP only. E
610 Advanced Topics in Life Sciences (1-3) Topics vary. May be repeated. Maximum 9 hrs.

Logistics
See Marketing, Logistics and Transportation

Management
(College of Business Administration)

MAJOR                        DEGREES
Business Administration .......... MBA, Ph.D.

Oscar Fowler, Head

Professors:
Boling, Ronald W. (Emeritus), Ph.D. .... Stanford
Dewhirst, H. Dudley, Ph.D. ..... Texas
James, Lawrence R., Ph.D. .......... Utah
Keally, A. H. (Emeritus), MBA .... Pennsylvania
Larsen, John M., Jr., (Emeritus), Ph.D. .... Purdue
Neel, C. Warren, Ph.D. ............ Alabama
Reed, S. Kyle (Emeritus), Ph.D. ...... Edinburgh
Stahl, Richard J., Ph.D. ............ Iowa
Tate, Mitchell J., Ph.D. ............ Pennsylvania
Vance, S. C. (Emeritus) (W.B. Stokely Prof.), Ph.D. ..... Tennessee

Associate Professors:
Dobbins, Gregory H., Ph.D. ............ VPI
Fowler, Oscar S., Ph.D. .......... Georgia
Fryxell, Gerald E. (Liaison), Ph.D. ...... Indiana
Gilbert, Kenneth C., Ph.D. ...... Tennessee
Ladd, Robert T., Ph.D. .......... Georgia
Maddock, Robert C., Ph.D. ......... Texas
Miller, Alex, Ph.D. .......... Washington
Russell, Michael C., Ph.D. ........... Akron
Srinivasan, M. R., Ph.D. .......... Northeastern

Assistant Professors:
Bowers, Melissa R., Ph.D. .......... Clemson
Management Science

(College of Business Administration and Intercollegiate Program)

MAJORS

DEGREES

Management Science .................. M.S., Ph.D.
Business Administration ................. MBA

Kenneth C. Gilbert, Chairperson

Associate Professors:
Gilbert, Kenneth C. (Liaison), Ph.D., Tennessee
Sriramvan, M. M., Ph.D. .......... Northeastern

Assistant Professors:
Bowers, Melissa R., Ph.D. .......... Clemson
Edrisineh, Chanaka F., Ph.D. British Columbia
Noon, Charles E., Ph.D. .......... Michigan

Additional Committee Members:
Fowler, Oscar S., Management
Leitnaker, Mary G., Statistics
Raison, Bruce A., Geography

THE MASTER'S PROGRAM

The M.S. program in Management Science is an intercollegiate program and is designed as preparation for a career in the application of quantitative techniques for the solution of complex problems. The program's flexibility also makes it appropriate as preparation for doctoral study in Management Science.

Management Science coursework will expose students to both the theoretical development of quantitative techniques and their application to managerial decision making. In addition to the development of sufficient mathematical maturity for creative use of quantitative skills, the program requires concentrated study in a supporting area. Supporting areas are available in other departments of the College of Business Administration (excluding statistics) as well as in computer science, public administration, ecology, and other areas, subject to approval by the Management Science Committee.

Admissions Requirements

The Master's program requires three Graduate School Rating Forms and the GRE or GMAT. Applications are encouraged from all majors, but mathematics background equivalent of the completion of at least two years of college calculus and proficiency in a computer language is required. The program is designed to be completed in three semesters by full-time students. However, students may start the program in any semester and may pursue an M.S. degree in Management Science on a part-time basis.

Course Requirements

Hours
Core Requirements 14
Management Science 531, 532, 533, 534
Statistics 563
Applied specialization area (approved by advisor)
Statistics elective—500 level or above (approved by advisor) or
Mathematics—400 level or above (approved by advisor)
A thesis option is available to qualified students which substitutes 6 hours of thesis credit for the following 6 hours of course work: Management Science 534, 3 hours in the applied concentration area and 3 hours of electives in any area. The Management Science Committee will work closely with the student in tailoring a program to his/her needs. The committee must approve a tentative overall program during the student's first semester and must approve all courses on a semester-by-semester basis.

Recognizing the diverse backgrounds and needs of Management Science M.S. students, the Management Science Committee is prepared to waive some of the above requirements on an individual basis. For example, an undergraduate mathematics major with a strong background may be allowed to take 6 additional hours of electives in place of the mathematics requirements. On the other hand, a student lacking experience in rigorous senior-level mathematics courses will be asked to take such courses to fulfill the 6-hour mathematics requirement. The total course load will remain 38 hours for all non-thesis students and 36 hours for all thesis students; however, the number of hours of electives can be reasonably expected to vary between 6 and 12 as a function of prior background.

THE DOCTORAL PROGRAM

The Ph.D. program in Management Science under the College of Business Administration is designed to prepare students for research related to the application of mathematical tools to complex decision making. Three primary objectives of the program are:

1. to provide, through management science coursework, a thorough knowledge of common Management Science/Operations Research mathematical models and their uses;
2. to provide sufficient advanced study in a supporting area to qualify the graduate for a joint faculty position in the supporting area and management science;
3. to develop in the student, through coursework in mathematics, statistics, and computer science, a high degree of mathematical maturity to enhance a potential career in management, research, or teaching.

Admission Requirements

The doctoral program requires three Graduate School Rating Forms and the GRE or GMAT, in addition to The Graduate School's requirements.

Coursework

A minimum of 48 semester hours of coursework taken for graduate credit (exclusive of thesis or dissertation) is required. Some of this may be coursework from a Master's program although a Master's is 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

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

502 Registration for Use of Facilities (3-15) Required for the degree, 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 Mathematical Programming (3) Linear programming procedures, duality and sensitivity analysis, Network flows, integer, and nonlinear programming. Prereq: Fundamentals of matrix algebra and differential calculus, proficiency in computer language. F

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. Sp

533 Computational Mathematical Programming (3) Advanced modeling, computational and reporting techniques in practical mathematical programming. Prereq: 531 and proficiency in PASCAL.

534 Application of Management Science Methods (3) Application of methods for leading to real world problems. Exposure to existing problem in industry or elsewhere. F


581 Special Topics in Management Science (3) Pre-req: Consent of instructor. May be repeated. Maximum 9 hrs.

593 Management Science Problems (1-6) Direct course study of such a study of individual 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, primal-dual and primal-dual basis tree methods. Prereq: 531 or equivalent.

631 Integer Programming (3) Theoretical and computational aspects of linear programming with integer variables, branch and bound, cutting plane, and group theoretical algorithms. Prereq: 531 or equivalent.


651 Nonlinear Optimization (3) Solution of constrained and unconstrained nonlinear programming problems. Practical algorithms that perform well in recent practice. Prereq: 531 or equivalent.


691-92 Management Science Seminar (1,1) Subjects selected from current literature. S/NC only.

681 Special Topics (3) Prereq: 531, 532 and consent of instructor. May be repeated. Maximum 9 hrs.

Marketing, Logistics, and Transportation (College of Business Administration)

MAJOR DEGREES
Business Administration MBA, Ph.D.

David W. Schumann, Head

Marketing

Professors:
Barnaby, D. J., Ph.D. .......... Purdue
Cadotte, E. R., Ph.D. .......... Ohio State
Jenkins, R. L., Ph.D. .......... Ohio State
Woodruff, R. B., DBA ............ Indiana

Associate Professors:
Gardial, S. F., Ph.D. .......... Houston
Reizenstein, R. C., Ph.D. .......... Cornell
Rentz, J. O. (Liaison), Ph.D. .......... Georgia
Schumann, D. W., Ph.D. .......... Missouri

Assistant Professors:
Daholikar, P. A., Ph.D. .......... Georgia State
Johnston, T. C., Ph.D. .......... California
Moon, M. A., Ph.D. .......... North Carolina
Song, X. M., Ph.D. .......... Virginia

BUSINESS ADMINISTRATION CONCENTRATIONS

For complete listing of MBA and Ph.D. program requirements, see Business Administration.

MBA Concentration: Marketing. Minimum course requirements are three courses from the following: 503, 504, 505, 506, 550, 593, 598, Logistics and Transportation 507, Business Administration 510, 559.

Ph.D. Concentration: Marketing. Minimum course requirements are 12 hours from among the following courses: 601, 602, 603, 604, 605, 606.

GRADUATE COURSES

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

503 Buyer Behavior—Analysis for Marketing (3) Consumer behavior concepts and processes developed and applied to market analysis and design, and control of marketing programs. Social psychology and demographic factors that affect consumer product, brand and patronage decisions. Prereq: Business Administration 504 and 505 or consent of instructor.

504 Analyzing Market Opportunity for Marketing Decisions (3) Major determinants of opportunity in markets, framework for finding markets and analyzing them for opportunity, application of market opportunity analysis to marketing strategy decisions. Prereq: Business Administration 504 and 505 or consent of instructor.

505 Marketing Research and Information Planning (3) Design of a rigorous marketing study from inception to implementation of results by recognizing key decision points and critically evaluating merit of research project. Prereq: Business Administration 504 and 505 or consent of instructor.

506 Marketing Strategy (3) Integration of concepts and analytical skills from each component area of marketing to formulate cohesive, well-organized marketing plan. Prereq: Business Administration 504 and 505 or consent of instructor.

550 Market Opportunity Analysis for New Ventures (3) Concepts for understanding coverage of new venture MOA and various information sources and procedures; identify and analyze sales opportunities in markets for new product or service. Prereq: Consent of instructor.

593 Independent Study (3) Directed research and study. Prereq: MBA Core and consent of instructor. May be repeated. Maximum 6 hrs.

599 Special Topics Seminar (3) Topics vary: nonbusiness marketing applications, macroenvironmental issues, market segmentation, international marketing, services marketing, marketing channels, and related issues. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

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

601 Marketing Theory (3) Nature and scope of marketing, role of theory development and theory testing important to marketing research.

602 Research Methods I (3) Research process: problem formulation, research and experimental design, measurement and implementation of results. Design: experimental design, survey research, and measurement.

603 Marketing Thought (3) Marketing literature across number of research areas. Evaluate individual works, determine state of research in each area, and identify areas that merit further study.

604 Seminar in Buyer Behavior Research (3) Behavioral study of people in their roles as buyers and users of goods and services both individual and group processes.

605 Research Methods II (3) Analytical approach to marketing decisions and role of quantitative methods. Models and modeling in marketing: consideration of decision theory, linear programming, simulation and other mathematical representations of marketing phenomena.

606 Special Topics (3) Topics vary: marketing strategy, advanced consumer behavior, influence and persuasion theory and strategy, pricing issues, international marketing issues, and nonprofit organization marketing issues.

Logistics and Transportation

Professors:
Davis, F. W., Jr. (Liaison), Ph.D. .......... Michigan State
Dicer, G. N., DBA .......... Indiana
Frye, J. L. (Emeritus), Ph.D. .......... Florida
Hendrix, F. L. (Emeritus), Ph.D. .......... North Carolina
Langley, C. L., Jr., Ph.D. .......... Penn State
Mundy, R. A., Ph.D. .......... Penn State
Patton, E. P., Ph.D. .......... North Carolina

Associate Professor:
Foggin, J. H., DBA .......... Indiana

Assistant Professor:
Holcomb, M. C., Ph.D. .......... Tennessee

BUSINESS ADMINISTRATION CONCENTRATIONS

For complete listing of MBA and Ph.D. program requirements, see Business Administration.

MBA Concentration: Logistics and Transportation. Minimum course requirements are 501, 508, and one course from the following: 504, 506, 597, 593, and 599.

Ph.D. Concentration: Logistics and Transportation. Minimum course requirements are 12 hours to include 601, 602, 603.

GRADUATE COURSES

501 Survey of Logistics and Transportation (3) U.S. logistics and transportation: physical, economic, social, and political environment; financing, managing, maintaining, and enhancing U.S. transport infrastructure.

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

504 Freight Carrier Systems and Management (3) Analysis of freight carrier manager's efforts to provide services demanded by consumers in logistics and transportation marketplace.

506 Logistics Systems Management (3) Development of strategy for management of logistics systems. Executive level integration of logistics operations with marketing, production, and other decision areas. Practical application through case approach and simulation game.

507 International Logistics and Transportation (3) Logistics strategy in the multinational firm: materials management, international sources and distribution, and importing/exporting, issues; international carrier management and operations and comparative national transport systems analysis.

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.

593 Independent Study (3-6) Directed research and study. Prereq: Consent of instructor. May be repeated.

599 Special Topics in Logistics and Transportation (3-6) Seminar designed to study specific current problem areas in logistics and transportation. Topic announced prior to offering. Prereq: Consent of instructor. May be repeated.

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

601 Seminar in Logistics and Transportation Models (3) Analysis of contemporary models and methodologies in logistics and transportation research, topical coverage at discretion of instructor.

602 Seminar in Evolution of Logistics Thought (3-6) Seminar designed to study specific current problem areas in logistics and transportation thought: dynamic development of principles and tools developed as organizational missions and environmental change, economic and policy issues peculiar to transportation and other service organizations.

603 Research Methodology in Logistics and Transportation (3) Various research methods used in logistics and transportation. History and development of body of knowledge. Review of literature. Discussion of contemporary research issues. Development of student's dissertation research proposal.
Materials Science and Engineering

(College of Engineering)

MAJORS DEGREES
Metallurgical Engineering .................. M.S., Ph.D.
Polymer Engineering .......................... M.S., Ph.D.

Joseph E. Spruill, Head

Professors:
Bogue, Donald C., Ph.D ............. Delaware
Borie, Bernard S., Ph.D ............. MIT
Brooks, C. R., Ph.D ................. Tennessee
Buchanan, Raymond A., Ph.D ......... Vanderbilt
Clark, Edward S., Ph.D .............. California
Fellers, J. F., Ph.D ............. Akron
Law, P. K., Ph.D ............... Northwestern
Lowndes, Donald A., Ph.D .......... Colorado
Lundin, Carl D., Ph.D ............. Rensselaer
McHargue, C. J., Ph.D ......... Kentucky
Oliver, Ben F., Ph.D ............ Penn State
Pedraza, A. J., Ph.D ................ National (Argentina)
Phillips, Paul J., Ph.D ........... Liverpool (UK)
Spruill, Joseph E. (Liaison), Ph.D . Tennessee
Stansbury, E. E. (Emeritus), Ph.D .... Cincinnati

Associate Professors:
Becker, William T., Ph.D ............. Illinois
Benson, R. S., Ph.D ................ Florida State
Meek, Thomas T., Ph.D .............. Ohio State

Graduate programs are offered leading to the degrees of Master of Science and Doctor of Philosophy in Metallurgical Engineering or Polymer Engineering. Both the metallurgical and polymer programs are flexible and interdisciplinary in nature. Students may be admitted from a wide range of disciplines; these include physics, chemistry, mathematics, mechanical engineering, electrical engineering, materials engineering, and engineering science programs. Prospective students should consult the materials science and engineering faculty concerning development of individual concentrations or special programs compatible with their backgrounds and goals.

Areas of concentration within the metallurgical engineering program include physical metallurgy; materials processing; welding metallurgy and materials joining; corrosion behavior; failure analysis; and mechanical and physical behavior of materials. Specializations in electronic and ceramic materials are available.

Areas of concentration within the polymer engineering program include rheology and polymer processing; polymer morphology; mechanical, physical and chemical behavior of polymers; and composite materials.

THE MASTER'S PROGRAM

Thesis Option
A total of 30 semester hours is required for the M.S. degree in either Metallurgical Engineering or Polymer Engineering. Additional requirements include:
1. A major consisting of 12 to 18 semester hours of graduate courses in metallurgical engineering or polymer engineering. The polymer engineering major must include 540, 541, 543, 546, 549, 550 and 572 unless similar material has been covered in prior coursework.
2. Additional courses amounting to 6 to 12 hours total in any approved engineering, chemistry, mathematics, physics, or other related fields.
3. Master's thesis, 500 totaling 6 to 12 hours. All resident students are required to register for and participate in the graduate seminar in metallurgical engineering or polymer engineering as appropriate, during each semester in which it is offered. Credits for the seminar do not count towards satisfying the coursework requirements.

Non-Thesis Option
Under certain conditions, a candidate may apply for a non-thesis option. To be eligible, the candidate must show evidence of significant professional experience after the baccalaureate degree; at least five years of industrial experience or research publications would be examples of such evidence. A departmental faculty meeting will consider each application individually. Upon acceptance, a supervisory committee of three will be appointed, at least two being from the Department of Materials Science and Engineering. The requirements for completion of the non-thesis option are as follows:
1. A total of at least 33 hours in graduate courses in metallurgical engineering, polymer engineering and related areas. The minimum requirements are 21 hours in the Department of Materials Science and Engineering and up to 12 hours in other engineering or science courses. The candidate's degree program must be approved by the faculty committee.
2. Satisfactory completion of a critical review of the literature in an area related to metallurgical, polymer or materials engineering (580).
3. Satisfactory performance in an oral examination to be conducted by the faculty committee and covering the review paper and other areas of metallurgical or polymer engineering.

THE DOCTORAL PROGRAM

Students applying for entrance into the doctoral program must display concrete evidence of ability to perform and report independent research to the satisfaction of the department. The Master's thesis may be offered as such evidence.

Department requirements consist of the satisfactory completion of:
1. Graduate courses in materials science and engineering amounting to approximately 24 semester hours, at least 8 of which must be in 600 series courses.
2. Supporting courses in related scientific and engineering fields amounting to approximately 24 semester hours, subject to approval by the student's faculty committee. These related fields will normally include chemistry, mathematics, physics, and engineering.
3. The comprehensive examination, usually given in two parts, and covering such topics as materials science and engineering, metallurgical or polymer engineering operations and processes, thermodynamics, technology, mathematics, physics, chemistry, and other related fields.
4. Active participation in graduate seminars conducted by the department. Resident students must register for the appropriate 503 or 504 every semester offered.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UTC Knoxville on an in-state tuition basis. The Ph.D. program in Metallurgical Engineering is available to residents of the state of Virginia; the M.S. and Ph.D. programs in Polymer Engineering are available to residents of Arkansas, Kentucky, Louisiana, Texas, or Virginia. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

GRADUATE COURSES
405 Structural Characterization of Materials (4) X-ray diffraction and fluorescence; scanning and transmission electron microscopy; microanalytical techniques.
421 Mechanical Behavior of Materials (3) Description of stress and strain; linear elastic constitutive equations; isotropic and anisotropic moduli in various materials; yield criteria; brittle fracture; crazing; plastic strain constitutive equations, forming operations and limit criteria. Prereq: Mechanical Behavior of Materials, Mechanics of Materials, and Mechanics of Solids.
422 Chemical Process Metallurgy (3) Application of chemical thermodynamics to metallurgical processing. Ferrous and nonferrous pyrometallurgical refining; slag-metal equilibria, solidification, gas-metal processing. Prereq: 421.
425 Metallurgical Applications in Manufacturing and Processing (3) Fabrication methods, standards and specifications; principles of thermomechanical processing for finished and semi-finished products; casting, forming, joining, heat treatment; powder metallurgy, corrosion control. Prereq: 201.
426 Materials Joining (3) Processes for joining metals, polymers and ceramics; mechanical, adhesive, fusion-soldering/crystalization; surface characteristics necessary for joining and chemical bonding; thermal effects on structure and properties of joints; design of joints. Prereq: Introduction to Materials Science and Engineering.
443 Polymer Processing (3) Rheological measurements; flow through tubes and dies; effects and extrudate swell; selected applications; screw extrusion, injection molding; synthetic fibers, spinning methods, structure, development, properties.
444 Plastics Fabrication and Design (3) Lectures, laboratories and field trips; unit operations of plastics fabrication; plastics classification; design and selection criteria; processing techniques; characterization laboratory.
472 Fundamental Principles of Composite Materials (3) Establishment of physical principles basic to design, manufacture and application of fiber reinforced polymers, metals and ceramics. Prereq: 302 or equivalent.
474 Biomaterials (3) Metals, polymers and ceramics used in orthopedic, cardiovascular, and dental surgical implant devices; corrosion and degradation problems; material properties of primary importance; tissue response to synthetic materials. Prereq: 201, recommended for engineering science and mechanics majors.
475 Fracture-Safe Design (3) Same as Engineering Science and Mechanics 475.
500 Thesis (1-15) P/NP only. E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/N/C only. E
503 Graduate Seminar in Metallurgical Engineering  (1) Prereq: Admission to graduate program. May be repeated. S/NC only. E

504 Graduate Seminar in Polymer Engineering  (1) Prereq: Admission to graduate program. May be repeated. S/NC only. E

505 Engineering Analysis  (3) [Same as Chemical Engineering 505.]

522 Defects in Crystals  (3) Analytical and experimental analysis of defects in solids. Prereq: 421 or consent of instructor.

523 Plastic Deformation of Metals  (3) Geometry and mechanisms of single crystal plastic deformation; slip, twinning, and cleavage, work hardening, effect of temperature, loading effects, effect of ordering and solid solution alloying; polycrystalline behavior in terms of single crystal deformation mechanisms; texture formation. Prereq: 301, 320 or consent of instructor.

524 Metallurgical Thermodynamics  (3) Applications of chemical thermodynamics to metallurgical problems: refining, oxidation, surface treatments, alloy systems. Prereq: 570 or equivalent.

525-26 Welding Metallurgy  (3,3) Welding processes; physical metallurgy of welding; phase transformations; heat flow; residual stresses; theories of hot cracking, physical metallurgy of welding; phase transformations; welding 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.

529 Diffusion in Solids  (3) Phenomenology and atomic mechanisms of diffusion in solid state. Solution and application 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 and phase equilibria, theory of nucleation in solids; kinetics and morphology of diffusion controlled growth; kinetics of interface controlled phase transformations; crystallography and kinetics of martensitic transformations.

531 Advanced Corrosion  (3) Analyses of corrosion processes in terms of polarization measurements and Pourbaix diagram. Influence of environmental and mechanical factors contributing to pitting, crevice, fretting, wear, fatigue and stress corrosion. Prereq: 470 or consent of instructor.


540 Basic Polymer Chemistry  (3) Synthesis, reactions and degradation of polymers. Molecular characterization: solution methods and spectroscopy. Prereq: Coreq: 540 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: screw extrusion, fiber spinning, injection molding. (Same as Chemical Engineering 541.)

542 Further Topics in Polymer Processing  (3) Description and analysis of selected polymer processing operations.


544 Polymer Solution Thermodynamics and Characterization  (3) Theories of solutions, statistical thermodynamics. Characterization, treatment of chromatography, viscosity, light scattering and osmotic pressure. Prereq: Undergraduate physical chemistry.

546 Mechanical Properties of Solid Polymers  (3) Types of testing; Hook's law and rubber elasticity; plastic deformation; fracture; linear viscoelasticity; dynamic mechanical behavior and testing; loss tangent; experimental methods. Introduction to mechanical properties of polymeric composites.

549-50 Laboratory Methods in Polymer Engineering  (1,1) Basic experimental techniques and instrumentation associated with characterization, x-ray and light scattering, calorimetry, rheometry, mechanical properties of polymeric compositions, polymer processing operations. Coreq: 540 or consent of instructor.

560 Principles of Ceramic Processing  (3) Treatment of ceramic processing; raw materials preparation and characterization; powder consolidation; drying, firing, sintering techniques, mechanisms and kinetics. Prereq: 360 or equivalent.

561 Inorganic Glass Forming Systems  (3) Physical and chemical nature of inorganic glasses; structural theories of glass formation; major glass forming systems: silica, other oxide glasses, nitrate glasses, -aloy glasses, and chalcogenide glasses. Prereq: 360, Chemistry 371.

562 Experimental Mechanics of Composite Materials  (3) [Same as Engineering Science and Mechanics 562.]

570 Chemical Thermodynamics  (3) Entropy and energy of mixing; Gibbs function and chemical potential methods of measuring activity; solution theories; phase rule; heat capacity of gases, liquids and solids; calculation of phase diagrams. Prereq: 303 or equivalent.

571 Electron Microscopy  (3) Operation of electron microscope; kinematical and dynamical diffraction theories; electron microscopy; structure determination; analysis of lattice defects. Prereq: 570 or equivalent.

572 X-ray Diffraction  (3) Symmetry of crystals, space group theory, reciprocal lattice and application to definition of structures; powder and single crystal x-ray techniques; introduction to crystal structure determination; characterization of orientation; application to inorganic, metallic and polymer structures.

573 Biomaterials Analysis and Development  (3) Physical properties of current surgical implant materials and methods of improvement; resistance to corrosion and mechanical damage; detrimental effects of specific metal ions; development of new biomaterials and new materials processing techniques. Prereq: 470, 474 or consent of instructor.

574 Formability of Materials  (3) Modelling and analysis of finite plastic strain with application to primary and secondary forming operations; crystalline and noncrystalline materials; material localization, instability, predictive testing. Prereq: Consent of instructor.

576-77 Special Topics in Materials Science and Engineering  (3,3) Topics of current significance and interest. Prereq: Consent of instructor. May be repeated.


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

621-22 Theoretical Metallurgy  (3,3) Topics in solid state physics as applied to metallurgy; introduction to quantum theory, specific heats, electron theory of solids, electrical and thermal conductivity, magnetic properties, theories of alloy formation. Prereq: Consent of instructor.

623-24 Solidification and Crystal Growth  (3,3) Theories of solidification, fluid flow effects, growth rate, nucleation and melting mechanisms; solidification and crystal growth. Prereq: 474 or consent of instructor.

641 Advanced Rheology and Viscoelastic Theory  (3) Continuum mechanics, formulation of viscoelastic theories for describing deformation and flow of polymeric materials. Application to polymer processing problems. Recommended for MS candidates working in rheological areas. Prereq: 541.

642 Advanced Topics in Polymer Processing  (3) Application of theories of 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 polycrystalline glasses; crystallization of polymers; nucleation, growth and morphology; secondary nucleation theory; solidification of copolymers; crystallization under stress. Prereq: 543.

671 Quantitative Microscopy  (3) Principal acoustic, optical, x-ray neutron, electron and field-ion techniques for examination of microstructures of materials. Prereq: 405.


678-79 Advanced Topics in Materials Science and Engineering  (3,3) Advanced developments and/or advanced special topics. Prereq: Consent of instructor. May be repeated.

678-79 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

(MAJOR DEGREES)

Mathematics ........................................... M.M., M.S., Ph.D.

John B. Conway, Head

Professors:
Albert, G. E. (Emeritus), Ph.D. ................. Wisconsin
Alexiades, V., Ph.D. ................................ Delaware
Allikakos, N., Ph.D. ................................. Brown
Anderson, D. F., Ph.D. ............................... Chicago
Baker, G. A., Ph.D. .................................. Cornell
Bradley, John S. (Emeritus), Ph.D. ............ Iowa
Carruth, J. H., Ph.D. ................................. Louisiana State
Clark, C. E., Ph.D. .................................... Maryland
Dobbie, D. E., Ph.D. ................................. Cornell
Dyak, J. E., Ph.D. ..................................... Warsaw
Friis, Mr. H. F. ......................................... Illinois
Gross, L. J., Ph.D. .................................... Cornell
Hagman, T. G., Ph.D. ................................. Missouri
Hinton, D. B. (Liaison), Ph.D. ................. Tennessee
Hussey, A. S. (Emeritus), Ph.D. ............... Chicago
Husby, L. S., Ph.D. ................................. Florida State
Johansson, K., Ph.D. ............................. Bielefeld
Jordan, G., Samuel, Ph.D. ...................... Wisconsin
Karakashian, O., Ph.D. ............................ Harvard
Kuperpfeld, B. A. (UTSI), Ph.D. ........... MIT
Lenhart, S., Ph.D. ................................. Kentucky
McDonnell, R. M., Ph.D. ......................... Duke
Mathews, H. T., Ph.D. ............................. Tulane
Miller, D. D. (Emeritus), Ph.D. ............... Michigan
Rajput, B. S., Ph.D. ................................. Illinois
Reddy, K. C. (UTSI), Ph.D. ................. Indian IT
Reinsch, J., Ph.D. ................................. Wroclaw
Schaefer, P. W., Ph.D. .............................. Maryland
Scriber, Steve, Ph.D. ............................. Cornell
Son, K., Ph.D. ....................................... Oregon State
Stallman, F. W. (Emeritus), Ph.D. .......... Giessen
Stephenson, K. R., Ph.D. ......................... Wisconsin
Sundberg,, C., Ph.D. ............................... Wisconsin
Thistledthwaite, M. B., Ph.D. ............... Manchester
Wade, W. R., Ph.D. ................................. California (Riverside)
Wagner, C. G., Ph.D. ............................... Duke

Associate Professors:
Kimble, K. R. (UTSI), Ph.D. ................... Ohio State
Kuo, Y., Ph.D. ................................. Cincinnati
Muly, S., Ph.D. ................................. Purdue
The Mathematics Department has three graduate degrees: (1) the Master of Mathematics degree, intended primarily for teachers, (2) the Master of Science degree, designed to prepare students for industrial employment and for teaching, and (3) the Doctor of Philosophy degree, designed to prepare students for graduate school and research. Contact the department office for additional information.

A student offering mathematics as a minor for the Master's degree is required to obtain at least 6 hours of resident graduate credit in courses numbered above 400 and approved by both the major department and the Department of Mathematics.

THE MASTER OF MATHEMATICS PROGRAM

Before admission to the Master of Mathematics program, the applicant must have either (a) certification for teaching secondary mathematics in at least one state, or (b) three years of elementary school, secondary school, or community college teaching experience. Applicants must have successfully completed one year of calculus (141-42 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, 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.

THE DOCTORAL PROGRAM

For the Ph.D in Mathematics, the student must meet the following four requirements in addition to those of The Graduate School:
1. Satisfy either of the following: the standard program or the mathematical ecology concentration. A student intending to work in mathematical ecology may complete either, but he/she is encouraged to complete the mathematical ecology concentration. A student may elect to switch from one to the other provided the constraints of the latter option have not been violated. A student's status after electing such a transfer is determined by the complete history of his/her earlier examinations from the standard program and part 1 of the mathematical ecology concentration. A description of both programs is below.
2. Demonstrate proficiency in one foreign language, normally French, German or Russian. This requirement is to be met prior to the examination in the area of specialization. The student's doctoral committee may require that the student pass a second language exam.
3. Pass an examination in the field of specialization. This examination will be given by a committee appointed by the department head at some time after the requirements in 1. have been met. A student may take this specialty examination only twice.
4. Take a one-year, 600-level sequence in mathematics outside of his/her area of specialization. The use of the course selected to fulfill this requirement must be approved by the department head and the student's doctoral committee (such approval may occur after completion of the course).

Standard Program

Pass written examinations covering four subjects, at least three of which must be from the following list:
- Modern Algebra 551-52
- Complex Analysis 543-44
- Topology 561-62
- Real Analysis 541-42
- Applied Linear Analysis 547-48
- Partial Differential Equations 551-56
- Ordinary Differential Equations 531-32
- Numerical Mathematics 571-72
- Statistics 525-26
- Probability 523-24

Students may not count examinations in both a. and e., in f. and g., nor in i. and j. toward the required four passes. Those who choose four from this list must choose at least two from a. through e., and the students who choose only three from this list must choose one from a. through e.

Students selecting only three from the above list will also be required to pass a written exam on an area of applied mathematics (e.g., fluids, elasticity, mathematical ecology) approved as an examination topic for that student by the Graduate Committee and the Applied Mathematics Committee. The Graduate Committee will appoint a section of faculty who will submit a list of topics and references to the Graduate Committee and the Applied Mathematics Committee for approval.

Students may take as many of the written examinations as desired at any time these exams are given, subject to the following conditions:
1. The exams to be taken must be approved in advance by the student's advisory committee.
2. At most, 4 minus n exams may be taken at any one time, where n denotes the number of exams previously passed by the student.
3. Students may take a collection of written examinations a maximum of four times, but no one failing five exams, counting possible repetitions, will be permitted to take another round of exams.

Mathematical Ecology Concentration

Students must pass examinations in two areas:
1. Three subjects in mathematics. One must be mathematical ecology and two must be from the list under the standard program. Students may not count passes on examinations in both d. and e., in f. and g., or in i. and j. toward the required three passes. At least one exam must be chosen from a. through e.

Students may take as many written examinations as desired at any time these exams are given subject to the following conditions:
- The exams to be taken must be approved in advance by the student's advisory committee.
- At most 3 minus n exams may be taken at any one time, where n denotes the number of exams previously passed by the student.
- Students may take a collection of written examinations a maximum of three times, but no one failing four exams, counting possible repetitions, will be permitted to take another round of exams.

2. Ecology, covering material selected from nine hours of coursework outside of mathematics at the 500 level or above.
   a. The courses submitted for examination must be approved by the student's doctoral committee and the departmental Graduate Committee. The exam is to be prepared, administered, and graded by instructors of the courses involved, along with at least one member of the mathematical ecology section. The student must obtain written agreement to participate in the examination from instructors of these courses and from at least one member of the mathematical ecology section before submitting materials to the committees for approval.
   b. Students may take the written examination at most twice.

GRADUATE COURSES

400 History of Mathematics (3) Development of major ideas in mathematics from ancient times to modern times and influence of ideas in science, technology, philosophy, art, and other areas. Writing emphasis course: at least one in-class essay examination and 3000 words of writing outside classroom. PreReq: Calculus.
401 Mathematics and Microcomputers (3) Primarily for students seeking certification as mathematics teachers at secondary level. Use of microcomputers to study concepts and problems in mathematics. Does not satisfy the major course 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 III.
405 Models in Biology (3) Difference and differential equations and their use in modeling biological systems. PreReq: Calculus II or Biocalculus II.
421 Combinatorics (3) Introduction to problems of construction and enumeration for discrete structures...

Richter, Stefan, Ph.D — Michigan
Row, W. H., Jr., Ph.D — Wisconsin
Simpson, H., Ph.D — Cal Tech
Smith, J., Ph.D — California
Soni, R. P., Ph.D — Oregon State

Assistant Professors:
Freire, A., Ph.D — Princeton
Plant, Conrad, Ph.D — Maryland

Soni, R.P., Ph.D
Oregon State
Smith, J., Ph.D
California
Simpson, H., Ph.D
Cal Tech
Richter, Stefan, Ph.D
Michigan

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 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 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 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.
Mathematics

sequences, partitions, graphs, finite fields and geometries, or experimental designs. Prereq: 323 or consent of instructor.

423 Probability II (3) Law of large numbers and central limit theorems for discrete and continuous random variables; Probability and independence; Markov chains and their applications, Kolmogorov differential equations; Brownian motion process as limit of random walks. Prereq: Probability I or consent of instructor.

425 Statistics (3) Derivation of standard statistical distributions; t, F, and \( \chi^2 \) distributions of mean and variance; basic limit theorems; point and interval estimation, Bayesian estimators; statistical hypothesis, Neyman-Pearson theorem, likelihood ratio and other parametric and non-parametric tests; sufficient statistics. Prereq: Probability I or consent of instructor.

431 Differential Equations II (3) Second course in ordinary differential equations. Linear systems of differential equations; stability of linear systems; non-linear systems; autonomous systems; limit cycles; phase plane analysis. Prereq: Matrix Computations or Matrix Algebra I, and Differential Equations.


443 Complex Variables I (3) Theory of functions of a complex variable: residue theory and contour integrals. Prereq: Calculus III. Recommended prereq: 300- or 400-level mathematics course.

444 Complex Variables II (3) Applications of complex variables to steady-state temperatures, electrostatics, and fluid flow. Prereq: 443.


452 Topics in Algebra (3) Number theory and the theory of polynomial equations such as quadratic reciprocity law and Pell's equation. Prereq: Algebra I or consent of instructor.

453 Matrix Algebra II (3) Matrix theory including Jordan canonical form. Prereq: Matrix Algebra I.

455-56 Abstract Algebra I, II (3,3) Algebraic structures: groups, rings, fields, vector spaces and linear transformations. Prereq: 351 or consent of instructor.

458-58 Honors: Abstract Algebra I, II (3,3) Honors version of 455-56. Prereq: 351 or consent of instructor.

460 Geometry (3) Axiomatic and historical development of neutral, Euclidean, and hyperbolic geometry stressing invariants. Prereq: Calculus II, and Discrete mathematics course.

461 Topology (3) Topology of line and plane, separation properties, connectedness, continuity, functions, homeomorphisms, compactness and continuous invariants. Prereq: 341 or consent of instructor.

471 Numerical Analysis (3) Computation, instabilities, and round-off errors; interpolation; numerical differentiation and integration by polynomial and piecewise polynomial approximation; norm and error estimation. Prereq: 341 or consent of instructor.

472 Numerical Analysis (3) Direct and iterative methods for systems of linear equations. Solution of single nonlinear equation and nonlinear systems. Orthogonal decomposition. Interpolation and approximation by polynomials and piecewise polynomials. Quadrature and numerical solution of initial and boundary value problems of ordinary differential equations, stiff systems. Prereq: Numerical Analysis or consent of instructor. (Same as Computer Science 471.)

490 Readings in Mathematics (1-3) Open to 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. Required of students with consent of department head. Independent study with faculty guidance. Prereq: Consent of faculty mentor to supervise independent work. May be repeated. Maximum 9 hrs.

500 Seminar in Mathematics (1-3) Topics vary. Recommended prereq: 453. (Same as Computer Science 472.)

502 Registration for Use of Facilities (3-15) Required for the above courses 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.

504 Discrete Mathematics for Teachers (3) Mathematical logic and methods of argument, sets, functions and relations, combinatorics. Normally first graduate course for students seeking M.M. degree. Prereq: 510. May not apply toward M.S. degree in mathematics. Prereq: 1 yr calculus or equivalent.

505 Analysis for Teachers (3) Development of differential and integral calculus, proofs of basic theorems. For students in Master of Mathematics program and for students in graduate programs in College of Education. May not apply toward M.S. degree in mathematics.

506 Algebra for Teachers (3) Algebraic structures: integral domains and fields and their applications to geometry and polynomials. For students in Master of Mathematics program and for students in graduate programs in College of Education. May not apply toward M.S. degree in mathematics.


508 Seminar in Differential Equations (1-3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

510 Applied Mathematics Laboratory (1) Computer applications in applied mathematics. Prereq: Mathematical Analysis I or consent of instructor.


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.


523-24 Probability (3,3) Pertinent facts from measure theory, definition of abstract probability spaces; Kolmogorov's existence theorem; series of independent random variables and laws of large numbers; general theory of distributions of random vectors and their characteristic functions; weak convergence concept, weak compactness and Levy's continuity theorem in Euclidean space; infinitely divisible distributions and their characteristic functions; limit problem; general concept and properties of conditional expectation, martingales, Doob's martingale and optimal sampling theorems. Prereq: 445-46. Prereq or coreq: 453.

525-26 Statistics (3,3) Pertinent facts from probability theory; formulation of statistical models; sufficiency, Fisher-Neyman factorization theorem, exponential families. Bayesian models; methods of estimation and optimization; point estimation, asymptotic efficiency and optimality; the confidence interval problem; hypothesis testing; optimal tests and confidence intervals, the Neyman-Pearson lemma, uniformly most powerful tests; general linear models, estimation and tests in linear models; non-parametric methods; rank methods for linear regression and independence, robust tests; topics from decision theory. Prereq: 445-46. Recommended prereq: 425.

527 Stochastic Modeling (3) Models in probability applied to real world situations, queuing theory, branching processes, Monte Carlo simulation. Prereq: 445-46 or consent of instructor.


534 Calculus of Variations (3) Necessary conditions for extrema, Euler's equation, broken extremals, Weierstrass-Ennegrad conditions. Sufficient conditions for extrema, Legendre's and Jacobi's conditions, conjugate points. Multiple integrals. Prereq: 431.


539 Seminar in Differential Equations (1-3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.


549 Seminar in Analysis (1-3) May be repeated. Maximum 12 hrs.

550 Matrix Algebra (3) Advanced topics in matrix theory: decomposition theorems and applications to matrices with special structure. Prereq: 453 or consent of instructor.

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 12 hrs.

561-62 Topology (3,3) Topological spaces; metrization; homeomorphic invariants of point sets. Mappings and homotopies. Covering spaces and fundamental group.

569 Seminar in Topology (1-3) May be repeated. Maximum 12 hrs.

THE MASTER'S PROGRAM

Entrance into the Master of Science program is available to qualified graduates of recognized undergraduate curricula in mechanical or aerospace engineering and to qualified graduates of other curricula who satisfy the necessary prerequisites. Three program options are available.

Thesis Option

The requirements of this option are that the student must satisfactorily complete a program of study that includes:

1. A minimum of 24 semester hours of coursework that includes at least 12 semester hours of graduate (500 level or above) courses in the department with at least 6 semester hours in the major and normally 6 semester hours of coursework (400 level or above) in mathematics. No more than 3 semester hours of engineering coursework may be below the 500 level.
2. Six semester hours of thesis.
3. Participation in the departmental seminar program.
4. Submission and defense of a written thesis that demonstrates the ability to conduct and report on an independent investigation.
5. Passing a final examination on all work submitted for the degree.

Course Option

This option is restricted to those students who have had the equivalent of a thesis experience or, at the time of completion of the degree requirements, have had at least three years of full-time engineering experience since receiving the Bachelor of Science degree. The evaluation of the work experience and the final selection of the student's program of study are left to the student's committee. The requirements of this option are that the student must satisfactorily complete a program of study that includes:

1. A minimum of 30 semester hours of coursework that includes at least 18 semester hours of graduate (500 level or above) courses in the department with at least 12 semester hours in the major and normally 6 semester hours of coursework (400 level or above) in mathematics. No more than 3 semester hours of engineering coursework may be below the 500 level.
2. Participation in the departmental seminar program.
3. Passing a comprehensive written and oral final examination on all coursework submitted for the degree. The student's committee will be of sufficient size to include all of the study areas reflected in the course program.

Problems Option

The requirements of this option are that the student must satisfactorily complete a program of study that includes:

1. A minimum of 24 semester hours of coursework that includes at least 12 semester hours of graduate (500 level or above) courses in the department with at least 6 semester hours in the major and normally 6 semester hours of coursework (400 level or above) in mathematics. No more than 3 semester hours of engineering coursework may be below the 500 level.
2. A minimum of 6 semester hours in 590 Selected Engineering Problems. A written report must be presented for each problem investigated.
3. Participation in the departmental seminar program.
4. Passing a comprehensive written final examination on all coursework submitted for the degree and an oral examination on all work (including problems).

THE DOCTORAL PROGRAM

Admission into the doctoral program will be granted to those applicants who have demonstrated superior achievement in their engineering backgrounds.

The student must satisfactorily complete an approved program of study that includes a minimum of 72 semester hours credit beyond the Bachelor's degree, exclusive of credit for the M.S. thesis or problems, including:

1. Twenty-four semester hours in doctoral dissertation.
2. A minimum of 12 semester hours of graduate credit in mathematics in courses numbered 400 or above with a minimum of 6 semester hours numbered 500 or above.
3. A minimum of 24 semester hours in the department in courses numbered 500 and above, with at least 12 of these semester hours in the major. A minimum of 9 semester hours of courses is required at the 600 level. These are exclusive of thesis, problems, or dissertation credit. The student's advisory committee may approve a student's petition to replace one 600-level course with one or more 500-level courses that are more appropriate.
4. Participation in the departmental seminar program.
5. The passing of a written and oral comprehensive examination is required as well as a successful defense of the dissertation.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The Ph.D. program in Aerospace Engineering is available to residents of the states of Arkansas, Kentucky, or South Carolina. The M.S. in Aerospace Engineering is available to residents of Kentucky or South Carolina. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

GRADUATE CREDIT FOR UNDERGRADUATE COURSES

Senior (400-level) mechanical and aerospace engineering courses may be taken for graduate credit by non-mechanical or non-aerospace engineering majors, if approved by the student's major department. Mechanical or aerospace engineering majors may not normally use more than one 400-level engineering course to meet their advanced degree requirements. Non-mechanical or non-aerospace engineering graduate students should consult with instructors regarding prerequisites for undergraduate courses.

Mechanical Engineering

NOTE: Not all the courses listed below are available at both the UT Knoxville and the UTSI campuses.

GRADUATE COURSES


422 Environmental Noise (3) Basic principles of acoustics; measurements and control of noise in industrial and community environments. Coreq: Subject standing in engineering or consent of instructor.

449 Mechanical Engineering Laboratory (3) Designing, conducting and reporting results of experimental exercises. Text standards and specifications. Analysis of data and formation of conclusions. Prereq: 332, 344, 345, Coreq: 475. 3 labs. Sp, Su

451 Systems and Controls (3) Analytical models of physical systems comprised of mechanical, fluid, electrical, and thermal components; feedback control systems; transient and frequency response; stability analysis; non-linear control of linear systems; sampled data systems; digital filters. Prereq: Mechanical Engineering Instrumentation and Measurement, Circuits and Electromechanical Components. F, Sp

455 Introduction to Design (2) Engineering economy, optimization, design for automation, reliability, patents and product liability; design of mechanical engineering solid mechanics system. Participation in team design effort; design report. Prereq: Dynamics and Vibrations of Machines. F

456 Introduction to Thermal Design (2) Engineering economy, optimization, design for automation, reliability, patents and product liability; design of mechanical engineering thermal-fluid system. Participation in team design effort; design report. Prereq: 332, 344. F


469 Machine Design I (4) Design of complete machine; documentation, complete specifications, design calculations, working drawings, and cost analysis. Written and oral report. Prereq: 455, 466. Sp

471 Refrigeration and Air Conditioning (3) Vapor compression and absorption cycles; heat pump systems; psychometric processes; air washers; cooling towers; solar radiation; building heat transmission. Prereq: 332, 344.

474 Solar Energy Utilization (3) Nature and availability of solar radiation; review of selected heat transfer topics pertinent to solar energy conversion; heat engine and solar energy converter design; analysis of solar energy collectors and method of storage; selected applications. Prereq: 332, 344, or consent of instructor.

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

479 Thermal Engineering Design (4) Design of complete thermal-fluid system; economic, technical and operational aspects. Participation in team design effort, formal presentations and design report. Prereq: 456, 475. Sp


494-95 Selected Topics in Mechanical Engineering (1-4, 1-4) Problems and topics related to developments and practice in mechanical engineering. Prereq: Consent of instructor. E

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

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; minimum degree is completed. May not be used toward degree requirements. May be repeated. S/NP only. E
507 Application of Numerical Linear Algebra in Systems and Control Engineering (3) (Same as Chemical Engineering 507 and Electrical and Computer Engineering 507.)


514 Phase Change Heat Transfer (3) Mechanisms and modeling of nucleate, transition and film boiling processes; critical heat flux; forced and natural convection post dry-out heat transfer; condensation processes; heterogeneous nucleation; dropwise and filmwise condensation; flow condensation; liquid-solid phase change processes; moving front phases; mathematical modeling. Prereq: 344, 511.

521-22 Thermodynamics I and II (3,3) Macroscopic thermodynamics, including First and Second Law analyses, availability, irreversible processes, phase equilibrium criteria, combustion, gas mixtures, and property relations, determination of thermodynamic properties from molecular structure, species data, kinetic theory, statistical mechanics, quantum physics, Schrödinger 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: thermochimistry, chemical kinetics and conservation equations; phenomenological approach to laminar flames; diffusion and premixed flame theory; single droplet combustion and detonation theory; stabilization of combustion waves in laminar streams; flammability limits of premixed laminar flames; introduction to turbulent flames. Prereq: 522, 531.

526 Combustion and Chemically Reacting Flows II (3) Advanced topics: phenomenological approaches to turbulent flames; fundamentals of turbulent flow; application of probability density functions to turbulent flames; turbulent reacting flows with premixed and/or non-premixed reactants; spray combustion models; fluidized bed combustion; chemically reacting boundary layer flow; gas turbine and/or rocket motor combustors; turbulence; introduction to subsonic combustion and supersonic flows. Prereq: 525.


551-52 Mechanical Engineering Design (3,3) Design of mechanical engineering devices and systems. Prereq: Consent of instructor.

553 Development of Superior Products and Processes (3) Case studies of latest techniques of superior product and process development practiced in industry. Case study of the development process; viewing superior results developed by student. Prereq: B.S. in Engineering or consent of instructor.


560 Computer Aided Mechanical Design (3) Applications of matrices and computational techniques in static and dynamic analysis and redesign of complex, three-dimensional, statically indeterminate, finite structures. Prereq: 569 and 464 or consent of instructor.

567 Dynamics of Machinery (3) Kinematics and kinet- ics: fixed, moving and rotating co-ordinate systems; linear and angular momentum; energy methods; computational techniques derived from Lagrangian mechanics; variable mass; rigid body dynamics. Prereq: 363, 391.

569 Vibrations (3) Free and forced vibration of single and multiple degree of freedom systems linear and nonlinear. Prereq: Undergraduate vibrations course.


581 Rocket Propulsion I (3) Rocket propulsion fundamentals; thermodynamics of nonreacting and chemically reacting ideal gases, rocket nozzle design; ideal rocket performance parameters; rocket heat transfer; chemistry of propellants; liquid rocket engine systems; ground testing; introduction to solid propellant rockets. Prereq: Consent of instructor.

582 Rocket Propulsion II (3) Solid propellant rocket performance, homogeneous and heterogeneous propellant chemistry and combustion system performance, thermal decomposition and gas phase reaction models; effects of chamber pressure, additives, signification models, burning rates, erosive burning; analysis of two-phase solid rocket exhaust flow. Introduction to nuclear and electric propulsion systems, ion (ion) engine performance, magnetohydrodynamic thrusters, traveling wave thrusters; exotic propulsion systems. Prereq: Consent of instructor.

584-85 Turbomachinery Systems I, II (3,3) ideal cycle analysis of turbine engines, real cycle analysis, component performance analysis, component design and systems integration (inlets, nozzles, combustors, compressors, turbines, flowpath design, component matching, transient operation, surge and rotating stall, engine control systems, structural considerations. Prereq: First year graduate standing and consent of instructor.


588 Measurement Science I (3) (Same as Nuclear Engineering 588, Aviation Systems 588, Chemical Engineering 588, Civil Engineering 588, Electrical and Computer Engineering 588, Engineering Science and Mechanics 588, and Aerospace Engineering 588.) Course includes instruments, data and formation of conclusions. Prereq: Consent of advisor. May be repeated. S/NC only.

590 Selected Engineering Problems (2-6) Enrollment limited to students in problems program. Prereq: Consent of advisor. May be repeated. S/NC only.

595 Seminar (1) All phases of mechanical engineering, reports on current research at UTK. May be repeated. S/NC only.

596 Special Topics in Mechanical Engineering (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

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

610 Advanced Topics in Fluid Mechanics and Heat Transfer (3) Advanced theory and application of fluid mechanics and heat transfer; natural convection; multiphase flow, high speed reacting and nonreacting flows; advanced boundary layer techniques, combustion, perturbation and variational methods of analysis, heat exchanger theory and design, computer simulation. Prereq: Consent of instructor. Maximum 9 hrs. Prereq: Consent of instructor.

611 Advanced Convection Heat Transfer, Fluid Mechanics and Mass Transfer (3) Stagnation point and high speed viscous boundary layer flows; problems in heat and mass transfer for high Reynolds number hypersonic flow; laminar and turbulent boundary layer heat transfer with surface melting, ablation, sublimation; effects of gas species recombinatiom; stagnation point heat transfer, Lee’s integral solution for high speed boundary layers; heat flux scaling rules; mass transfer and radiation cooling techniques. Prereq: 512 and consent of instructor.


513 Advanced Radiation Heat Transfer (3) Radiation heat transfer in absorbing, emitting and scattering media; interaction of thermal radiation with conduction and convection. Prereq: 511, 512.


Aerospace Engineering

NOTE: Not all the courses listed below are available at both the UT Knoxville and the UTSI campuses.

GRADUATE COURSES

422 Aerodynamics (3) Theory and design of aerodynamic systems for desired flight characteristics and performance, subsonic flow theory, viscous effects, compressibility effects. Subsonic, transonic, and supersonic airfoils. Prereq: 370 F

423 Viscous Flow (3) Boundary layer theory; laminar and turbulent flow; compressibility effects; numerical solution methods. Prereq: 422 or Heat Transfer or consent of instructor. Sp

424 Astronautics (3) Propulsion, trajectories, guidance, control, and atmospheric reentry of space vehicle systems. Prereq: 362, Mechanical Engineering 332, Sp

425 Propulsion (3) Principles of propulsion devices; turbo-jet, ram jet and rocket engines. Prereq: 351 F

426 Introduction to Aerospace Design (2) Design process, synthesis, safety, reliability, patents, product liability, economic analysis, optimization, design standards, design studies. Individual design reports. Prereq: 351, 370, 363, Core: Mechanical Engineering 344, F

429 Aerospace System Design (4) Synthesis and design of complete aerospace system, economic and technical aspects. Participation in team design effort, formal presentations and design report. Prereq: 425, 426, Sp

449 Aerospace Engineering Laboratory (3) Designing, constructing, and evaluating representative experiments: Test standards and specifications. Analysis of data and formation of conclusions. Prereq: 345, 351, 3 labs, F

494-95 Selected Topics in Aerospace Science (1-4) Current problems and topics in aerospace science. Prereq: Consent of instructor.

500 Thesis (1-5) 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 Inviscid Flow I (3) Kinematics and dynamics of inviscid fluids; potential flow about body, conformal mapping. Prereq: Mechanical Engineering 531, Mathemat- ics 425 or equivalent.

512 Viscous Flow (3) Equations of viscous fluid flow; laminar and turbulent flow; transition; separation; boundary layer theories; exact and approximate solutions. Prereq: Mechanical Engineering 531 or equivalent.

513 Experimental Methods in Fluid Mechanics (3) Experimental techniques with laboratory experiments: representative experiments: hot wire anemometry and
turbulence measurements, flow visualization, wind tunnel tests, water table experiments, supersonic flow experiments, boundary layer measurements, laser-optical measurements. Prereq: 423 or Mechanical Engineering 531.

515-16 Air Vehicle Aerodynamics and Performance (3,3) Application of aerodynamics to the design and performance of aircraft. Prereq: 422 and Mathematics 511. Course 515-16 is offered in the Fall semes-
ter and 515 is offered in the Winter semester. Course 515 is open to students majoring in Aerospace Engineering.

521-22 Aerodynamics of Compressible Flows (3,3) Analysis of the motion of fluids in which the effects of compressibility and viscosity are important. Prereq: 512 and 521.

525 Hypersonic Flow (3) Eulerian formulation; hypersonic flow fields; shock waves; free molecular flow. Prereq: 512 and 521.

527-28 Aerospace Ground Test Facilities (3,3) At the undergraduate level. Course 527 is offered in the Fall semester and 528 is offered in the Winter semester.

529 Rarefied Gasdynamics (3) Rarefied gas flows and applications. Prereq: 512 and 521.

531 Magnetohydrodynamics (3) Electromagnetics, fluid flow, and applications. Prereq: 512 and 521.

533 Biochemistry of Coagulation, Fibrinolysis and Hemostasis (2) Biochemical mechanisms underlying the processes of blood coagulation, fibrinolysis, and platelet function and the control of hemostasis. Prereq: Consent of instructor.


574 Space Engineering: Satellite Technology (3) Satellite design and evaluation of space technologies and communication systems. Prereq: 512 and 515.

Medical Biology

Graduate School of Medicine-Medical Center Knoxville

Carman B. Lozio, Acting Chair

Professors:

Carroll, R., Ph.D. ---------- Cornell
Chen, J., Ph.D. ---------- Penn State
Congdon, C. G. (Emeritus), M.D. ---------- Michigan
Farkas, W., Ph.D. ---------- Duke
Fuhr, J., Ph.D. ---------- St. John's
Ichik, A. T., Ph.D. ---------- UCLA

Lange, R. D. (Emeritus), M.D. ---------- Washington (St. Louis)
Lozio, Carmen B., M.D. ---------- Buenos Aires
Lodigio, T. F., Ph.D. ---------- Tennessee
Wigler, P. W., Ph.D. ---------- California
Wust, Carl J., Ph.D. ---------- Indiana

Associate Professors:

Goodman, M. M., Ph.D. ---------- Alabama
Hanna, W. T., M.D. ---------- Am-Stams
Matteson, K., Ph.D. ---------- Wisconsin
Schoeder, E. G., D.V.M. ---------- Michigan State
Wimalaseena, J., Ph.D. ---------- Colorado

Assistant Professors:

Karstad, M. D., Ph.D. ---------- Loyola
Potter, N. T., Ph.D. ---------- Duke
Switzer, R. C. III., Ph.D. ---------- Michigan State
Tyler, J., Ph.D. ---------- SUNY Buffalo

The Department of Medical Biology of The University of Tennessee Graduate School of Medicine was formed from the faculty of The University of Tennessee College of Medicine in 1956. The Research Center was established in 1956. The faculty has research, education, and service interests in cancer, blood diseases, metabolism, toxicology, neuroscience, birth defects, cyto genetics, and clinical genetics.

Associate Professors:

Carman, R. D., M.D. ---------- Kentucky
Goodman, M. M., Ph.D. ---------- Alabama
Hanna, W. T., M.D. ---------- Am-Stams
Matteson, K., Ph.D. ---------- Wisconsin
Schoeder, E. G., D.V.M. ---------- Michigan State
Wimalaseena, J., Ph.D. ---------- Colorado

Assistant Professors:

Karstad, M. D., Ph.D. ---------- Loyola
Potter, N. T., Ph.D. ---------- Duke
Switzer, R. C. III., Ph.D. ---------- Michigan State
Tyler, J., Ph.D. ---------- SUNY Buffalo

The Department of Medical Biology of The University of Tennessee Graduate School of Medicine was formed from the faculty of The University of Tennessee College of Medicine in 1956. The Research Center was established in 1956. The faculty has research, education, and service interests in cancer, blood diseases, metabolism, toxicology, neuroscience, birth defects, cyto genetics, and clinical genetics.

Courses in these areas are offered to students at the graduate and undergraduate levels. Elective courses are also available to students in the College of Medicine.

The faculty with the College of Veterinary Medicine participates in the graduate program leading to M.S. and Ph.D. in Comparative and Experimental Medicine. Other advanced degree students can do thesis research in the department by arrangement with other life science departments at the University.

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

508 Graduate Research Participation (3) Advanced research techniques and courses conducted in individual and 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 220-3 or consent of instructor.

531 Principles of Hematology (3) Pathophysiology of blood disorders. Prereq: Consent of instructor.

533 Biochemistry of Coagulation, Fibronolysis and Hemostasis (2) Biochemical mechanisms underlying the processes of coagulation and fibrinolysis and the roles of platelets in hemostasis. Prereq: Consent of instructor.

541 Molecular Basis for Metabolic Disease (4) Disease and disease mechanisms. Prereq: Consent of instructor.

543 Metabolism of Drugs (1)Drug mechanisms of action: membrane transport, enzyme reactions, ionization, and metabolism. Prereq: 410-419 or equivalent. F/Sp
Metallurgical Engineering

See Materials Science and Engineering

Microbiology

College of Liberal Arts and College of Veterinary Medicine

MAJOR DEGREES

Microbiology ........................................ M.S., Ph.D.
Veterinary Medicine ................................. D.V.M.

Dwayne Savage, Head

Professors:

Beck, Raymond W. (Emeritus), Ph.D. Wisconsin
Becker, Jeffrey M., Ph.D. ............... Cincinnati
Brian, D. A., D.V.M., Ph.D. ................. Michigan State
Monte, T. C., Ph.D. ............. Maryland
Riggsby, W. Stuart (Liaison), Ph.D. .... Louisiana
Rouse, B. T., Ph.D. ............ Guelph
Savage, Dwayne C., Ph.D. ................. California
Sayler, Gary S., Ph.D. .............. Idaho
Stacey, G., Ph.D. .................. Texas
White, D. C. (Distinguished Scientist), Ph.D. ................ Rockefeller
Woodward, J. M. (Emeritus), Ph.D. .... Kansas
Wust, Carl J., Ph.D. .......... Indiana

Associate Professors:

Bemis, D. A., Ph.D. .................. Cornell
Moore, R. N., Ph.D. ............. Texas

Assistant Professor:

Hacker, David, Ph.D. ............. Michigan State
Lampson, Bert C., Ph.D. .......... Missouri
Villafane, Robert J., Ph.D. .......... NYU

Microbiology

The Department of Microbiology offers both the M.S. and Ph.D. degrees to students interested in biochemical pharmacology. Prereq: Biochemistry 310. Sap

543 Clinical Genetics (3) Human genetic disorders: new developments in cytogenetics, molecular genetics, clinical diagnoses and prevention. Prereq: Biology and genetics background or consent of instructor.

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

610 Medical Biology Seminar (1) Invited speakers. Topics posted in advance. May be repeated. S, Sp

611 Advanced Topics in Medical Biology (1-3) New developments in biological research 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

GRADUATE COURSES

410 Bacterial Physiology (3) Modern concepts of structure and function of bacterial cell. Prereq: Introduction to Microbiology. F

411 Bacterial Genetics (3) Transmission and expression of genetic information by bacteria. Prereq: Introduction to Microbiology. Sp

420 Medical Microbiology (3) Disease producing microorganisms, including bacteria, rickettsia, chlamydia and fungi. Prereq: Introduction to Microbiology. Sp

429 Medical Microbiology Laboratory (2) Laboratory exercises designed to accompany 420. Prereq: Introduction to Microbiology Laboratory. Coreq: 420. Sp

430 Immunology (3) Principles of inflammation and immunity; immunoglobulin structure and theories of formation and diversity, complement, hypersensitivities, cell cooperation and recognition in immune mechanisms; soluble factors. Prereq: Biology 220. (Same as Zoology 430.) F

439 Immunology Laboratory (2) Laboratory exercises designed to accompany 430. Coreq: 430. (Same as Zoology 430.) F


449 Virology Laboratory (1) Laboratory exercises designed to accompany 440. Prereq: 440. F

470 Microbial Ecology (3) Physiological diversity and taxonomy of microorganisms from natural environments. Functional role of microorganisms in natural and simulated ecosystems. Prereq: 430. Sp

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

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

510 Microbial Physiology (3) Topics in microbial physiology and metabolism. Prereq: 410. Biochemistry 410, or consent of instructor. May be repeated. Maximum 12 hrs.

520 Pathogenesis of Infectious Disease (3) Topics in pathogenesis: microbial factors and host responses. Prereq: 420, 430, or consent of instructor. May be repeated. Maximum 12 hrs.

530 Immunology and Immunochemistry (3) Topics in molecular and genetic aspects of immune response, immunobiology, and immunopathobiology. Prereq: 420, 430, or consent of instructor. May be repeated. Maximum 12 hrs.

540 Molecular Virology (3) Topics in replication, assembly, and expression of viruses. Prereq: 440 or consent of instructor. May be repeated. Maximum 12 hrs.

550 Microbial and Molecular Genetics (3) Topics in transmission and expression of genetic information at molecular level. Prereq: 411, Biochemistry 410, or consent of instructor. May be repeated. Maximum 12 hrs.

570 Applied and Environmental Microbiology (3) Topics in applied and environmental microbiology that treat physiology, metabolism, and genetics of microorganisms: fermentations and natural and simulated ecosystems. Prereq: 470 or consent of instructor.

575 Applied Microbiology and Biotechnology (3) (Same as Chemical Engineering 575, Environmental Engineering 575, and Agricultural Engineering 575.)
Microbiology - Veterinary Medicine

See Veterinary Medicine for program description.

Music

(College of Liberal Arts)

MAJOR DEGREES

Music ........................................... M.M.

Kenneth A. Keeling, Sr., Head

Professors:

Ball, Charles H., Ph.D. ................. Peabody
Bitzas, George C., M.M. .............. Converse
Brock, John P. (Liaison), M.M. .......... Alabama
Carter, W. J. (Emeritus), D.M.A. ...... Eastman

Coker, J., M.A. ............................ Sam Houston
Combs, F. M., M.A. ....................... Missouri
DeVine, George F. (Emeritus), Diploma ........ Schurz
Dorn, W. (Emeritus), M.A. ......... Columbia
Fred, Herbert W. (Emeritus), Ph.D. ......... North Carolina
Holford, A. G. (Emeritus), M.M. ....... Northwestern
Huber, Calvin R., Ph.D. ............... North Carolina
Julian, W. J., Ph.D. ............... Northwestern
Lennon, J. A., D.M.A. ............... Michigan
Keeling, Kenneth A., Sr., D.M.A ......... Meacham
John, J., M.M. ............... Northwestern
Moore, M. C., Ph.D. ............... Michigan
Northington, D. B., D.M.A. ......... Yale
Pederson, D. M., Ph.D. ............... Iowa
Starr, W. J. (Emeritus), M.M. ......... Eastman
Stutzerberger, D. R., D.M.A. ......... Maryland
Tibbs, A. W., Ph.D. ............... Michigan
Van Vactor, D. (Emeritus), M.M. ......... Northwestern

Associate Professors:

Adams, Fay, M.M. ...................... Tennessee
Bommelje, W., M.M. ................. Tulsa
Carter, P. S., M.M. ................. Colorado
Horodyski, P., M.M. ................. Manhattan
Hough, Don, M.M. ...................... Tennessee
Hough, Dolly C., M.M. .............. Tennessee
Jacobs, K. A., D.M.A. ............... Texas
Johnson, A. E., D.M.A. .............. Stanford
MacMorrow, W. S., M.M. ............ Wisconsin
McClendon, D. K., M.A. ............. Columbia
McDaniel, Walter H. (Emeritus), M.S. ......... Tennessee
Michalopoulos, L. W., M.A. ............ Columbia
Mintz, J. B., Ed.D. ...................... Columbia
Scarlett, William P., M.M. ......... Louisiana State
Searle, S. M., M.M. ............... Tennessee
Sparks, J. R., M.S. ............... Tennessee
Teachey, J. C., D.M.A. .............. Florida State
Young, S. E., Ph.D. ................. North Carolina

Assistant Professors:

Boling, M. E., M.M. ............... Tennessee
Brown, Donald R. ...................... Indiana
Dubert, T. S., M.M. .................... Yale
Erwin, A. Y., M.M. .................... Southern Cal
Hawthorne, W., Ph.D. .............. Cincinnati
Leach, C. F., M.M. .................... New Mexico
Root, Patricia, M.A. ................. Washington State
Sper, G. R., M.M. ...................... Indiana

The Department of Music offers the Master of Music degree with concentrations in accompanying, choral conducting, composition, instrumental conducting, jazz, music education, musicology, performance (organ, piano, strings, voice, wind, and percussion), piano pedagogy and literature, sacred music, string pedagogy, and theory. Students with concentrations in composition, instrumental conducting, and sacred music are required to have an interview with members of the faculty in this area. Other applicants are required to have an interview with members of the faculty of the prospective area of concentration.

All applicants are required to take the Diagnostic Examinations in music theory and music history/literature. These examinations are given by the Department of Music at the beginning of each semester.

THE MASTER'S PROGRAM

A minimum of 30-33 semester hours of coursework is required for the Master of Music degree. These hours are specifically distributed according to the area of concentration. All concentrations require coursework in music history/literature and music theory and allow for elective courses. Specific curricula are available from the department.

The graduate recital is given in lieu of thesis by students with concentrations in performance, pedagogy, jazz, and accompanying. A performance project is given in lieu of thesis by students with concentrations in choral conducting, instrumental conducting, and sacred music. A thesis is required of students in composition, musicology, and theory.

All concentrations require a written and oral final examination.

Concentration in Music Education

The concentration in music education is designed for persons who hold a Bachelor's degree in Music or Music Education and certification to teach music in the public schools. Students seeking initial certification should consult the requirements for the Master of Science degree in the College of Education. The program requires 510 and 520; 9 hours of music education electives at the 500 level; 6 hours of Thesis 500; 6 hours of 500-level courses in music theory or history; 2 hours of applied music at either the 400 or 500 level; 2 hours of music ensemble at the 500 level; and 3 hours of electives at the 500 level.

A three credit research problem and three extra hours coursework in Music Education may be substituted for Thesis. If a larger thesis problem is desired, the thesis credit may be increased to 9 hours, and 3 hours of Music Education electives may be dropped.

Diagnostic tests in theory, ear training, and music history will be required.

Music 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 who holds a University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

510 Foundations of Music Education (3) Historical, philosophical and aesthetic basis. 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.

530 Advanced Band Literature and Conducting (3) Reading, conducting, and interpreting band scores suit-
able for school, college, and community bands; contemporary and standard band literature. Prereq: Consent of instructor.


555 Administration and Supervision of School Music (3) Problems of supervision, research, and in-service education, teacher preparation, guidance. Prereq: Consent of instructor.

560 Psychology of Music Teaching (3) Research on musical perception and cognition and its application to teaching of music. Definition and measurement of musical ability. Prereq: Course in general psychology and 1 yr of music theory or consent of instructor.

563 Special Problems in Music Education (3) Problems of supervision, research, and in-service education, teacher preparation, guidance. Prereq: Consent of instructor.

583 Men's Chorale (1) May be repeated.

582 University Chorus (1) May be repeated.

580 Music in the Baroque Period (3) From c.1600 to 1750. Mass, motet, chansons, madrigal, and other vocal and instrumental forms and genres.

550 Music in the Renaissance (3) From 1400 to 1600. Mass, motet, chansons, madrigal, and other vocal and instrumental forms and genres.

540 Music in the Middle Ages (3) Gregorian and medieval chant, secular monophony, and rise of polyphonic style from pre-classic music to music of Haydn, Mozart, and early Beethoven.

530 Music in the Romantic Period (3) Nineteenth-century musical styles from Beethoven to post-romanticists.

520 Music Research (1) Principles of research methodology applied to writing of research proposal and project.

510 Lecture Recital (2)

521 Special Topics in Performance (1-3) Prereq: Consent of department head.

540 Secondary Applied Music (1) May be taken by music majors desiring applied study on a 2nd or 3rd instrument. May be repeated for a maximum of 4 hours credit on each instrument. Admission by audition. Requires payment of Applied Music fee.

540 Church Music Performance Project (1-2) May be repeated. Maximum 6 hrs.

Music History

GRADUATE COURSES

410 Music History Genre (3) Topics vary. May be repeated. Maximum 6 hrs.

420 History of Opera (3) Dramatic, vocal, and orchestral elements in opera of Italian, French, and German schools, 1600-present.

430 Symphonic Literature (3) Literature for orchestra from Baroque to present, evolution of symphony.

440 Music of North America (3) Folk and art music of U.S. and Canada from colonial times to present.

450 Composer Seminar (3) Life and works of single composer. Subjects vary.

460 Music Aesthetics (3) Nature of music and musical experience, sense perception and emotions, music, and roles of artist in society. Aesthetic viewpoint of individuals and historical eras through selected writings.

480 Music in Christian Worship (3) Hymnody, liturgies, and liturgical music.

490 Church Music Methods and Administration (3)

510 Music Bibliography (2) Bibliographic methodology in music.

520 Music Research (1) Principles of research methodology applied to writing of research proposal and project.

530 Music in the Middle Ages (3) Gregorian and medieval chant, secular monophony, and rise of polyphonic style from pre-classic music to music of Haydn, Mozart, and early Beethoven.

540 Music in the Baroque Period (3) From c.1600 to 1750. Mass, motet, chansons, madrigal, and other vocal and instrumental forms and genres.

550 Music in the Renaissance (3) From 1400 to 1600. Mass, motet, chansons, madrigal, and other vocal and instrumental forms and genres.

560 Music in the Classic Period (3) Evolution of classical style from pre-classic music to music of Haydn, Mozart, and early Beethoven.

570 Music in the Romantic Period (3) Nineteenth-century musical styles from Beethoven to post-romanticists.

580 Music in the Twentieth Century (3) From 1890, Debussy, to present, Stockhausen and others.

590 World Music (3) Attitudes and techniques of ethnic musicology. Survey of world music cultures. Interview and transcription projects.

591 Independent Study (3-15) See page 32. Prereq: Consent of department head.

Music General

GRADUATE COURSES

500 Thesis (1-15) S/NC only. E

501 Graduate Recital (2)

Music Instrumental

GRADUATE COURSES

490 Instrumental Conducting (3) Development of knowledge and skills in instrumental conducting; study of various periods and composers and relationship of different styles to conductor's art; musical analysis and practice in conducting. Prereq: Music Education 320 or equivalent.

570 Advanced Suzuki Pedagogy (2) Study of psychol- ogy, procedures and literature utilized by Shinichi Suzuki in Japan. Prereq: 495 or consent of instructor. May be repeated. Maximum 4 hrs.

580 Band Literature (3) Band literature and origins of band, its important expanded cultivation during past century in United States and Europe.

582 Instrumental Conducting Performance (1) Jury performance; conducting band or orchestra in public.

583 Practicum for Instrumental Conductors (1) Intern experience in choral music. S/NC only.

584 Practicum for Instrumental Conductors (1) Intern experience in field other than area of major interest. S/NC only.

595 Instrumental Conducting Seminar (3) Rehearsal and performance problems and techniques allied to score reading and preparation. Particular attention to individual problems. Prereq: 490 or equivalent.

Music Jazz

GRADUATE COURSES

410 Advanced Improvisation (3) Further development of individual skills and solving individual problems in jazz improvisation. Prereq: 210 and 220.

420 Jazz Pedagogy (1) Methods and materials relating to teaching of jazz, designing and administering jazz programs, and rehearsal techniques for jazz ensembles. Prereq: Studio music and jazz major or consent of instructor.

520 Seminar in Jazz (3) Topics vary.

Music Keyboard

GRADUATE COURSES

420-30 Piano Literature I,II (3,3) 420--From 1750 to middle 19th century; 430--Middle 19th century to present.

460-70 The Organ and Its Literature I,II (3,3) Development of organ and organ literature from Middle Ages to present; problems of style and interpretation; pedagogical literature and methods; organ design. Prereq or coreq: Music History 220 and consent of instructor.

485-95 Suzuki Piano Method I,II (2,2) Psychology, procedures, and literature of Suzuki piano method. Must be taken in sequence. Prereq: Consent of instructor.

520 Piano Literature Seminar (3) Topics vary. May be repeated. Maximum 6 hrs.

531-41 Recital Project (2,2) Preparation and accompaniment of full recital for accompanying concentrations only. 531--Vocal recital, 541--Instrumental recital. Prereq: Consent of instructor.

540-50 Advanced Piano Pedagogy I,II (2,2) 540--Evaluation and study of methods and materials for teaching piano at all levels. Supervised laboratory teaching. Prereq: 440, 450, or consent of instructor. 550--Introduction and principles of Kodaly, Orff, Suzuki, Dalcroze Eurhythmics, and class piano teaching. Prereq: 440, 450 or consent of instructor.

560 Organ Literature Seminar (3) Topics vary. May be repeated. Maximum 6 hrs.

Music Performance

GRADUATE COURSES

All performance courses require an audition and consent of instructor. May be repeated. Maximum 8 hrs toward M.M. degree.
GRADUATE COURSES

Music Voice

510 Vocal Literature Seminar (3) Topics vary. May be repeated. Maximum 6 hrs.

520 Vocal Theatre Performance Techniques (1) Improvisation, movement, and basic techniques for dramatic vocal performance. Prereq: Consent of instructor. May be repeated for credit. Maximum 2 hours.

530 Vocal Performance (2) Prereq: Consent of instructor. May be repeated. Maximum 4 hrs.

540 Vocal Production (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

560-60 Advanced Vocal Pedagogy I, II (2,2) Study of vocal production, analysis of vocal problems in selected students, and supervised teaching.

570 Vocal Chamber Music Performance (2) Prereq: Consent of instructor.

580-85 Choral Literature I, II (2,2) Choral music from middle ages to present with consideration of historical development of major choral genres.

590 Advanced Choral Conducting (3) Expansions and continued refinement of conducting technique; development of choral rehearsal skills. Prereq: Consent of instructor.

594 Project in Choral Conducting Performance (1-3) Public performance, critical document; recording project. Prereq: Consent of instructor. May be repeated.

595 Choral Conducting Seminar (3) Score reading and preparation; problems of interpretation, performance practices, and conducting techniques. Prereq: 590 or consent of instructor. May be repeated.

Nuclear Engineering

(College of Engineering)

MAJOR DEGREES

Nuclear Engineering M.S., Ph.D.
Thomas W. Kerlin, Head

Professors:
Dodds, H. L., PE, Ph.D. Tennessee
Kerlin, T. W. (Liaison), Ph.D. Tennessee

Mihalczuk, J. T., Ph.D. Tennessee
Miller, L. F., PE, Ph.D. Texas A&M
Perez, R. B., Ph.D. Madrid
Stevens, P. N., PE, Ph.D. Northwestern
Uhrig, R. E. (Distinguished Prof.), PE, Ph.D. Iowa
Upadhyaya, B. R., Ph.D. California

Associate Professors:
Groer, P. G., Ph.D. Vienna
Katz, E. M., PE, Ph.D. Tennessee
Scott, T. H., PE, Ph.D. Florida

Assistant Professor:
Ruggles, A. E., Ph.D. Rensselaer

The Department of Nuclear Engineering offers programs leading to the Master of Science and Doctor of Philosophy degrees. Students may elect a traditional nuclear engineering M.S. or Ph.D. program (focusing on fission energy or fusion energy) or a radiation protection engineering concentration at the Master's level. The radiation protection 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.

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 two-semester sequences: 511, 512; 551, 552; 563, 564; 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. thesis or Nuclear Engineering Practice.
2. A minimum of 24 semester hours in doctoral research.
3. A minimum of 30 semester hours in nuclear engineering courses numbered 500 and above (or 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, taken 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 permitted only 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 Knoxville on an in-state tuition basis. The Ph.D. program in Nuclear Engineering is available to residents of the states of Alabama, Kentucky, Mississippi, or South Carolina. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

GRADUATE CREDIT FOR UNDERGRADUATE COURSES

400-level courses in nuclear engineering may be used for graduate credit. However, students must recognize that at least two-thirds of the minimum required hours (30) in a Master's degree program must be taken in courses numbered 500 or above.

GRADUATE COURSES

403 Nuclear Engineering Laboratory (3) Cross-section measurement, diffusion properties of neutrons, critical loading experiment, control rod calibration, statistical weight, shielding, xenon poisoning, dynamics and control experiments. Prereq: Nuclear Engineering Laboratory or equivalent. Coreq: 471, 405.

404 Nuclear Fuel Management (3) Variety of topics relative to nuclear fuel cycle. Mining and milling, fuel fabrication, in-core fuel management, reprocessing and waste disposal. Economic and regulatory issues. Prereq: 470.


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: Introduction to Nuclear Engineering.

463 Introduction to Fusion Energy I (3) (Same as Electrical and Computer Engineering 463.)

464 Introduction to Fusion Energy II (3) (Same as Electrical and Computer Engineering 464.)

470 Nuclear Reactor Theory I (3) Fundamentals of reactor physics relative to cross sections, kinematics of elastic scattering, reactor kinetics, reactor systems and nuclear data. Analytical and numerical methods applicable to general criticality problems, eigenvalue searches, perturbation theory, and diffusion equations. Prereq: Introduction to Nuclear Engineering.

471 Nuclear Reactor Theory II (3) Thermal spectrum computational methods: heterogeneous effects in fast and thermal spectra; considerations in reactor core design; equations that relate thermal and neutrons variables; power distribution calculations and reactivity control methods. Prereq: 470.

495 Special Topics in Nuclear Engineering (3) Problems related to recent developments and practice. Prereq: Senior standing and consent of instructor. May be repeated. Maximum 6 hrs.

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

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or facility 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) Rheology of Newtonian and non-Newtonian fluids; integral and system conservation equations for single- and multi-component fluids; In-depth development of differential conservation equations for mass, energy, and momentum; exact and approximate solutions of equations of motion; boundary layer analysis; numerical analysis of fluid flow and heat transfer.

521 Nuclear Systems Dynamics and Control (3) Introduction to state variable methods for system dynamics and control analysis, and application of these methods to nuclear plant dynamics, simulation and control problems.


541 Reactor Fuel Management (3) Topics relative to in-core fuel management. Applicable topics in reactor physics, fuel depletion, isotopic inventories, reactivity control and numerical methods for nuclear plant modeling and simulation, nuclear plant control. Prereq: 470.


543 Selected Topics in Nuclear Criticality Safety (3) Criticality safety computational and experimental methods. Reactor containment, fabrication, reprocessing, and transport applications; overview of safety practices and regulatory requirements. Prereq: 421 or consent of instructor.

550 Nuclear Instrumentation (3) Physics and electronics associated with radiation detection, methods of data analysis, applicability of particular instrument measurement and fundamentals of nuclear instrumentation operation.

551 Radiation Protection (3) Interactions of photons, neutrons, charged particles, and charged leptons with matter and mechanisms of energy loss; methods of radiation detection, internal and external radiation dosimetry; chemical and biological effects of radiation; regulatory standards. Prereq: Nuclear Engineering and Differential Equations I or equivalents.

552 Radiation Monitoring and Dose Assessment (3) Methods for work-area and environmental monitoring; dose assessment; pathways analysis; risk projections and regulations. Prereq: 551.

561 Plasma Diagnostics I (3) (Same as Electrical and Computer Engineering 561.)

562 Plasma Diagnostics II (3) (Same as Electrical and Computer Engineering 562.)

563 Plasma Engineering (3) Integration of plasma physics models, fusion engineering design criteria, and fusion technology into design of future plasma experiments and reactors. Particle, momentum, and energy balance equations. Simulation of various fusion reactor plasmas. Prereq: 464 or consent of instructor. (Same as Electrical and Computer Engineering 564.)

564 Fusion Technology (3) Engineering problems associated with fusion reactor design; vacuum and magnetic systems; materials and irradiation; plasma heating, fuelling, and impurity control; review of major design studies. Prereq: 464 or Electrical and Computer Engineering 564.


572 Nuclear System Design (3) Design and analysis of a nuclear system, interface with non-nuclear aspects of system design: system reliability and economics; class project. Prereq: 571 or consent of instructor.

573 Applied Artificial Intelligence (3) Symbolic methods for artificial intelligence systems. Regression and optimization applied to engineering problems. Prereq: Consent of instructor. (Same as Engineering Science and Mechanics 573.)

575 Expert Systems in Engineering (3) Application of expert systems in engineering: logic and rationale, developing expert systems, programming, advanced topics. Prereq: 575 or consent of instructor. (Same as Engineering Science and Mechanics 575.)

577 Neural Networks in Engineering (3) Neural network technology for use in intelligent systems; rationale for neural computing, structure of neural computing systems, programming, Prereq: Consent of instructor. (Same as Engineering Science and Mechanics 577.)


585 Process System Reliability and Safety (3) Qualitative and quantitative methodology for assessing and improving process systems reliability and safety. Fault tree analysis and associated dependent failure analysis. (Same as Chemical Engineering 585.)

588 Measurement Science I (3) Principles of measurement, introduction to measuring devices. Prereq:
Nursing

(College of Nursing)

MAJOR

DEGREE

Nursing .............................................. M.S.N., Ph.D.

Joan E. Uhl, Dean
Mildred M. Fenske, Associate Dean and
Director of M.S.N. Program
Sandra Thomas, Director of Ph.D. Program

Professors:
Allgood, Martha R., Ph.D. ..................... New York
Goodfellow, Dale H., Ph.D. ..................... Peabody
Mozingo, Johnie N., Ph.D. ..................... Walden
Thomas, Sandra P., Ph.D. ..................... Tennessee
Uhl, Joan, Ph.D. ................................. Utah

Associate Professors:
Davis, Mitzi M., Ph.D. .......................... Tennessee
Droppelman, Patricia G., Ph.D. ............. Tennessee
Feinberg, Mildred M. (Liaison), Ph.D. .... Vanderbilt
Jolly, Mary Rue, Ed.D. ......................... Kentucky
McGuire, Sandra, Ed.D. ....................... Tennessee
Overton, Helen, Ph.D. ........................... Maryland
Sharp, Theresa G., Ed.D. ...................... Tennessee
Shoffner, Dava, Ph.D. ............................ Tennessee
Tuck, Inez, Ph.D. ................................. North Carolina (Greensboro)

Assistant Professors:
Bowen, Sheila, Ph.D. ............................ Tennessee

Kollar, Mary, Ph.D. ............................. Tennessee
Witherington, Carol, Ph.D. ..................... Tennessee

THE MASTER'S PROGRAM

The College of Nursing offers the Master of Science in Nursing degree with concentrations in adult health nursing, parent-child nursing, mental health nursing, family nurse practitioner, and nursing administration.

Admission Requirements
1. Meet requirements for admission to The Graduate School.
2. Hold a Bachelor's degree in Nursing or complete the equivalent of an upper division undergraduate major in nursing in addition to meeting all M.S.N. degree requirements.
3. Have an undergraduate GPA of 3.0 or higher or a GPA of 3.0 for courses in the undergraduate major.
4. Complete the General portion of the Graduate Record Examination. NOTE: A strong performance on this examination may compensate for a GPA lower than 3.0.
5. Complete Graduate Program Data Form.
6. Submit three Graduate School Rating Forms from individuals familiar with the applicant's current work performance or academic aptitude.

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 a physical examination and rubella immunization or sufficient titer completed within six months of registering for clinical courses.
4. Each student must present evidence of current CPR certification.
5. Non-registered nurse students must have completed 8 semester hours of chemistry or physics and 1 semester hour of behavioral science courses.

Thesis and Non-Thesis Options

Thesis
The thesis option is available for interested students who are considering pursuit of doctoral degrees sometime in the future. Students who choose the non-thesis option must complete a research-oriented project while registered for 580 Nursing Project.

Program Requirements
All students must complete a minimum of 36 semester hours distributed as follows:

Core (12 credits)
503-04 Holistic Nursing 6
510 Theoretical Foundations of Nursing 3
520 Nursing Resource Management 3

Research (9-12 credits)
--- Graduate level statistics course 3
501 Nursing Research: Methods, Design & Analysis 6
500 Thesis 6
OR 580 Nursing Project 3
OR 581 Directed Research 3

Concentration (12 credits) -- choose one
530-31 Adult Health Nursing I,II 12

Elective (3 credits) -- waived for those who choose thesis option 3

Students who are not nurses must complete the following undergraduate nursing courses in addition to meeting the requirements listed above:

301 Pharmacology 3
302 Introduction to Professional Nursing 9
304 Nursing Assessment and Health Promotion 4
311 Acute Care Nursing 10
313 Nursing Research 3
414 Community Mental Health Nursing 6
415 Community/Community Health Nursing 6

Registered nurses whose undergraduate degrees are not in nursing must complete 304, 305, 313, 315 Clinical Nursing Practicum, and 403. They must also complete or successfully challenge the following:

301 Pharmacology 3
312 Acute Care Nursing Theory 6
402 Family Health Nursing Theory 3
412 Psychosocial Long Term Nursing Theory 3

Students whose science backgrounds are deficient may also need to take 214 Integrated Biomedical and Health Sciences and/or 450 Physiological Principles.

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 nursing course, he or she will not be permitted to repeat the course and will be required to withdraw from the program.
3. If the clinical performance of any student is characterized by unethical, unprofessional or unsafe behavior, or behavior that places the client in jeopardy, the student will be required to withdraw from the program.

REQUIREMENTS FOR SECOND MASTER'S DEGREE

1. Those who already hold a Master's or doctoral degree may apply up to 6 semester hours from that degree to meeting MSN program requirements. To apply these hours to the MSN degree, the following criteria must be met:
   a. The courses used must be relevant to the MSN.
Admission Requirements

care policy at various levels.

1. Meet requirements for admission to The Graduate School.
2. Hold a Master’s degree in nursing from a college level instructors and/or administrators. Specifically, the graduate of this program should be able to:
   - 1. Analyze, test, refine, extend, and expand the theoretical basis for nursing practice.
   - 2. Conduct nursing research that generates 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.
3. Have a minimum cumulative grade-point average of 3.3 on a 4.0 scale.
4. Have a cumulative score of at least 1000 on the verbal and quantitative sections of the Graduate Record Examination.
5. Have successfully completed a basic statistics course.
6. Complete Graduate Program Data Form, College of Nursing.
7. Submit Graduate School Rating Forms from three college level instructors and/or nurses and administrators who have supervised applicant’s professional work.
8. Have a personal interview with the College of Nursing Graduate Student Admissions Committee.
9. Submit entire application (Graduate Application for Admission, 3 Graduate School Rating forms, Graduate Program Data form, academic transcripts, and GRE scores) and schedule personal interview by March 1st of the year preceding Fall admission.

Program Requirements

**Graduate Courses**

- 500 Thesis (1-15) P/NP only, E
- 501 Nursing Research: Methods, Design, and Analysis (3) Methodology, design, and data analysis issues and their interrelationships in planning, implementation, and evaluation of nursing and health-related research. Investigations of computer applications to data analysis. Prereq or coreq: 503. F
- 502 Registration for Use of Facilities (3-15) Required. Prereq or coreq: 501, 520. 2 hrs and 4 labs. Sp
- 503 Holistic Nursing: Wellness (3) Examination of philosophy of holistic nursing and new paradigms for nursing assessment, diagnosis, and intervention. Exploration and application of principles of health promotion, education, and innovative strategies for achievement of wellness. Roles of health habits, genetics, psychological factors, and culture in lifestyle diseases. F
- 504 Holistic Nursing: Illness (3) Exploration, analysis, and application of principles of holistic nursing of clients with acute and chronic pathophysiological disease: mind-body influences and interactions. Prereq: Nursing Assessment and Wellness Promotion and Physiological Principles or equivalents. Prereq or coreq: 503. F
- 511 Advanced Nursing Seminar 2
- 514 Nursing Preceptorship 3
- 603 Dissertation 24
- 608 Quantitative Nursing Research 3

**Total** 66

The electives should constitute a cognate area. All 12 hours should be selected from a specific area of concentration. Appropriate cognate areas are anthropology, child and family studies, clinical psychology, educational administration, educational psychology, management, medical ethics, public health, and social work.

**Doctoral Committee**

The student and major professor identify a committee composed of at least five faculty members who will form the committee. Each professor or above, four of whom, including the chair, must be approved by the Graduate Council to direct doctoral research. Two of the faculty members must be from an academic unit other than nursing. The committee should be formed during the student’s first year of doctoral study.

**MINOR IN GERONTOLOGY**

Graduate students in the College of Nursing may pursue a specialized minor in gerontology. This interdepartmental/interdisciplinary minor gives the student an opportunity for combining the knowledge about aging in American society with his/her major concentration. Please refer to Human Ecology for specific requirements.

**ACADEMIC COMMON MARKET**

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The Ph.D. program in Nursing is available to residents of the states of Alabama or Arkansas. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

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

501 Nursing Research: Methods, Design, and Analysis (3) Methodology, design, and data analysis issues and their interrelationships in planning, implementation, and evaluation of nursing and health-related research. Investigations of computer applications to data analysis. Prereq or coreq: Graduate level statistics course, 510. F

502 Registration for Use of Facilities (3-15) Required. Prereq or coreq: 501, 520. 2 hrs and 4 labs. Sp

503 Holistic Nursing: Wellness (3) Examination of philosophy of holistic nursing and new paradigms for nursing assessment, diagnosis, and intervention. Exploration and application of principles of health promotion, education, and innovative strategies for achievement of wellness. Roles of health habits, genetics, psychological factors, and culture in lifestyle diseases. F

504 Holistic Nursing: Illness (3) Exploration, analysis, and application of principles of holistic nursing of clients with acute and chronic pathophysiological disease: mind-body influences and interactions. Prereq: Nursing Assessment and Wellness Promotion and Physiological Principles or equivalents. Prereq or coreq: 503. F

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: 310 or equivalent or consent of instructor. F

508 Advanced Seminar in Public Health (1) (Same as Public Health 506, Nutrition 509, Physical Education 500 and Social Work 509.)

510 Theoretical Foundations of Nursing (3) Historical evolution of nursing science; examination and critical analysis of nursing’s metaparadigm and selected conceptual models, philosophies, and theories; contemporary ethical theories and application to nursing practice dilemmas. F,Sp,Su

520 Nursing Resource Management (3) Selected organizational, conflict management, decision-making, leadership, professional, technological, and other theories, principles, and concepts applicable to advanced clinical nursing practice. Prereq or coreq: 503. F,Sp

530 Adult Health Nursing I (6) Exploration and application of advanced nursing research, physiological, and psychosocial theories to nursing care and management of clients and their families who are experiencing episodes of acute and chronic illnesses and related crises, role of clinical nurse specialist in helping clients and families achieve optimal wellness. Prereq: 504. Prereq or coreq: 501, 520. 2 hrs and 4 labs. Sp

531 Adult Health Nursing II (6) Further emphasis on role of clinical nurse specialist in providing and managing nursing care for acutely and chronically ill adults across life span; exploration, analysis, and application of selected advanced management, supervisory, organizational, and leadership theories, and critical thinking skills; development of health-related concepts and research to implementation of clinical nurse specialist role. Prereq: 530. 2 hrs and 4 labs. F

532 Directed Study in Technical Nursing Education (3) Prereq: History and contemporary issues in technical nursing and nursing education; teaching strategies for adult learner in community college; investigation of selected topics. Prereq: Graduate student or consent of instructor. Su

540 Family Nurse Practitioner I (6) Exploration and application of holistic nursing theories to nursing management of common health problems of individuals and their families; opportunities for clinical practice in role of nurse practitioner in variety of settings. Prereq: 504. Prereq or coreq: 501, 520. 2 hrs and 4 labs. Sp

541 Family Nurse Practitioner II (6) Continuation of 540. Seminar and clinical practicum: management of chronic health problems in all developmental life stages; role redefinition and exploration of major issues in delivery of holistic primary nursing care; clinical experiences in variety of settings. Prereq: 540. 2 hrs and 4 labs. F

550 Parent Child Nursing I (6) Exploration and application of advanced, clinical, and compassionate parenting; child development; psychological, developmental, ecological, and social factors; biological, psychological, social, and environmental factors; role redefinition and exploration of major issues in delivery of holistic parenting care; clinical experiences in variety of settings. Prereq: 550 or consent of instructor. Sp

551 Parent Child Nursing II (6) Continuation of 550. Seminar and clinical practicum: management of chronic health problems in all developmental life stages; family wellness promotion and interventions designed to recognize and respond to threats to wellness of mothers, neonates, children, and adolescents. Prereq: 550 or consent of instructor or completion of 550. 2 hrs and 4 labs. 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 used for advanced practice. Role redefinition of clinical nurse specialist in nursing management of women and child-bearing or child-rearing families in community, hospital, or other health care settings. Prereq: 550. 2 hrs and 4 labs. F

560 Mental Health Nursing I (6) Exploration and application of advanced theories of therapeutic nursing intervention to clients experiencing mental health problems. Options for clinical practice with clients of various age groups in acute care or community facilities. Prereq: 504. Prereq or coreq: 501, 520. 2 hrs and 4 labs. Sp

561 Mental Health Nursing II (6) Continuation of 560. Groups and families with mental health problems. Seminar and clinical practicum designed to focus on ad-
**The Ph.D. Concentrations**

**Nutrition Science**

The nutrition science concentration enables students to study the science of nutrition from the cellular level to the application of nutritional principles by people in a changing environment. The doctoral program emphasizes human nutrition, nutritional epidemiology, experimental nutrition, and intermediary metabolism. Cognate areas may include anthropology, biochemistry, chemistry, communications, education, food technology, human development, physiology, public health, sociology, statistics, and 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. Professional seminar, HE 610;
5. Six hours of statistics;
6. Six hours in a cognate area;
7. Nine hours at the 600 level;
8. 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.

**Consumer Environments**

Students enrolled in the Ph.D. program with a concentration in consumer environments are provided with a foundation of coursework relevant to understanding the consumer in the design, environment, and management of facilities. From this base, students in foodservice and lodging administration focus on areas of specialization in foodservice systems and in lodging administration to further theory and the application of theory in the field. For further information, contact the consumer environments concentration under Human Ecology.

**Academic Common Market**

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. program in Foodservice and Lodging Administration is available to residents of the states of Arkansas, Kentucky, South Carolina, or West Virginia. The M.S. program in Nutrition is available to residents of Arkansas, South Carolina, or Virginia. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records. For the Ph.D., see Human Ecology.

**Nutrition**

**Graduate Courses**

- **413 Experimental Food Science (3)** Individual and group laboratory experimentation in food science; microcomputer applications. Prereq: Science of Food, Plant and Soil Science 471. 1 hr and 2 labs. F

- **414 Nutrient-Drug Interactions (2)** Nutrient effects on efficacy and toxicity of drugs; drug effects on absorption and metabolism of nutrients. Prereq: Fundamentals of Nutrition or equivalent. Sp,A

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

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

- **508 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: Nutrition for Educators or Advanced Nutrition or consent of instructor. F,A

- **509 Graduate Seminar in Public Health (1)** (Same as Public Health 506, Nursing 509, Physical Education 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. Length of in-depth study to be selected in consultation with instructor. Prereq: 513, 514 and consent of instructor. S/N C 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,A

- **518 Nutrition and Aging (3)** Nutritional problems of children, 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,A

- **521 Physiological Basis for Diet and Disease (2)** Altered nutrient needs as result of metabolic changes that occur in selected diseases. 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. Sp.

- **524 Nutrition Education: Principles, Implementation, and Evaluation (3)** Conceptual models, principles, application, and evaluation models in nutrition education research. Prereq: 506 or consent of instructor. Su,A

- **527 Nutrition in Mental Retardation and Developmental Disabilities (1-9)** Interdisciplinary diagnosis and treatment of developmentally-handicapped child; role of nutritionist; clinical experiences and lectures. Child Development Center, UT, Memphis. Prereq: Consent of department head. E

- **540 Seminar in Nutrition (1)** May be repeated. S/N C only. E

- **541 Research Methods (1)** Basic principles of planning, conducting, and interpreting nutrition and foodservice systems administration research. Prereq: 6 graduate hrs in nutrition and food system administration and statistics. Sp

- **542 Advanced Experimental Nutrition (2)** Application of research principles to individual project using experimental animal models. Prereq or coreq: 541. Sp

- **543 Human and Metabolic Research Methods (2)** Application of research principles to conducting and interpreting metabolic study. Prereq or coreq: 541. Sp

- **544 Food and Nutrition Survey Methods (2)** Application of principles of research to food survey project. Prereq: Consent of instructor. F,A

- **547 Field Experience (3-9)** Experience in food-related industry or agency under supervision of faculty member. Prereq: Consent of instructor. S/N C only. E

- **548 Directed Study in Nutrition (1-3)** Advanced study in nutrition. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

- **549 Special Topics (1-3)** Research in nutrition or food systems administration. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

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

- **602 Advanced Topics in Nutrition Science (1-3)** Comprehensive individual study and group discussion of topics related to current problems in nutrition. Prereq: 512 or consent of instructor. May be repeated. F

- **603 Current Trends in Food and Sociocultural Change (2)** Critical evaluation of research. Prereq: 508 or consent of instructor. F,A

**Hotel and Restaurant Administration**

**Graduate Courses**

- **421 Foodservice Systems Design and Equipment (3)** Physically and aesthetically: planning and layout; computer applications; technology selection and purchase. Prereq: Quantity Food Procurement, Production and Service with lab or consent of instructor. F,A

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

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

- **530 Computer-Assisted Foodservice and Lodging Management (3)** Application of computer technology to foodservice and lodging industry; inventory, cost accounting, production, nutrient, dietary analysis, management, and sales planning and analysis. Prereq: Quantity Food Procurement, Production and Service, Microcomputer Applications or consent of instructor. F,A

- **531 Advanced Financial Management (3)** Financial planning and operations of techniques used in foodservice and lodging management for budgeting, accounting systems and financial reports. Prereq: Food and Lodging Cost Control or consent of instructor. F

- **532 Advanced Human Resource Management (3)** Identifying labor needs, developing and maintaining the work force. Prereq: Food and Lodging Personnel Development or consent of instructor. F

- **533 Advanced Food Production and Delivery Systems 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 or consent of instructor. F

- **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. E

- **535 Directed Study in Foodservice and Lodging Administration (1-3)** Problems selected for study by
The Department of Ornamental Horticulture and Landscape Design offers the Master of Science with concentrations in floricultural science and technology, nursery science and technology, or turfgrass science and technology. Various interests may be emphasized in any of these commodity areas, including micropropagation, innovative production and maintenance systems, computer-aided management systems, and the molecular biology, genetics, horticulture, and stress physiology of ornamentals.

For admission, the student must have a B.S. in ornamental horticulture, floriculture, horticulture, plant science, or a related agricultural or basic science discipline. Undergraduate transcripts must be evaluated by the department for prerequisite requirements, if any. Graduate research assistantships are available on a competitive basis. For further information, contact the department head.

THE MASTER'S PROGRAM

Thesis Option
1. A thesis is required. A Master's committee of no fewer than 3 faculty members will be selected. Prior to research for the thesis, a proposal must be approved by the Master's committee. Registration for 6 hours of Thesis 500 is required.
2. In addition to the thesis requirement, a minimum of 24 hours of graduate credit is required. Not more than 10 hours of the minimum 30 hours can be below the 500 level.
3. The academic program must be approved by the Master's committee which may require additional coursework if the student's progress or background indicates such need.
4. All students are required to include 510 Research Methods and 2 hours of 590 Seminar in their program and are expected to attend this course and participate in discussions each semester enrolled.
5. Twelve hours of coursework in the major must be at the graduate level, exclusive of Thesis 500.
6. An oral examination covering the thesis and coursework is required.

Non-Thesis Option
1. A Master's committee of no fewer than 3 faculty members will be selected.
2. Thirty-four hours of graduate coursework are required of which 22 hours must be at the 500 level or above.
3. All students are required to include 2 hours of 590 Seminar in their program and are expected to attend this course and participate in discussions each semester enrolled.
4. Twelve hours of coursework in the major must be at the graduate level.
5. Final comprehensive written and oral examinations shall be taken upon completion of no fewer than 32 hours of approved graduate work.

GRADUATE COURSES

410 Nursery Management and Production (3) Modern management methods as applied to retail and wholesale nurseries and landscape contracting firms. Methods of producing liners, container and field-grown woody ornamental plants. Prereq: 220, 330, and 360, and Plant and Soil Science 210, or consent of instructor. 2 hrs and 1 lab. Sp.

440 Advanced Turfgrass Management (4) Principles and scientific basis of turfgrass culture: adaptation, ecology, physiology, soil fertility, and grass nutrition, climatic influences on grass culture; physiology of clipping and 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.

510 Research Methods in Ornamental Horticulture (3) Topics to be assigned. May be repeated. Maximum 6 hrs. Prereq: Consent of Instructor. E.

520 Registration for Use of Facilities (3-15) Not more than 10 hours of the minimum 30 hours can be below the 500 level.


550 Microtechnique (3) Methods of investigating histostructure, histochemistry, and physiologcal structures in ornamental and crop plants, light microscopy. Prereq: 8 hrs biological science, 8 hrs chemistry, and consent of instructor. 1 hr and 2 labs. Su.

570 Physiology and Development of Ornamental Plants (3) Basic and applied physiology of ornamental plants related to growth and development in production and utilization. Critical review of literature and discussion of juvvenility and phase change, flowering, photoperiodism, vernalization, cold acclimation, hardness, dormancy, growth regulators, nutritional and environmental stress, and post-harvest consideration. Prereq: Botany 321 and consent of instructor. Sp.

580 Ornamental Plant Nutrition (3) Applications of nutrition principles and analyses in production of ornamental crops. Comprehensive study of functional roles of nutrients essential to plant growth; critical evaluation of recent developments in nutrient sources and formulations, foliar fertilization and analysis, nutrient uptake and water relations of ornamental plants grown in containers and in the field. Prereq: Botany 321, Plant and Soil Science 311 and consent of instructor. F.

590 Seminar (1) Current literature and developments. May be repeated. Maximum 3 hrs. E.

593 Problems in Ornamental Horticulture and Landscape Design (1-3) Independent study. Current topic related to technology and science. May be repeated. Maximum 6 hrs. E.

Pathobiology

(Major of Veterinary Medicine)

MAJOR

Veterinary Medicine

DEGREE

D.V.M.

Professors:

Edwards, D. F. D.V.M. Georgia
McGavin, M. D., Ph.D. Michigan State
Patton, S., D.V.M. Ohio State
Powell, H. S. (Adjunct), D.V.M. Georgia
Schuller, H. M., D.V.M., Ph.D. Hannover
Shull, R. M., D.V.M. Cornell
Slauson, D. O., D.V.M.
Ph.D., University of California (Davis)
Woyrich, R. (Adjunct), Ph.D. Casa Western Reserve

Associate Professor:
McCracken, M. D., D.V.M., Ph.D. Purdue

Assistant Professors:
Bochser, P. N., D.V.M., Ph.D. Cornell
Godfrey, V. (Adjunct), D.V.M., Ph.D. Tennessee
McEntee, M. F., D.V.M. Cornell
Miller, M. S., Ph.D. Columbia
Munson, L. D.V.M., Ph.D. Cornell
Schultze, A. E., D.V.M., Ph.D. Michigan State
Wilkinson, J. E., D.V.M., Ph.D. Cornell

Senior Research Associate:
Kat, D. S., Ph.D. Kansas

Post-Doctoral Research Associates:
Lu, Xiaochen, M.D. China
Yang, Z., M.D. China

Residents:
Brenneman, K., D.V.M. Virginia
Dean, D. F. D.V.M. Tennessee
Donnell, R., D.V.M. Tennessee
Mason, G. L., D.V.M. Texas A&M
Richman, L., D.V.M. Wisconsin

See Veterinary Medicine for program description.

GRADUATE COURSES

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

501 Special Topics in Pathobiology (1-2) May be repeated. Maximum 6 hrs. E

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

503 Comparative Pathology (3) Pathogenic mechanisms. Comparative aspects. Study of gross, microscopic and ultrastructural lesions. Prereq: Histology. 2 hrs and 1 lab: SP.A.

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

601 Advanced Topics in Pathobiology (1-3) Necropsy, histopathology, clinical pathology, clinical parasitology, clinical immunology, clinical bacteriology and mycology, and clinical virology. May be repeated. Maximum 12 hrs. E

602 Veterinary Biopsy (1-2) Examination of biopsy specimens and interpretation of observations. Preparation of specimens for sectioning. Prereq: Consent of instructor. May be repeated. Maximum 3 hrs. E

603 Correlative Post-Mortem Pathology (1-3) Gross and microscopic post-mortem examination of animals. Correlative interpretation of clinical diseases and lesions. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

604 Veterinary Pathology Seminar (1) Microscopic slides and transparencies of lesions from cases examined by pathologists, residents, and graduate students. Interpretation of observations. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. E

605 Pathobiology Seminar (1) Subjects of current interest in biomedical sciences. Students present one seminar per term enrolled. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. Class meets once monthly. E

609 Mechanisms of Disease (4) Advanced topics in pathobiology and mechanisms of disease: pathophysiology, cellular degeneration, inflammation, immunopathology, hemostasis. Principal biochemical and non-physiologic 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. F.A.

Philosophy

(College of Liberal Arts)

MAJOR DEGREES

Philosophy ............................................ M.A., Ph.D.

George G. Brenchert, Head

Professors:

Associate Professors:
Bennett, James O., Ph.D. Tulane Bohstedt, Kathleen Emmett (Liaison), Ph.D. Ohio State Cohen, Sheldon M., Ph.D. Northwestern Lavin, Michael, Ph.D. Stanford Noit, John E., Ph.D. Ohio State Osborne, Martha Lee, Ph.D. Tennessee

Assistant Professors:
Baylis, Francois, Ph.D. Western Ontario Hamlin, H. Phillips, Ph.D. Georgia

The Department of Philosophy offers graduate study leading to the Master of Arts and Doctor of Philosophy. The M.A. program includes thesis and non-thesis options and offers concentrations in medical ethics and religious studies. The Ph.D. program also has a concentration in medical ethics. Detailed information may be obtained from the Director of Graduate Studies in Philosophy.

THE MASTER'S PROGRAM

The department offers both a thesis and a non-thesis option. The course requirements for an M.A. with thesis are 30 hours, including 6 hours in Philosophy 500. Of non-thesis hours, at least two-thirds must be in courses at or above the 500 level. No philosophy course numbered under 400 may be taken for graduate credit. There are no particular courses that M.A. students are required to take. The nature of the student's coursework should be determined in consultation with the student's faculty committee. The non-thesis M.A. requires 30 hours of coursework of which at least two-thirds must be in courses at or above the 500 level. Students seeking the non-thesis option must also pass a final written examination on all work offered for the degree. An additional oral examination may be required.

THE DOCTORAL PROGRAM

Specific requirements for doctoral students in Philosophy include a minimum of three academic years of graduate study involving at least 48 semester hours in coursework (normally 16 semester hours per year) and a dissertation. The Ph.D. program includes thesis and non-thesis options and offers concentrations in medical ethics and religious studies. The dissertation research, the Graduate Committee may approve research and/or dissertation which of no fewer than 30 hours shall be in courses numbered over 500 and no fewer than 6 hours shall be in courses numbered over 600. The specific number and distribution of courses will be determined by the student's faculty committee. Students must demonstrate a reading knowledge of one foreign language, normally a living language in which there exists a significant body of philosophical literature. In special circumstances relating to the area of dissertation research, the Graduate Committee may approve a language not satisfying these conditions. This may be done by passing the doctoral language examination given by the appropriate department, if available, or by passing French 332 or German 332 with a B or better. Bi- or multilingual (normally, foreign) graduate students, whose native language (other than English) is one in which there is a significant body of philosophical literature, are exempted from the foreign language requirement. Students receiving the Ph.D. with concentration in medical ethics are also exempted.

CONCENTRATIONS

Medical Ethics
The department has an M.A. and Ph.D. program of graduate study with a concentration in medical ethics. Detailed information concerning the program may be obtained from either the Director of Graduate Studies in Philosophy or the Director of the Medical Ethics Program.

Religious Studies
The department has an M.A. program of graduate study with a concentration in religious studies. Details concerning the program may be obtained from either the Director of Graduate Studies in Philosophy or the Department of Religious Studies.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.A. and Ph.D. programs in Philosophy are available to residents of the states of Alabama, Kentucky (concentration in medical ethics only), Maryland (concentration in medical ethics only), Virginia (concentration in medical ethics only), or West Virginia; the Ph.D. program to residents of Arkansas (concentration in medical ethics only), Louisiana, or Mississippi; and the M.A. program to residents of Oklahoma (concentration in medical ethics only). Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

GRADUATE COURSES

400 Special Topics (3) May be repeated when topic varies. Maximum 6 hrs.

411 Modern Religious Philosophies (3) (Same as Religious Studies 411)
520 Topics in the History of Ancient and Medieval Philosophy (3) Same as Religious Studies 412.

420 Topics in History of Philosophy (3) Figures or movements from antiquity through mid-twentieth century. Prereq: 6 hrs of philosophy or consent of instructor. May be repeated when topic varies. Maximum 9 hrs.

425 American Philosophy (3) Colonial to early 20th Century. Prereq: 6 hrs of philosophy or consent of instructor.

430 Topics in Logic (3) Prereq: 8 hrs of logic or consent of instructor. May be repeated when topic varies. Maximum 6 hrs.

440 Contemporary Ethical Theory (3) Topics in metaethics or ethics. Prereq: 8 hrs of philosophy or consent of instructor.

446 Theoretical Issues in Medical Ethics (3) Prereq: 240 or 345 or consent of instructor. (Same as Religious Studies 446.)

460 Philosophy of Science (3) Methodological and conceptual issues in natural and social sciences; patterns of theory modification and replacement, nature of explanation and causation, status of theoretical entities. Prereq: 360 and 1 yr of natural or social science, or consent of instructor.

465 Philosophy of History (3) Speculative and critical aspects of philosophy of history. Prereq: 6 hrs of philosophy or consent of instructor.

473 Philosophy of Mind (3) Problems of mind and body in relation to consciousness and personal identity. Prereq: 6 hrs of philosophy or consent of instructor.

475 Analytic Metaphysics and Epistemology (3) Topics in metaphysics and epistemology in recent Anglo-American tradition. Prereq: 6 hrs of philosophy or consent of instructor.

476 Philosophy of Language (3) Survey of issues such as meaning, reference, and truth. 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 the 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 Topics in the History of Ancient and Medieval Philosophy (3) Intensive critical work on major philosopher or school. May be repeated. Maximum 9 hrs.

522 Topics in the History of Modern Philosophy (3) Intensive critical work on major philosopher or school. May be repeated. Maximum 9 hrs.

524 Topics in the History of Twentieth-Century European Philosophy (3) Intensive critical work on major philosopher or school. May be repeated. Maximum 9 hrs.

527 Topics in the History of American Philosophy (3) Intensive critical work on major philosopher or school. May be repeated. Maximum 9 hrs.

530 Topics in Logic and Philosophy of Mathematics (3) May be repeated. Maximum 9 hrs.

540 Topics in Value Theory (3) May be repeated. Maximum 9 hrs.

542 Ethics (3) Dominant movements in history of ethics. May be repeated. Maximum 9 hrs.

544 Applied Ethical Theory (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. Prereq: Consent of Medical Ethics Committee.

547 Clinical Medical Ethics (3) Medical terminology, history of medical ethics, case study discussion, clinical observation. Open only to students concentrating in medical ethics. May be repeated. Maximum 4 hrs. S/NC or letter grade.

548 Clinical Residency in Medical Ethics (3-12) Open only to students concentrating in medical ethics. Prereq: Consent of Medical Ethics Committee. May be repeated. Maximum 20 hrs. S/NC only.

553 Philosophical Topics in Literature and the Arts (3) Aesthetics, criticism, art and society. May be repeated. Maximum 9 hrs.

560 Philosophy of Natural Sciences (3) Nature of subject matter and method of science. May be repeated. Maximum 9 hrs.


570 Philosophy of Religion (3) Examination of central problems. May be repeated. Maximum 9 hrs.

575 Topics in Metaphysics and Epistemology (3) May be repeated. Maximum 9 hrs.

577 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.

590 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 page 32.

592 Off-Campus Study (1-15) See page 32.

593 Independent Study (1-15) See page 32.

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

620 Topics in the History of Ancient and Medieval European Philosophy (3) May be repeated. Maximum 9 hrs.

622 Topics in the History of Modern Philosophy (3) May be repeated. Maximum 9 hrs.

624 Topics in the History of 20th-Century Philosophy (3) May be repeated. Maximum 9 hrs.

640 Topics in Value Theory (3) May be repeated. Maximum 9 hrs.

646 Topics in Medical Ethics (3) Prereq: Consent of Medical Ethics Committee. May be repeated. Maximum 9 hrs.

675 Topics in Metaphysics and Epistemology (3) May be repeated. Maximum 9 hrs.

---

**Physics and Astronomy**

_(College of Liberal Arts)_

**MAJOR DEGREES**

Physics .................................................. M.S., Ph.D.

William M. Bugg, Head

Professors:

Bingham, C. R., Ph.D. ............... Tennessee
Bliss, A. W., Ph.D. ............... Michigan State
Bottcher, C. ............... Cal Tech
Breazeale, M. A. (On Leave), Ph.D. ............... Pennsylvania
Bringing, M. Ph.D. ............... Oregon
Bugg, W. M., Ph.D. ............... Tennessee
Burrus, J. Ph.D. ............... Fie Universitat Berlin
Calcutt, T. A., Ph.D. ............... Purdue
Childs, R. W., Ph.D. ............... Vanderbilt
Christophorou, L. G., Ph.D. ............... Manchester
Colglazier, E. W., Ph.D. ............... Cal Tech
Condo, G. T., Ph.D. ............... Illinois
Cramer, H. W. (UTSI), Ph.D. ............... Yale
Deeds, W. E. (Emeritus), Ph.D. ............... Ohio State
Duckett, K. E., Ph.D. ............... Tennessee
Fox, K. Ph.D. ............... Michigan
Gallai, N. M. (Emeritus), Ph.D. ............... Ohio State
Georgiou, S., Ph.D. ............... Manchester
Gildy, M. W., Ph.D. ............... Tennessee
Handler, T. H., Ph.D. ............... Rutgers
Harris, E. G. (Distinguished Prof.), Ph.D. ............... Tennessee
Hart, E. L. (Liaison), Ph.D. ............... Cornell
Jacobson, H. Ph.D. ............... Yale
King, D. T. (Emeritus), Ph.D. ............... Bristol
Lewis, J. W. L. (UTSI), Ph.D. ............... Mississippi
Macek, J. (Distinguished Scientist), Ph.D. ............... Rensselaer
Mahar, D. G. (Distinguished Scientist), Ph.D. ............... California
Mason, A. A. (UTSI), Ph.D. ............... Tennessee
McGregor, W. K. (UTSI), Ph.D. ............... Tennessee
Nielsen, A. H. (Emeritus), Ph.D. ............... Michigan
Obenshain, F. E., Jr., Ph.D. ............... Pittsburgh
Painter, L. R., Ph.D. ............... Tennessee
Pegg, D. J., Ph.D. ............... New Hampshire
Plummer, E. W., Ph.D. ............... Cornell
Quinn, J. J., Ph.D. ............... Maryland
Riedinger, L. L., Ph.D. ............... Vanderbilt
Ritchie, R. H., Ph.D. ............... Tennessee
Rusk, W. R. (Emeritus), M.S. ............... Tennessee
Sandner, W., Ph.D. ............... Freiburg
Sellin, J. A. (Chancellor's Research Scholar), Ph.D. ............... Chicago
Shih, C. C., Ph.D. ............... Cornell
Strayer, M. R., Ph.D. ............... MIT
Thompson, J. R., Ph.D. ............... Duke
Thomson, J. O. (Emeritus), Ph.D. ............... Illinois
Ward, F. L., Ph.D. ............... Princeton
Wheeler, G. W. (Emeritus), Ph.D. ............... Yale
White, J. W. (Emeritus), Ph.D. ............... North Carolina

Associate Professors:

Barnes, F. E., Ph.D. ............... Cal Tech
Briston, S. B., Ph.D. ............... Massachusetts
Ferrall, T., Ph.D. ............... Clemson
Muehlhauser, J. W. (UTSI), Ph.D. ............... Tennessee
Shein, S. Y., Ph.D. ............... Maryland
Sorensen, P. S., Ph.D. ............... Copenhagen

Assistant Professors:

Carriage, G. Ph.D. ............... Tennessee
Dault, S. J., Ph.D. ............... Queens
Harmatz, R., Ph.D. ............... Ohio State
Menzel, R. (UTSI), Ph.D. ............... Tennessee
Read, K. F., Ph.D. ............... Cornell
Sanders, A. J., Ph.D. ............... Tufts
Siopsis, G., Ph.D. ............... Cal Tech

Research Professors:

Kamyshnov, I., Ph.D. ............... ITEP (Russia)
Zhang, J., Ph.D. ............... Lanzhou

Research Associate Professors:

Du, Yuan-Cai, Ph.D. ............... Beijing
McCorkle, D. L., Ph.D. ............... Tennessee

Research Assistant Professors:

Davis, L. (UTSI), Ph.D. ............... Auckland
Faidas, H., Ph.D. ............... Tennessee

---
Instructors:
Fairman, R. C., B.A. .......... Earlham
Riederer, T., M.S. .......... Vanderbilt

Graduate programs leading to the Master of Science and the Doctor of Philosophy are offered in a number of concentration areas: atomic and low temperature physics, biophysics, chemical physics, elementary particle physics, health physics, heavy ion atomic physics, molecular spectroscopy, nuclear physics, plasma physics, condensed matter physics, theoretical physics, and ultrasonics.

Departmental graduate programs leading to the M.S. and Ph.D. are also available at The University of Tennessee Space Institute, Tullahoma, where opportunities for study and research are available in quantum optics and laser physics, atomic and molecular spectroscopy, fluid physics, and theoretical physics. For additional information, contact the department head.

ADMISSION REQUIREMENTS
A student who enrolls in The Graduate School with the intention of attaining an advanced degree in Physics will have completed an undergraduate major in Physics or its equivalent. Physics 311-12, 321, 431-32, and 461-82-63 or 411-12 constitute the minimum courses requisite to graduate study.

A student who intends to present Physics as a graduate minor will have completed an undergraduate minor in Physics or its equivalent. Physics 311 and 431-32 constitute the minimum coursework prerequisite to a minor in Physics.

All first-year graduate students are required, for advising purposes only, to take a qualifying examination in undergraduate physics during the fall semester registration period.

THE MASTER'S PROGRAM

Thesis Option
This program is designed primarily for students intending to go into 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 500, and pass an oral examination on course material and thesis.

Non-Thesis Option
This program is designed primarily for students intending to teach in colleges or universities on the elementary or intermediate level, or for students specifically intending to work toward a Ph.D. Students seeking the non-thesis option must apply to the department's graduate committee for permission to enroll under this program. The requirements are the satisfactory completion of 30 hours of coursework comprised of 18 semester hours from Physics 511-12, 521-22, 531-32, 541-42, and 571-72; 6 semester hours in a minor field; and 6 semester hours from other courses numbered above 400 (preferably of advanced laboratory nature). At least 20 hours must be taken at the 500 level or above. In addition, the candidate must pass a written examination administered by his/her committee.

THE DOCTORAL PROGRAM
All students are expected to take Physics 521-22, 531-32, 541-42, 551, 561, 571-72, and 611. Physics 601-02 are normally required of students specializing in atomic physics; Physics 521-22 of students specializing in elementary particle physics; Physics 626-27 of students in elementary particle physics; Physics 663-64 of students in plasma physics; Physics 611-82 of students in health physics; Physics 671-72 of students in solid state physics; and Physics 681-82 of students specializing in molecular spectroscopy.

Students specializing in chemical physics may substitute Chemistry 572 for Physics 551 and should complete at least 6 semester hours chosen from Chemistry 580, 670.

The courses Physics 531-32, 571-72, 521-22, 541-42, 561 constitute the core curriculum. They are the usual basis for the departmental comprehensive examination which is normally taken by a well-prepared student after two years of graduate study.

A reading knowledge of one foreign language in which there exists a significant body of literature is required. Physics 490 Special Topics in Astronomy (1-3) Topics of current interest to astronomy and astrophysics. Acceptable for graduate credit in physics with consent of department. Maximum 6 hrs.

THE DOCTORAL PROGRAM

Physics

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. Applicable for major credit in physics. Prereq: Physics 232 and consent of instructor.

490 Special Topics in Astronomy (1-3) Topics of current interest in astronomy and astrophysics. Applicable for graduate credit in physics with consent of department. May be repeated with consent of department. Maximum 9 hrs.

505 Physics of Fluids (3) Fluid physics, overview of fluid mechanics and associated computational techniques; general description of laminar and turbulent flows; viscous, supersonic and hypersonic flows; continuum, transonic, and high-speed flows; pipe flow, nozzle flow and sonic orifice expansion flows; reacting and nonreacting flowfields; shock-tube physics; and an introduction to the method of characteristics and Monte Carlo computational techniques.

506 Experimental Methods (3) Principles, real operational behavior, and hazards of laser types, radiation detectors, photomultiplier tubes, image intensifiers, image converter, image dissector, streak cameras, fast-framing cameras; high-vacuum systems including cryogenic-based devices, data acquisition techniques including synchronous and digital electronics methods and microcomputer data acquisition and registration methods.

507 Contemporary Optics (3) Topics in geometrical, physical, Fourier, and nonlinear optics and introductory laser physics. Extensive use of mathematical calculations and design of practical and sophisticated optical systems.

508 Laser Physics (3) Mode analysis, stable and unstable resonators; rate equations and population inversion; saturation; relaxation oscillations; fluctuations and noise, laser stability; quantum theory of laser, photon coherence; mode-locking, Q-switching and frequency stabilization; specific laser systems 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.

521-22 Quantum Mechanics (3,3) Fundamental principles of quantum mechanics, free particle, harmonic oscillator, hydrogenation, angular momentum, electron spin, particles in electric and magnetic fields, perturba-

532 Advanced Classical Mechanics (3) Variational principles, canonical transformations, Hamilton-Jacobi theory, non-linear mechanics, elasticity, fluid mechanics. Prereq: 531.


561 The Theory of Relativity (3) Geometry of space-time, relativistic electrodynamics, particle mechanics and continuum mechanics, Einstein's field equations, Schwarzschild solution, the classical test of general relativity. Prereq: or coreq: 531 and 542.


574 Group Theory for Physicists (3) Introduction to abstract group theory, discrete and continuous groups, representation theory, Noether's theorem, symmetries and degeneracies, application of group-theoretical methods to atomic physics, solid-state physics, and particle physics. Prereq: 571-72.

591 Foreign Study (1-15) See page 32.

592 Off-Campus Study (1-15) See page 32.

593 Independent Study (1-15) See page 32.

594 Special Problems (1-15) Especially assigned theoretical or experimental problems. Prereq: permission of faculty. May be repeated. Prereq or coreq: 521, 531, 572.


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


505 Laser Spectroscopy (3) Application of lasers to spectroscopy of atomic and molecular systems; review of classical multi-particle statistics; atomic, diatomic, and J-V coupling and Zeeman effects, spontaneous emission of atomic systems and oscillator strength, selection rules of dipole and quadrupole transitions, radiative transfer and formation of spectral lines. Study of saturated absorption spectroscopy, resonance fluorescence, and strong field effects. Hanle effect, optical double resonance, optical pumping and hyperfine spectroscopy. Prereq: 521, 541, 558.

606 Nonlinear Optics (3) Nonlinear optical susceptibilities, wave propagation in nonlinear media, sum-frequency and difference frequency generation, harmonic generation, parametric amplification and oscillation, stimulated Raman processes, two- and multi-photon processes, four-wave mixing and phase conjugation, transient coherent optical phenomena, free induction decay, optical breakdown and nonlinear effects in plasmas. Prereq: 522.


610 Quantum Optics (3) Quantum theory of emission and absorption of radiation; frequency-dependent susceptibility, coherence theory; field quantization and coherent photon states; interaction of radiation with atoms, photons, and coherent radiation fields. Prereq: 521.

611 Advanced Quantum Mechanics & Field Theory (3) Second quantization; quantization of electromagnetic field, emission, absorption, and scattering of light. Radiation, pair creation and annihilation, quantum field theory methods in condensed matter physics, and quantum optics. Topics vary according to instructor. Prereq: 522 and 541 or equivalent. Prereq or coreq: 521 or consent of instructor.

612 Advanced Topics in Quantum Field Theory (3) Renormalization, Lamb shift, anomalous magnetic moment, gauge theories, electroweak theory, quantum chromodynamics, grand unified theories, and advanced topics in laser physics and quantum optics. Topics vary according to interest of students, instructor and present state of physics. Prereq: 561 or 611 or consent of instructor.


641 Advanced Topics in Classical Theory (3) To meet special needs of students. Advanced dynamics and hydrodynamics, electromagnetic theory, statistical mechanics, or theory of nuclear equilibrium 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, 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 in astrophysics, boundary value problems in electromagnetism, atomic and nuclear structures, band structure on solid state physics, transport problems in statistical mechanics, Monte Carlo simulation of liquids, fitting and interpolation of data, correlation analysis, or optimization strategy. Prereq: 522, 531, 542, and 572.

661-62 Collision Interactions (3,3) Interaction of electromagnetic radiation and charged particles with atoms and molecules or free particles, scattering, ionization, transport and capture, collective excitations, Cerenkov radiation, and stopping power. Prereq: 522.

663 Advanced Plasma Physics I (3) Same as Electrical and Computer Engineering 663.


681-82 Molecular Spectroscopy (3,3) Spectroscopic methods of determining molecular properties, theoretical and experimental aspects of intermolecular energy and charge transfer, group theoretical methods and selection rules in gases and condensed phases, normal coordinates and potential functions, vibration-rotation interaction theory, intensities, frequencies and line shapes of molecular transitions. Prereq: 552 and 542 or consent of instructor.

Planning

(College of Architecture and Planning)

MAJOR PERIOD

DEGREE

Planning.............................................. M.S.P.

James A. Spencer, Director

Professors:

Johnson, David A., Ph.D. .............. Cornell
Kenney, Kenneth B., Ph.D. ........ North Carolina
Prochaska, J. M., M.U.P. .............. Michigan State
Shouse, Walter L. (Emeritus), M.C.P. .... Har vard
Spencer, James A. (Liaison), M.C.P. Ohio State

Associate Professors:

Bowen, George E., M.A. .............. George Washington
Fisher, Patricia, Ph.D. ............... Florida State

Assistant Professor:

Anderson, Annette, M.P.A. ........... Missouri (Kansas City)

Research Associate Professor:

Putnam, Sandra, Ph.D. ............... Brown

Research Assistant Professor:

Newsom, Theodore, Ph.D. ............ Penn State

The Graduate School of Planning offers a program of studies leading to the professional degree of Master of Science in Planning. The degree is the normal route for entry into professional positions in urban and regional planning or related positions. Graduates are candidates for positions in regional, city, county, and metropolitan planning agencies; in local, state, and federal agencies concerned with physical, economic, and administrative planning; in private business and organizations dealing with development problems; and in private consulting.

The Master of Science in Planning program is accredited by the Planning Accreditation Board, a joint undertaking of the American Institute of Certified Planners and the Association of Collegiate Schools of Planning.

THE MASTER'S PROGRAM

Admission Requirements

Applicants are to submit an application for admission to The Graduate School, two letters of reference from faculty familiar with their prior academic work, and a statement describing personal career objectives. If the applicant has prior work experience in planning, a reference statement is required.
letter should also be provided by the work supervisor. Graduate Record Examination scores are requested of all applicants whose undergraduate GPA is below 3.0. Other applicants are encouraged to submit them.

Degree Requirements
The M.S.P. requires completion of at least 48 hours of graduate credit, at least 30 of which must be in planning. The following courses are the core curriculum required of all students: 510, 511, 515, 520, 521, 523, 530, 531, 532, 540, and 545.

Students should plan to enter the program in the fall term to take the core courses in the proper sequence. Each student is required to develop an area of concentrated competence beyond the core curriculum. After selecting the area of concentration, usually by the end of the second semester, the student takes a minimum number of courses or hours from a prescribed set of courses in the subject area. Further enhancement of the concentration is gained by taking additional elective courses in the subject and by focusing the thesis or major paper on the subject. Concentration courses are drawn from the planning curriculum and from other departments in the University. Concentrations are available in land use planning, information systems in planning, economic development planning, real estate development planning, transportation planning, environmental planning, historic preservation planning, and international planning.

Students have the latitude to propose an alternate specialization consisting of at least 9 hours of coursework, subject to approval of a faculty committee. Each student is required to demonstrate competence in individual research. This may be done in one of two ways:

Thesis Option—Complete a thesis for 6 hours credit;
Non-Thesis Option—Complete a major study with acceptable documentation. To be eligible for the major study option, the student must have completed at least 12 hours of graduate coursework in planning with at least a 3.5 cumulative grade-point average. The student meeting these criteria may present a proposal to his or her committee for a major study that will include at least 6 hours of subsequent coursework. The proposal shall justify the selection of the topic, describe the approach to the study, and describe the nature of the final product. The topic will normally be expected to reinforce or complement the student's concentration.

Accademic Common Market
An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S.P. program is available to residents of the states of Arkansas, Kentucky, South Carolina, or West Virginia. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

Graduate Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>401</td>
<td>The City in the U.S. (3) Development and character of U.S. cities. Concepts and selected case studies. (Same as Urban Studies 401.)</td>
</tr>
<tr>
<td>402</td>
<td>Survey of Planning (3) History of city development and of planning; U.S. experience in urban and other levels of planning. State of the art, process, comprehensive plan, implementation devices. Planning issues in society. Not for credit for M.S.P. degree.</td>
</tr>
<tr>
<td>446</td>
<td>Housing (3) Nature and demand for housing in U.S. and abroad. U.S. experience. Private market processes and public influences. Problems of change in housing supply, impede, and new techniques. (Same as Civil Engineering 658.)</td>
</tr>
<tr>
<td>500</td>
<td>Thesis (1-15) P/NP only. E</td>
</tr>
<tr>
<td>502</td>
<td>Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or library.</td>
</tr>
<tr>
<td>510</td>
<td>Fundamentals of Planning (2) History of planning, structure and development of urban areas, operations of contemporary planning, trends and issues.</td>
</tr>
<tr>
<td>511</td>
<td>Graph and Oral Communications in Planning (1)</td>
</tr>
<tr>
<td>515</td>
<td>Theory of Planning (2) Analysis of nature and objectives of planning process; role of planner and planning function in public decision-making. Prereq: 510 or consent of instructor.</td>
</tr>
<tr>
<td>520</td>
<td>Planning Research Methods (3) Research techniques in subject areas associated with city and regional planning. Research tools, data collection and analysis as basis for planning and decision-making.</td>
</tr>
<tr>
<td>521</td>
<td>Computers in Planning (3) Basic computer concepts, hardware and software, use of mainframe and microcomputer in planning and government.</td>
</tr>
<tr>
<td>523</td>
<td>Statistics for Planners (3) Applications of basic descriptive and inferential classical and non-parametric techniques in planning research. Data organization and display, measures of location, dispersion and association; data transformations; some basic probability theory; selected one and two sample tests; correlation and regression analysis. Prereq: 520 or consent of instructor.</td>
</tr>
<tr>
<td>525</td>
<td>Planning Information Systems (3) Design, analysis, and use of information systems in planning and local government. Design or programming decision support systems; use of public data bases; impact of information revolution and new technologies on planning profession. Prereq: Consent of instructor.</td>
</tr>
<tr>
<td>530</td>
<td>Planning Analysis and Forecasting (3) Methods of quantitative analysis and modeling in urban and regional studies. Population, employment, and economic base studies, forecasting techniques. Use of facilities and collections of library.</td>
</tr>
<tr>
<td>531</td>
<td>Urban and Regional Analysis (3) Past, present and possible future patterns of urban and regional structures drawing on contemporary theories, models, and empirical research.</td>
</tr>
<tr>
<td>532</td>
<td>Planning Methods (6) Preparation of comprehensive plans for urban areas or regions. Development of baseline data and forecasts, formulation of alternative plans and strategies, and development of plan implementation programs. Extensive laboratory experience. Prereq: 510, 520, 530 and 531 or consent of instructor.</td>
</tr>
<tr>
<td>537</td>
<td>Planning and Transportation (3) (Same as Civil Engineering 558.)</td>
</tr>
<tr>
<td>538</td>
<td>Urban and Site Design (3-6) Principles of design of residential subdivisions and some components of physical community, shopping centers, institutional complexes, central business districts. Problems of reviewing alternative designs against each other or written regulations. Extensive laboratory experience.</td>
</tr>
</tbody>
</table>

539 | Planning for Historic Preservation (3) Planning for preservation, restoration, and conservation of historic buildings, areas and sites as related to comprehensive planning process. National, state, and local government role in preservation, designation of sites, legislative needs, financing and administrative organizations. |

540 | Legal Aspects of Planning (3) Legal basis for planning and guiding community development. Legal tools of planning. Prereq: 510 or consent of instructor. |

545 | Planning and Property Development (2) Process of urban physical growth change and functions of private sector real estate development and its relationship to planning. Partnership roles of public and private sectors in urban development and redevelopment. Prereq: 510 or consent of instructor. |

547 | Negotiation (1) Methods, strategies, techniques and skills useful to planners in mediation, negotiation, and dispute resolution concerning urban planning and development. |

548 | Tourism Planning (3) Planning of tourist resources and programs within a geographic region. Tourism planning models. Relationships among tourists, tourism developments and planning of tourist attractions and services. Application of techniques in selected area. |

549 | Local Fiscal Planning and Capital Improvements (3) Fiscal planning and capital improvements programing in planning. Tax and expenditure limitation, infrastructure financing, municipal bond market, alternative revenue sources, development fees, exemptions, intergovernmental aid. Evaluation of fiscal policies. |


551 | State and Regional Planning (3) Theory and practice of planning at state, sub-state, and metropolitan levels. |

552 | Development Planning in the Third World (3) Seminar on urban and regional development in Third World nations. Population growth, settlement patterns, economic development, land framework of integrated resource management. (Same as Geography 555.) |

555 | Environmental Planning (3) Role of planners and planning in maintenance of balance between natural and built environment. (Same as Geography 555.) |

560 | Policy Analysis and Strategic Planning (3) Models of policy making process and role of strategic planning and applied decision making. Quantitative and qualitative approaches, evaluative research and program evaluation, and impact assessment. |

590 | Practicum (3) Prereq: Consent of instructor. N/S or letter grade. |

591 | Special Topics (1-3) Prereq: Consent of instructor. |

592 | Readings in Planning (1-3) Prereq: Consent of instructor. May be repeated. |

593 | Problems in Planning (1-3) Prereq: Consent of instructor. |

595 | Environmental Assessment and Sustainable Development in Third World Countries (3) (Same as Geography 655.) |

Plant and Soil Science
(College of Agricultural Sciences and Natural Resources)

Major Degrees

<table>
<thead>
<tr>
<th>Plant and Soil Science</th>
<th>M.S., Ph.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>John E. Foss, Head</td>
<td></td>
</tr>
</tbody>
</table>

Professors:

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allen, Fred L.</td>
<td>Minnesota</td>
</tr>
<tr>
<td>Bell, Frank F.</td>
<td>Iowa State</td>
</tr>
</tbody>
</table>

Assistant in the Office of Graduate Admissions and Records.
The Department of Plant and Soil Science offers graduate programs leading to the Master of Science and the Doctor of Philosophy. Concentrations 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

This option requires writing a thesis based on original research. Six hours of 500 Thesis are required. Prior to conducting research, the student must develop a detailed written research plan. In addition to the thesis hours, a minimum of 24 hours of graduate coursework is required, of which at least 14 must be taken in courses numbered 501 and above. The student's advisory committee may require additional coursework if the student's progress or background indicates such need. Each student is required to take 1 hour of 501 and 2 hours of 503. The student's advisory committee consists of the major professor, who acts as chairperson of the committee, and a minimum of two other faculty members. The advisory committee approves the student's coursework and the report on participation in a research program for 593. Students are required to write a comprehensive examination integrating the coursework.

Non-Thesis Option

A student desiring the non-thesis option should declare this intention at the beginning of the first semester of graduate studies, and must declare it before the beginning of the second semester. In lieu of thesis, students are required to complete 3 hours of 593 for satisfactory participation in a single research program for a period of 12 weeks and the writing of an original, creative and well-written report, both to be conducted by the major professor and approved by the advisory committee. In addition to the research program, a minimum of 30 hours of graduate coursework is required, of which at least 20 must be taken in courses numbered 501 and above. The student's advisory committee may require additional coursework if the student's progress or background indicates such need. Each student is required to have 1 hour of 501 and 2 hours of 503. The student's advisory committee consists of the major professor, who acts as chairperson of the committee, and a minimum of two other faculty members. The advisory committee approves the student's coursework and the report on participation in a research program for 593. Students are required to write a comprehensive examination integrating the coursework.

THE DOCTORAL PROGRAM

A minimum of 72 hours beyond the Bachelor's degree, exclusive of credit for Thesis 500, is required. Of this number, 24 hours must be Doctoral Research and Dissertation 600. A minimum of 24 hours must be completed in courses numbered above 500. The student's advisory committee may require additional coursework if the student's progress or background indicates such need. Each student is required to take 1 hour of 501 and 1 hour of 503, and to present an oral seminar on the thesis research.

The student's advisory committee consists of the major professor, who acts as chairperson of the committee, and a minimum of two other faculty members. The advisory committee approves the student's research problem and coursework and conducts the final oral examination integrating the thesis and coursework.

411 Soil Microbiology (3) Soil microbial populations and roles in soil organic matter decomposition, inorganic and organic compounds, decomposition of residues, dynamics of soil organic matter. Prereq: Intro to Soil Science and Introduction to Organic Chemistry or Organic Chemistry or consent of instructor. 2 hrs and 1 lab. F,A

412 Soil Genesis, Classification, and Mapping (3) Soil genesis and formation: observing and describing morphology of agricultural and forest soils; chemical and physical properties; classification; mapping. Two Saturday field trips. Prereq: 210 or consent of instructor. 2 hrs and 1 lab. Sp

413 Soil Chemistry (3) Principles concerning structure and chemical properties of soil materials; fractional factor as related to exchange, chemical equilibria, soil acidity, reduction, weathering, nutrient availability and waste disposal. Prereq: 311 or consent of instructor. F

414 Soil, Land Use, and the Environment (3) Soil as environmental component and soil properties affecting land use as resources; management and planning: consideration of nonengineering aspects of site selection for land use, soil survey and resource data in land use, recognition and prevention of soil pollution. Prereq: 210 or consent of instructor. Sp,A

415 Soil-Water Relations (3) Physical relationships among solid, liquid, and gaseous phases of soil system. Relationships of soil properties to processes governing transport of water, and chemicals in soil. Prereq: Intro to Soil Science. 2 hrs and 1 lab. F,A

431 Crop Physiology and Ecology (3) Principles of plant physiology and ecology as applied to crop production. Effects of environmental factors on physiological processes. Prereq: 230, Botany 231, 2 hrs and 1 lab. A

432 Bioclimatology (3) Solar energy budget; interactions on the global scale and their implication for soils and biological systems: quantification of macro- and microclimates; microclimates and their modification; automatic weather station data collection and analysis; biological responses to climate stresses; climate variation and change and their effects on biological systems. Prereq: 1 year physical or biological science, junior standing; 2 hrs and 1 lab. F,A

433 Agricultural Pesticides (3) Regulation of pesticide development, manufacture, transportation, marketing and use. Structure, mode of action, degradation and environmental impact of pesticides used in agriculture, forestry and related areas. Prereq: 1 year biological sciences and 1 semester chemistry. 2 hrs and 1 lab. Sp

434 Postharvest Biology and Technology (3) Principles, methods, and techniques related to maintenance of quality of horticultural commodities. Preharvest handling, harvesting, storage facilities and techniques, quality evaluation and biological and physiological mechanisms related to maturation, ripening, and senescence. Graduate credit requires a short lab project in addition to regular class assignments. Two Saturday field trips. Prereq: 1 year biological science. 2 hrs and 1 lab.

435 Principles of Plant Breeding (3) Genetic principles and techniques used in crop improvement. Prereq: Biology 131, 2 hrs and 1 lab. F

471 Statistics for Biological Research (3) Application of statistics to interpretation of biological research. Notation, descriptive statistics, probability, distributions, confidence intervals, and chi-square tests. Analysis of variance, mean separation procedures, linear regression and correlation. Prereq: Mathematics 121 or equivalent. F

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

501 Seminar Preparation (1-3) Application of speaking, writing, and organizational skills in preparation and presentation of scientific material to both academic and general audiences. Preparation of abstracts for scientific presentations. Required of all entering graduate students during their first year of graduate study. F,Sp

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. SINC only. E

503 Seminar (1) Presentations and discussion of current scientific material. May be repeated. Maximum 3 hrs. F,Sp


512 Pedology (3) Physical and chemical weathering processes, factors of soil formation, soil forming proc-
and quantitative parts of the GRE is normally required. Students pursuing the Master of Arts degree may follow one of two options: Thesis Option: (30 hours) Coursework, preparation of a thesis, and an oral examination on coursework and the thesis, is required. At least 12 of these hours must be in political science, with 6 in the field of methodology (Political Science 510 and 512), and 3 hours in the 600-level research seminar in the student’s first field of interest.

THE MASTER OF PUBLIC ADMINISTRATION PROGRAM

The M.P.A. program is intended to prepare students for public service careers by acquainting them with management principles, analytical tools, and the ethical dilemmas they will face as public administrators. It consists of a total of 36 semester hours, including a core program, an elective specialization, and a recommended internship.

Applicants for admission to the program must have a Bachelor’s degree or its equivalent. Normally, an overall average of 3.0 and an average of 3.2 in the last two years of political science or social science courses is required. In addition, a composite score of at least 1100 on the verbal and quantitative parts of the GRE is normally required.

The M.P.A. is a non-thesis program. Specific requirements include the following:

1. Core - 21 hours.
   a. General perspectives - required courses (6 hours).
   b. Specialization - 9 hours.
   c. Analytical skills (6 hours) - 512 Quantitative Political Analysis; 514 Research and Methodology in Public Administration.
   d. Management skills (6 hours) - 562 Public Management; 564 Human Resources Management in Public Organizations.

2. 36 hours may follow one of two options:
   a. The non-thesis option is the Master of Public Administration program. Possible specializations include general government, public health, budgeting and finance, planning, natural resources, program evaluation, criminal justice, public relations, personnel, and others.
   b. Recommended internship with a public agency - 6 hours.

Internships are arranged in consultation with the coordinator of the M.P.A. program. A specialization is designed by the student in consultation with the coordinator of the M.P.A. program. The M.P.A. program offers a coordinated dual degree program leading to the B.S. in one of the natural sciences or humanities and the M.P.A. degree.

THE MASTERS OF ARTS PROGRAM

A Bachelor’s degree or its equivalent is required for admission. Normally an overall average of 3.0 is also required together with an average of 3.2 in the last two years of political science or social science. In addition, a composite score of at least 1100 on the verbal and quantitative parts of the GRE is normally required.

Students pursuing the Master of Arts degree may follow one of two options: Thesis Option: (30 hours) Coursework, preparation of a thesis, and an oral examination on coursework and the thesis, is required. At least 12 of these hours must be in political science, with 6 in the field of methodology (Political Science 510 and 512), and 3 hours in the 600-level research seminar in the student’s first field of interest.

THE MASTER OF PUBLIC ADMINISTRATION PROGRAM

The M.P.A. program is designed 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 36 semester hours, including a core program, an elective specialization, and a recommended internship.

Applicants for admission to the program must have a Bachelor’s degree or its equivalent. Normally, an overall average of 3.0 and an average of 3.2 in the last two years of political science or social science courses is required. In addition, a composite score of at least 1100 on the verbal and quantitative parts of the GRE is normally required.

The M.P.A. is a non-thesis program. Specific requirements include the following:

1. Core - 21 hours.
   a. General perspectives - required courses (6 hours).
   b. Specialization - 9 hours.
   c. Analytical skills (6 hours) - 512 Quantitative Political Analysis; 514 Research and Methodology in Public Administration.
   d. Management skills (6 hours) - 562 Public Management; 564 Human Resources Management in Public Organizations.

2. 36 hours may follow one of two options:
   a. The non-thesis option is the Master of Public Administration program. Possible specializations include general government, public health, budgeting and finance, planning, natural resources, program evaluation, criminal justice, public relations, personnel, and others.
   b. Recommended internship with a public agency - 6 hours.

Internships are arranged in consultation with the coordinator of the M.P.A. program. A specialization is designed by the student in consultation with the coordinator of the M.P.A. program. The M.P.A. program offers a coordinated dual degree program leading to the B.S. in one of the natural sciences or humanities and the M.P.A. degree.
rather than the five years that otherwise would be required. Students pursuing the dual degree program should plan to complete coursework or an internship for one summer term in addition to taking normal course loads for four academic years.

**Admission**

Applicants for the J.D.-M.P.A. program must make separate application to, and be independently accepted by, the College of Law for the J.D. degree and the Department of Political Science and The Graduate School for the M.P.A. degree. Applicants must also be accepted by the Dual Degree Committee. All applicants must submit a Law School Admission Test (LSAT) score. An applicant’s LSAT score may be substituted for the Graduate Record Examination (GRE) score, which is normally required for admission to the M.P.A. program. Application may be made 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 to the last 15 hours required for the M.P.A. degree.

**Curriculum**

A dual degree candidate must satisfy the requirements for both the J.D. and the M.P.A. degrees, as well as the requirements for the dual program. The College of Law will award a 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 (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.

Dual degree students who withdraw from the program before completion of the requirements for both degrees will not receive credit toward either the J.D. or the M.P.A. degree for courses taken in the other program except as such courses qualify for credit without regard to the dual program.

**Awarding of Grades**

For grade recording purposes in the College of Law and the Department of Political Science, grades awarded in courses in the other unit will be converted to either Satisfactory or No Credit and will not be computed in determining a student’s GPA or class standing. The College of Law will award a grade of Satisfactory for an approved M.P.A. course in which the student earns a grade of B+ or higher and a grade of No Credit for any lower grade. The Political Science Department will award a grade of Satisfactory for an approved law course in which the student earns a grade of 2.3 or higher and a grade of No Credit for any lower grade. The official academic record of the student maintained by the Registrar of the University shall show the actual grade assigned by the instructor without conversion.

**DUAL M.S.S.W.-M.P.A. PROGRAM**

The Department of Political Science and the College of Social Work offer a dual degree program leading to the conferral of both the Master of Science in Social Work and the Master of Public Administration degrees. In this program, the M.P.A. and M.S.S.W. degrees can be awarded on a full-time basis in five consecutive terms rather than seven to eight terms.

**Admission**

Applicants for the M.S.S.W.-M.P.A. program must be admitted to the College of Social Work and to the Department of Political Science. In addition, applications from dual degree students must be reviewed and approved by the dual degree committee that is responsible for overseeing the program. It is anticipated that some students may apply to the dual degree program before they matriculate in either the M.S.S.W. or the M.P.A. program. Students already enrolled in one program will also be permitted to apply, but must do so prior to the end of the first year of study.

**Curriculum**

Students in the dual degree program are required to take a set of core courses from each curriculum, but the program is designed to be flexible, providing students the opportunity to develop special areas of competence. For the dual degree program, a minimum of 65 hours are required (35 hours must be in social work and 30 hours must be in public administration). Admission to candidacy will be completed separately for each degree.

A comprehensive examination is required in each discipline for students receiving the dual degrees. A faculty committee from Public Administration and one from Social Work will write and grade the respective examination.

Dual degree students who withdraw from the program before completion of the requirements for both degrees will not receive credit toward either the M.P.A. or the M.S.S.W. degree for courses taken in the other program, except as such courses qualify for credit toward a degree independent of the dual degree program.

**Financial Aid**

Students may apply for financial aid to both the College of Social Work and the Department of Political Science. Normally, students will not receive funding from both programs concurrently.

**THE DOCTORAL PROGRAM**

The Ph.D. program prepares students for careers in college teaching, as well as careers in other occupations related to service in the public or private sectors. Applicants for admission to the program should normally have completed a Master’s degree in political science or a related field with a 3.0 GPA (3.5 for international students) and have earned a composite score of at least 1100 on the verbal and quantitative parts of the Graduate Record Examination.

Students admitted to the program must complete 78 hours of coursework beyond the Bachelor’s degree, must successfully pass written and oral comprehensive examinations in three broad subject fields of political science, and must pass a final oral examination on the dissertation.

In addition, students must satisfy a research tool requirement. This requirement may be satisfied either by demonstrating competency in one foreign language, or by completing 12 hours of coursework, numbered 500 or above, in empirical methodology.

In addition to the total hours required for the degree, the following requirements must also be met:

1. At least 83 hours must be in political science courses.
2. At least 48 hours in political science courses must be in courses numbered 500 or above.
3. Completion of Political Science 510 and 512.
4. At least 6 hours in political science courses must be earned in political science courses numbered above 600, exclusive of dissertation hours.
5. A total of 24 hours must be earned by writing the dissertation.

**GRADUATE COURSES**

430 United States Constitutional Law: Sources of Power and Restraint (3) Analysis of judicial review, constitutional powers of President and Congress, federalism, sources of regulatory authority, and constitutional protection of political and economic rights.

431 U.S. Constitutional Law: Civil Rights and Liberties (3) Analysis of current issues in civil rights and liberties including: first amendment freedoms, equal protection, privacy and rights of accused.

442 Administrative Law (3) Legal dimensions of administrative power and procedures, and constitutional controls over administrators.

452 Black African Politics (3) Recent evolution and current political environment of African nations. (Same as Afro-American Studies 452.)

454 Government and Politics of China and Japan (3) Examination of the political setting, structure and political processes in China and Japan.

455 Latin American Government and Politics II (3) Selected topics on Latin American political dynamics, consideration of leading theoretical explanations. (Same as Latin American Studies 455.)

459 Government and Politics of the Soviet Union (3) Origins and development of Soviet political system, and study of selected policy areas.

461 Policy Making in Democracies (3) Comparative approach to theory and process of making public policy.

463 Contemporary Middle East Politics (3) Governments and movements in Middle East, their characteristics, bases, and interrelationships.

470 International Law (3) Nature and development of international law and compliance. Function of international law in context of international conflict.

475 Ancient and Medieval Political Thought (3) Survey of major western political thinkers from Socrates to Marliago 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
faculties before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
510 Scope and Methods in Political Science (3)
Procedures of analysis in political science.
512 Quantitative Political Analysis (3)
Methods and techniques in quantitative analysis: univariate and bivariate statistics.
513 Quantitative Political Analysis (3)
Methods and techniques in quantitative analysis: multivariate model building.
514 Research and Methodology in Public Administration
(3) Basic assumptions and techniques of research in public administration: measurement, analysis, and reporting of data.
520 Political Theory
(3) Survey of major ideas, thinkers and works of Western political theory.
522 American Political Thought (3)
Systematic examination of the normative and empirical theories of leading American political thinkers from the colonial period to the present.
530 American Government and Politics (3)
Survey of literature, approaches to research and analysis, critical examination of major topics, and surveys 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 analysis 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)
Select examination of published research and current approaches in subfields of constitutional law, judicial process, and judicial behavior. May be repeated with consent of department. Maximum 9 hrs.
546 Law and the Administrative Process (3)
Constitutional positions, implementation, organizational, and administrative choice. May be repeated with consent of department. Maximum 9 hrs.
548 Public Policy Process (3)
Theoretical, formal and empirical analysis of the political, administrative, and legal aspects of decision-making processes of public policymakers, including legislative, executive and judicial actors.
550 Public Administration (3)
Overview of public administration and function.
552 Organization Theory (3)
Appraisal of major theories of organization and their applicability to public sector.
553 Management of Information Systems (3)
Theory, design, development and evaluation of information systems in public organizations. Database systems, computer applications, and training for management information technology.
556 Policy Analysis (3)
Strategies and techniques for 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 Budgeting and Finance (3)
Technical and political aspects of planning, preparing and adopting government budgets. Management implications of revenue collection, debt management, treasury function, accounting, internal auditing, purchasing risk management, post-auditing.

562 Public Management (3)
Interpersonal and leadership skills, techniques and methods for planning, decision making, and implementation of management strategies in public sector. May be repeated with consent of department. Maximum 9 hrs.
564 Human Resource Management in Public Organizations
(3) Intensive analysis of contemporary issues, challenges, methods and strategies related to effective management of human resources in public sector.
566 Ethics, Values, and Morality in Public Administration (3) 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/NC only.
570 Comparative Government and Politics (3)
Selected topics in modern governments. May be repeated with consent of department. Maximum 9 hrs.
572 The Politics of Development (3)
Selected topics dealing with political problems of less developed countries. May be repeated with consent of department. Maximum 9 hrs.
574 Area Seminar in Comparative Government and Politics (3)
Selected topics in areas studied: Africa, Asia, Latin America, Middle East, 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 page 32.
592 Off-Campus Study (1-15)
See page 32.
593 Independent Study (1-15)
See page 32.
596 Readings and Special Problems in Political Science (1-3)
Prereq: Consent of instructor. May be repeated. Maximum 15 hrs.
600 Doctoral Research and Dissertation (3-15)
Prereq: Consent of instructor. Maximum 9 hrs.
610 Special Topics in Empirical Methodology and Methodology (3)
Advanced methods and procedures of analysis in political science. May be repeated with consent of department. Maximum 9 hrs.
615 Formal Political Analysis (3)
Assumptions, methods and applications of formal 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 normative political theory. Specific content determined by instructor. May be repeated with consent of instructor. Maximum 9 hrs.
639 Special Topics in American Government and Politics (3)
Advanced study of selected topics. May be repeated with consent of instructor. Maximum 9 hrs.
640 Special Topics in U.S. Constitutional Law (3)
Systems of 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.
642 The Politics of Criminal Justice (3)
Selective examination of contemporary problems of research and policy in the criminal justice system. May be repeated with consent of department. Maximum 9 hrs.
646 Contemporary Public Policies (3)
Problems in one or more public policy areas from a political and administrative perspective. Topics selected by instructor. May be repeated with consent of department. Maximum 9 hrs.
652 Special Topics in Public Administration (3)
Analyzing 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 and analysis of policy-making processes. May be repeated with consent of department. Maximum 9 hrs.
688 Special Topics in International Politics (3)
Selected topics in international politics. Specific content determined by instructor. May be repeated with consent of instructor. Maximum 9 hrs.

Polymer Engineering

See Materials Science and Engineering

Psychology

( College of Liberal Arts)

MAJOR DEGREES

Psychology ........................................ M.A., Ph.D.
Warren H. Jones, Head

Professors:
Burkhardt, Gordon M., Ph.D. ................. Chicago
Burstein, Alvin G., Ph.D. ................. Chicago
Calhoun, William H., Ph.D. ............ California
Cohen, Charles P., Ph.D. .............. Kansas
Cureton, Edward E. (Emeritus), Ph.D. ............ Columbia
Fine, Harold J. (Emeritus), Ph.D. ............. Syracuse
Handel, Stephen J., Ph.D. ........... Johns Hopkins
Handler, Leonard, Ph.D. .............. Michigan State
Johnson, Michael G., Ph.D. ............ Johns Hopkins
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
Lubas, Joel F., Ph.D. ................. Chicago
Maione, John C., Ph.D. .............. Duke
Newton, Kenneth R. (Emeritus), Ph.D. .......... Tennessee
Pollio, Howard R. (Distinguished Prof.), Ph.D. .......... Michigan
Samejima, Fumiko, Ph.D. ............... Keio
Saudargas, Richard S., Ph.D., Ph.D. .......... Florida State
Shrader, Raymond R. (Emeritus), Ph.D. .......... Tennessee
Sundstrom, Eric D., Ph.D. ............ Utah
Travis, Cheryl B., Ph.D., Ph.D. .......... California (Davis)
Verplanck, William S. (Emeritus), Ph.D. ....... Brown
Wahler, Robert G. (Liaison), Ph.D., Ph.D. ........ Syracuse

Associate Professors:
McIntyre, Anne, Ph.D. .................... Yale
Morgan, Wesley G., Ph.D. ........... Tennessee
Nash, Michael R., Ph.D. .............. Ohio

Assistant Professors:
Baldwin, Debora R., Ph.D. .......... Kent State
Hopson, Ronald E., Ph.D. .......... Michigan State
**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 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 Department Head.

**Program Requirements**

All students must complete 30 semester hours of graduate level courses in psychology. These hours must include 504-505, or Statistics 537-538 or an equivalent sequence; 420; six semester hours of Thesis 500; and twelve hours of 500- or 600-level foundation courses. Students must earn a grade of B or better in all courses that are to count toward the 30-hour total.

**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 general psychology or clinical psychology. The doctoral program with a concentration in experimental psychology is offered through the Life Sciences Program. Doctoral study in industrial and organizational psychology is offered through the Intercollegiate Program in Industrial and Organizational Psychology, to which application is made through the Department of Management.

**Departmental Requirements**

All students in the doctoral program in psychology must obtain a score of at least 630 on the GRE in psychology by the end of the first year, and all students must pass the departmental general psychology examination (a comprehensive, two-day essay exam offered twice each year) by the end of the second year. In addition, each student must pass the doctoral comprehensive examination, complete an acceptable doctoral dissertation, and conduct a satisfactory oral defense of the dissertation. 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).

**General Psychology**

This program allows students to select from a variety of specializations oriented toward careers in research and teaching in psychology in academic, institutional, or industrial settings.

**The Doctoral Program**

The program is highly flexible and individualized and seeks to provide a professional apprenticeship. Specializations include behavioral medicine and health psychology, child and adolescent development, cognitive and symbolic processes, conditioning and learning, ethology, existential phenomenology, psychometrics, psychophysiology, social psychology, and others. Requirements of the program are as follows:

1. Statistics 537-38, or equivalent, and two additional courses numbered above 500 in research methodology, quantitative methods, statistics, or psychology.
2. Competence in general psychology, demonstrated by completing Psychology 513 (Foundations of Psychology) or Psychology 565 (History and Systems of Psychology) or equivalent, plus at least one course or sequence or equivalent from each of four categories in the following list. (This requirement may be met by passing approved written examinations.)
   a. Biological psychology: 461-69 Physiological Psychology and Laboratory; 526 Neuroanatomy; 527 Behavioral Neurology.
   d. Developmental psychology: 511 Developmental Psychology; 512 Life-Span Development; 574 Child Psychopathology.
   e. Individual differences and personality: 445 Measurement and Testing; 470 Theories of Personality.
3. Research practicum (509) - research apprenticeship involving participation in the ongoing research of two different members of the faculty during the first two semesters in the program.
4. Pre-dissertation research project completed during the second year, involving the collection of original data or original analysis of existing data, reported in publishable form and acceptable to the doctoral supervisory committee.
5. At least 4 graduate seminars in psychology numbered above 600.
6. **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 the scientist-practitioner model of clinical psychology. Requirements are as follows:

1. Apprenticeship with one faculty member during the first year, one day each week.
2. Pre-dissertation research project completed before forming a doctoral supervisory committee, reported in written form acceptable to the student’s faculty advisor and the director of clinical training.
3. Supervised clinical placement two days (16 hours) each week during the second, third, and fourth years.
4. Satisfactory completion of listed courses (or equivalents) in the following nine categories:
   a. Foundations of Psychology (513);
   b. Measurement and Testing (445);
   c. Personality Theory and Research (570-71);
   d. Lifespan Development (512);
   e. Statistics and research methods (504 Empirical Methods in Psychology plus either 505 Research Design or 557 Applied Psychological Measurement);
   f. Psychopathology (572, 573, 574);
   g. Psychological Assessment (594-595, 596);
   h. Psychotherapy (670, 671, 673, 675);
   i. Ethical, Legal, and Professional Issues (635).
5. Satisfactory completion of at least 3 additional graduate-level courses in non-clinical topics in psychology.
6. Satisfactory completion of a one-year clinical internship at a site approved by the program.

**MINOR IN GERONTOLOGY**

Graduate students in the Department of Psychology may pursue a specialized minor in gerontology. This interdepartmental/interdisciplinary minor gives the student an opportunity for combining the knowledge about aging in American society with his/her major concentration. Please refer to Human Ecology for specific requirements.

**GRADUATE COURSES**


409 Group Facilitation (3) Study of theory and technique through supervised experience in small groups. Prereq: 359 and consent of instructor. May be repeated. Maximum 6 hrs.


424 Psychology and the Law (3) Psychological aspects of legal systems. Prereq: 110 or equivalent, upper-division standing and consent of instructor.

430 Health Psychology (3) Survey of psychological factors related to health and illness: stress, personality, and environment. Applications of psychological treatments to physical illness. Prereq: 110 or equivalent, 210.

434 Psychology of Gender (3) Biological, psychological, and social factors in gender. Importance of gender roles and stereotypes for behavior and experience. Prereq: 110 or equivalent, 210, 220. (Same as Women’s Studies 434.)

440 Organizational Psychology (3) Social-psychological analysis of organizations, role-theory and systems theory. Prereq: 360.


450 Comparative Animal Behavior (3) (Same as Zoology 450.)

459 Comparative Animal Behavior Laboratory (3) Coreq: 450. (Same as Zoology 459.)

461 Physiological Psychology (3) Nervous system and physiological correlates of behavior. Biological basis of emotion, learning, memory and stress. Prereq: 110 or equivalent, 210, and 1 yr of biology or zoology introductory courses or equivalents.
469 Laboratory in Physiological Psychology: (3) Laboratory studies of nervous system and physiological correlates of behavior. Coreq: 461.

470 Theories of Personality: (3) Survey of major theories of human personality and their development. Prereq: 220 and 300 or 330.

480 Theories of Learning: (3) Classical and current approaches to learning and cognition. Prereq: 310.

513 Foundations of Psychology: Biological Factors, perception, relaxation, thinking, motivation (4) Intensive analysis of theories of human personality and their development. Prereq: Consent of instructor.

512 Life-Span Development (3) Theories and research on life-span development from conception through infancy, childhood, and adolescence. Coreq: 511 and consent of instructor. May be repeated. Maximum 6 hrs.

511 Developmental Psychology: (3) Normal processes of human socialization; physical, cognitive, and emotional development through infancy, childhood, and adolescence. Coreq: Consent of instructor. May be repeated. Maximum 6 hrs.

508 Readings and Special Issues in Psychology (1-3) Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

509 Research Practicum (1-3) Required of first-year graduate students in psychology. May be repeated. Maximum 9 hrs. S/NC only.

510 Topics in Psychology: (3) Intensive examination of selected issues in psychology. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

517 Proseminar in Industrial and Organizational Psychology: (3) (Same as Management 567-68.) "Theories and research on life-span development from conception through infancy, childhood, and adolescence. Coreq: 511 and consent of instructor. May be repeated. Maximum 6 hrs.

516 Colloquium in Ethology: (1) Current research and professional practices concerning normal human development through life, adulthood and old age. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

515 Life-Span Development: (3) Theories and research concerning normal human development throughout life, adulthood and old age. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

514 Seminar in Psychology: Biological Factors, Perception, Learning, Thinking, Motivation (4) Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. S/NC only.

507 Personality: Theory and Research I: (3) Advanced survey of psychodynamic and neo-Freudian approaches to personality; related research. Prereq: Admission to clinical program or consent of instructor. F

506 Psychology of Learning (3) Review of current evidence from research involving human and nonhuman animals. Prereq: 400 and consent of instructor. May be repeated. Maximum 6 hrs.

505 Personality: Theory and Research II: (3) Advanced survey of behavioral and humanistic approaches to personality; related research. Prereq: Admission to clinical program or consent of instructor. May be repeated. Maximum 6 hrs.

504 Biological Psychology: (3) Biological basis of behavior and experience. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

503 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.

502 Theories of Learning: (3) Classical and current approaches to learning and cognition. Prereq: 310.

501 Introduction to Psychology: (3) Survey of psychology and related fields. Coreq: 461. F

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

591 Independent Study (1-15) See page 32.

594 Psychological Assessment I: (3) Basic concepts and techniques of adult assessment: intelligence tests and personality tests. Prereq: Admission to doctoral program in clinical psychology or consent of instructor.

593 Psychological Assessment II: (3) Basic concepts and techniques of adult assessment: intelligence tests and personality tests. Prereq: Admission to doctoral program in clinical psychology or consent of instructor.

592 Laboratory in Psychological Assessment: (1) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. Coreq: 394 or 595. May be repeated. Maximum 4 hrs. S/NC only.

591 Evaluation of Development in Childhood: (3) Structured and projective tests and interview techniques for evaluation of intellectual, personality, and social development in childhood. Prereq: 511 and admission to doctoral program in clinical psychology or consent of instructor. May be repeated. Maximum 12 hrs.

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

601 Seminar in Psychology: (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

605 Seminar in Research and Quantitative Methods (3) Prereq: 505. Statistics 537-538 or equivalent, or consent of instructor. May be repeated. Maximum 12 hrs.

610 Seminar in Applied Psychology: (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

611 Seminar in Developmental Psychology: (3) Prereq: 511 and consent of instructor. May be repeated. Maximum 12 hrs.

612 Seminar in Existential-Phenomenological Psychology: (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

620 Seminar in Social and Organizational Psychology: (3) Prereq: 440 or 580 and consent of instructor. May be repeated. Maximum 12 hrs.

622 Seminar in Comparative and Ethological Psychology: (3) Prereq: 546 or consent of instructor. May be repeated. Maximum 12 hrs.

623 Seminar in Methods of Naturalistic Research (3) Prereq: 548 or consent of instructor. May be repeated. Maximum 12 hrs.

624 Seminar in Psychometrics: (3) Prereq: 555 or consent of instructor. May be repeated. Maximum 9 hrs.

625 Seminar in Organizational Psychology: (3) (Same as Management 625.)

626 Seminar in Industrial Psychology: (3) (Same as Management 626.)

627 Seminar in Applied Industrial Psychology: (3) (Same as Management 627.)

631 Ethical, Legal, and Professional Issues in Psychology: (3) (Same as Educational and Counseling Psychology 631.)

632 Current Issues in Industrial/Organizational Psychology: (3) (Same as Management 632.)

661 Advanced Psychometrics: (3) Construction and standardization of psychological tests: questionnaires, rating scales; theory of errors of measurement; item analysis, scaling, equating, and development of norms; latent trait models; factor analysis; and other topics. Prereq: 555 or consent of instructor. May be repeated. Maximum 9 hrs.

668 Seminar in Psychopathology: (3) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. May be repeated. Maximum 12 hrs.

670 Psychodynamic Psychotherapy: (3) Theories and principles. Prereq: Admission to doctoral program in clinical psychology or consent of instructor. F

671 Psychodynamic Psychotherapy: (3) Theories and principles. Prereq: Admission to doctoral program in clinical psychology and 670 or consent of instructor. F
675 Field Placement in Clinical Psychology (3) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. May be repeated. Maximum 12 hrs.

680 Seminar in Psychotherapy (3) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. May be repeated. Maximum 12 hrs.

681 Seminar in Assessment (3) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. May be repeated. Maximum 12 hrs.

683 Seminar in Behavioral Medicine (3) Current research and theory concerning relationships between behavior and health. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

684 Neuropsychology (3) Investigation of brain-behavior relationships in adults and children. Introduction to administration of REITAN neuropsychological screening battery. Luna battery, and other tests of brain dysfunction. Prereq: Consent of instructor.

685 Psychopharmacology (3) Connections between pharmacology and psychology. Prereq: Consent of instructor.

690 Field Work in Industrial and Organizational Psychology (1-12) (Same as Management 690).

695 Field Placement in Clinical Psychology (3) Prereq: Admission to doctoral program in clinical psychology and consent of instructor. May be repeated. Maximum 24 hrs. S/N only. E

696 Advanced Psychology Clinic Placement (1-3) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. May be repeated. Maximum 24 hrs. S/N only. E

GRADUATE COURSES

411 Modern Religious Philosophies (3) Religious implications of major Western thinkers and movements from Nicolas of Cusa to nineteenth-century German Idealists. (Same as Philosophy 411.)

412 Classical Indian Systems of Philosophy: The Mahayana Tradition (3) Investigation of selected writings and philosophic problems of traditions of Samkhya, Yoga, Vedanta, Buddhism, or Jainism. Prereq: 374 or 376 or consent of instructor. (Same as Philosophy 412.)

416 Jesus and Paul Compared (3) Central ideas and concepts of each person considered with equivalent concepts in the other. Advanced study of Gospels and Epistles of Paul, involving extensive independent research.

423 Seminar in Western Religions (3) Selected figures, themes, movements, and problems. Content varies. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

430 Seminar in American Religion (3) Selected figures, themes, movements, and problems. Content varies. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

435 Seminar in Asian Religion (3) Selected figures, themes, movements, and problems. Content varies. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

440 Seminar in Comparative Religion (3) Selected figures, themes, movements, and problems. Content varies. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

446 Theoretical Issues in Medical Ethics (3) (Same as Philosophy 446.)

490 Readings and Research in Religious Studies (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

498 Proseminar in Religious Studies (3) For advanced students in religious studies; required for majors. Selected specific topics: nature and function of myth in religion, problem of evil, transcendence, theories of religion, hermeneutics, integrating various disciplines involved in study of religion. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

531 Topics in Religion and Society (3) Prereq: Consent of instructor.

532 Topics in the History of Religions (3) Prereq: Consent of instructor.

533 Topics in Religious Thought (3) Prereq: Consent of instructor.

566 Topics in U.S. Religious History (3) Research in methods and sources for investigating United States religious history. Prereq: 351, 353, 355, 430, or consent of instructor. May be repeated. Maximum 6 hrs.

591 Foreign Study (1-15) See page 32.

592 Off-Campus Study (1-15) See page 32.

593 Independent Study (1-15) See page 32.

Romance and Asian Languages

(College of Liberal Arts)

MAJORS DEGREES

French .............. M.A.
Spanish .............. M.A.
Modern Foreign Languages .............. Ph.D.

John B. Romeiser, Head

Professors:
Barrett, Paul E., Ph.D. .... California
Brady, Patrick, D.U.P. .... Sorbonne
Cobb, Carl W., Ph.D. .... Tulane

Elliott, Jacqueline C. (Emeritus), M.A. .... Illinois
Handelsman, Michael H., Ph.D. .... Florida
Helfin, William H., Ph.D. .... Florida State
Irving, Thomas B. (Emeritus), Ph.D. .... Princeton
Maurino, Ferdinando D. (Emeritus), Ph.D. .... Columbia
Petrovska, Marija (Emeritus), Ph.D. .... Kentucky
Pinsky, Clara (Emeritus), Ph.D. .... California
Rivera-Rodas, Oscar (Liaison), Ph.D. .... California
Romeiser, John B. (Liaison), Ph.D. .... Vanderbilt
Vazquez-Bigio, A. M. (Emeritus), Ph.D. .... Minnesota
Wallace, Albert H. (Emeritus), Ph.D. .... North Carolina
Washburn, Yulan M., Ph.D. .... North Carolina

Associate Professors:
Campion, Edmund J., Ph.D. .... Yale
D'Entrechamps, Robert M., Ph.D. .... Illinois
Dillmann, Salvatore, Ph.D. .... Wisconsin
D'Pucchio, Denise M., Ph.D. .... Kansas
Dunbar, Cynthia K., Ph.D. .... Illinois
Levy, Karen D. (Liaison), Ph.D. .... Kentucky

Assistant Professors:
Beaumont, Margaret, Ph.D. .... Texas
Brixi, Flavia, Ph.D. .... Washington
Cazenave, Odile, Ph.D. .... Penn State
Cree, Bryant, Ph.D. .... California
Da Cruz, Jose, Ph.D. .... California
Ehrlich, Linda, Ph.D. .... Hawaii
Holmlund, Christine, Ph.D. .... Wisconsin
LaCure, Jon, Ph.D. .... Indiana
Nakuna, Corinado, Ph.D. .... Sorbonne
Young, Dolly, Ph.D. .... Texas

The Department of Romance and Asian Languages offers two advanced degrees: the Master of Arts in French and in Spanish and the Doctor of Philosophy in Modern Foreign Languages.

Inquiries should be addressed to the head of the department. The head, through the coordinators of Spanish and French, will make available further departmental requirements, regulations, and materials not listed below.

THE MASTER'S PROGRAM

Thesis Option

1. Completion of a minimum of 24 semester hours in coursework plus at least 6 hours in course 500 Thesis. In French, 501 is required; in Spanish, 550. A maximum of 6 hours may be taken at the 400 level, the rest at the 500 level, and under certain conditions the student may take 600-level seminars. If the student chooses to have a minor (such as Italian or Portuguese), at least 24 hours (including 5 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.

A written examination covering the coursework and selected items from a master reading list.

A final oral examination covering the thesis.

Non-Thesis Option

1. Completion of at least 30 semester hours, with a maximum of 9 at the 400 level, the rest at the 500 level, including 501 (French) or 550 (Spanish). Under certain conditions, the student may take 600-level seminars. If the student chooses to have a minor (such as Italian or
Portuguese), at least 24 hours must be taken in the major, 6 in the minor.

2. Three term papers that have been accepted by the student's advisory committee.

3. A written examination covering the coursework and selected items from a master reading list.

4. A final oral examination to discuss the papers (French M.A. only).

THE DOCTORAL PROGRAM

The Ph.D. in Modern Foreign Languages is offered jointly by the Department of Germanic and Slavic Languages and the Department of Romance Languages and requires advanced training in at least two foreign languages.

Admission Requirements

Applicants must have completed a B.A. in either French, German or Spanish to be accepted into this program. Both graduates of institutions in the United States and those with undergraduate degrees from institutions outside the United States must have a grade point average of at least 3.0. Consideration will also be given to applicants who do not have an undergraduate degree in one of the three foreign languages but do have the equivalent of an undergraduate major in one of them.

Requirements for the Ph.D.

Candidates must complete a minimum of 63 semester hours of coursework beyond the Bachelor's degree in addition to 24 hours of doctoral research and dissertation. Two tracks are available.

The coursework for Track I must be distributed as follows: (1) at least 39 hours in the first concentration; (2) at least 18 hours in the second concentration; and (3) at least 6 hours in a cognate field.

1. First Concentration: French, German, or Spanish. It consists of a minimum of 39 semester hours beyond the Bachelor's degree, distributed as follows:
   - A maximum of 6 hours of 400-level classes taken for the M.A. may be applied.
   - A minimum of 21 hours at the 500 level (exclusive of dissertation hours) including French 584(3), German 560 (3), or Spanish 580 (3); German 512 (3), French 512 (3), or Spanish 512 (3); French 515-16 (2.2) or German 520 (3).
   - At least 12 hours at the 600 level (exclusive of dissertation hours).

2. Second Concentration: French, German, Italian, Portuguese, Russian, or Spanish (different from the first concentration). It consists of at least 18 hours of courses beyond the Bachelor's degree, at least 12 of which must be at the 500 or 600 level.

3. Cognate Field: Six hours must be in graduate courses numbered 400 and above and in a field outside the candidate's first concentration but related to the student's principal area of research. If the cognate field is yet a third foreign language, a reading proficiency exam will be administered after completion of the 6 cognate hours by the language section concerned.

4. Additional requirements for both tracks: A student must demonstrate competence in the languages of both the first and second concentrations by taking a test in each language. The test will include reading, writing, listening, and speaking, and should be completed by the time the student reaches 40 hours of study beyond the bachelor's degree.

Standardized examinations that may be used for this purpose include applicable portions of the National Teachers Examination, the MLA Examination for Teachers and Advanced Students, or the proficiency standards of the United States Foreign Service Institute (FSI). If the student has not chosen a third language as his or her cognate area, basic competence (determined by a reading examination with translation into English administered by the department concerned) in a third language is required. If the student's first and second languages are Romance languages, the third language should be chosen from another language family.

A comprehensive examination on the language and literature of the first and second concentrations must be passed before the student may be admitted to candidacy. The candidate is required to defend his/her dissertation in an oral examination. Central emphasis is put on the dissertation as the final test of the candidate's scholarly qualifications.

Graduate Teaching Assistants in the program should have the opportunity and will be strongly encouraged to instruct at least two foreign languages, subject to staffing needs.

Doctoral students are strongly encouraged to reside and study abroad and will be assisted in identifying potential sources of financial support (e.g., Fulbright, McClure, Rotary fellowships).

For additional courses, see Germanic and Slavic Languages.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The Ph.D. program in Modern Foreign Languages is available to residents of the state of Alabama or Kentucky. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

Asian Languages

431 Readings in Chinese Literature (3) Prereq: Mastery of intermediate-level Chinese or consent of instructor. May be repeated. Maximum 9 hrs.

471 Selected Topics in Asian Studies (3) Content varies. May be repeated. Maximum 9 hrs.

French

GRADUATE COURSES


411 French Literature of the 16th Century (3) Highlights of 16th-century French literature. Excerpts from Rabelais and Montaigne: readings of poems from writers from Lyon and members of Pèlerinade. Prereq: 212, 218 or equivalent.


413 French Literature of the 18th Century (3) Major works of Enlightenment. Prereq: 212, 218 or equivalent.


416 Survey of Francophone Literature (3) Examination of Francophone literature outside metropolitan France, particularly Africa and Caribbean. Prereq: 212, 218 or equivalent.

420 French Cinema (3) French cinema from earliest days through New Wave directors. Prereq: 212, 218 or equivalent. May apply toward major.


422 Advanced Grammar (3) Improving one's written French by studying basic and more refined structures of French language. Writing creative free-style compositions. Prereq: 342 or 345.

423-44 Advanced Conversation (1,1) Informal conversation with native speakers on contemporary topics. Stresses in-class contact rather than outside preparation. Prereq: 342 or 345. 2 hrs weekly.

425 Introduction to Descriptive Linguistics (3) Phonetics and phonemics, morphology and syntax. Types of languages, linguistic groups, dialects, and dialect geography. Application of descriptive linguistics—field linguistics, dialect study; its practical use in learning languages and in language teaching. Introduction to transformational generative grammar. Prereq: 3hrs of upper-division English or 6 hrs of upper-division courses in a modern or ancient language (exclusive of German and French 301-32, courses in literature in translation, and general courses in Latin and Greek requiring no knowledge of these languages), or consent of department. (Same as Ger-
French

581-82 The French Novel (3,3) French Novel from 17th through 20th centuries.

583 Problems in Stylistics (3) Survey of comparative English-French stylistics. Development and improvement of one's own written French.

584 Literary Criticism: the Foundations of Romance Criticism (3) Survey of critical ideas utilized over centuries and applied to various types of literature.

591 Foreign Study (1-15) See page 32.

592 Off-Campus Study (1-15) See page 32.

593 Independent Study (1-15) See page 32. Letter grade of S/NC.

594-95 French Directed Readings (3,3)

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

621-22 Seminar in French Literature (3,3,3) 621- Middle Ages; 622-16th Century; 623-17th Century. May be repeated with consent of department. Maximum 6 hrs each.

631-32 Seminar in French Literature (3,3,3) 631-18th Century; 632-19th Century; 633-20th Century. May be repeated with consent of department. Maximum 6 hrs each.

Italian

401 Dante and Medieval Culture (3) Introduction to significance of this great Italian writer. Prereq: 212 or consent of instructor.

402 Petrarch and Boccaccio (3) Prereq: 212 or consent of instructor.

403-04 Literature of the Rinascimento (3,3) From 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)

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.)

510-11 Readings in Italian Literature (3,3) Topics vary. May be repeated with consent of department.

512-13 Special Topics (3,3) Topics vary. May be repeated with consent of department.

591 Foreign Study (1-15) See page 32.

592 Off-Campus Study (1-15) See page 32.

593 Independent Study (1-15) See page 32.

Portuguese

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 page 32.

592 Off-Campus Study (1-15) See page 32.

593 Independent Study (1-15) See page 32.

Spanish

421 Phonetics (3) Prereq: 212, or 218 or equivalent.

422 Advanced Grammar (3) Finer points of grammatical structures. Required of all majors. Native speakers must receive consent of instructor. Prereq: 212, 218 or equivalent.

423-24 Advanced Conversation and Composition (3,3) Advanced conversational and written skills in Spanish for pre-professionals.

425 Introduction to Descriptive Linguistics (3) (Same as French 425, German 425, Russian 425, and Linguistics 425.)

429 Romance Linguistics (3) (Same as French 429 and Linguistics 429.)

431 Spanish Civilization (3) Major social, political, and cultural achievements of Spanish people from origins of their civilization until today. Prereq: 311, 312 or equivalent.


450 Hispanic Drama (3) Close reading and analysis of representative works by selected dramatists of Spain and Spanish America. Topics vary. Prereq: Aspects of Spanish and Spanish American Literature or equivalent. May be repeated with consent of department. Maximum 6 hrs.

451 Hispanic Prose (3) Close reading of selected works of prose fiction and essays by major writers from Spain and Spanish America. Topics vary. Prereq: Aspects of Spanish and Spanish American Literature or equivalent. May be repeated with consent of department. Maximum 6 hrs.

452 Hispanic Poetry (3) Major poets of each period, either Spanish or Spanish American. Topics vary. Prereq: Aspects of Spanish and Spanish American Literature or equivalent. May be repeated with consent of department. Maximum 6 hrs.

459 Capstone Colloquium in Spanish (3) Integrative experience. Broad range of topics and topics that affect much of Spanish-speaking world and also involve those who specialize in Hispanic studies. Prereq: 311, 312 or equivalent.

461 Special Topics (3) Aspect of Hispanic literature, culture, linguistics, or foreign language pedagogy. Topics vary. May be repeated with consent of department. Maximum 6 hrs.

471 Latin American Civilization (3) Latin America's diverse heritage and major social and political institutions. Prereq: 311, 312 or equivalent.

473-74 Survey of Spanish American Literature (3,3) 473—Historical survey from Conquest to late 19th century. 474—Major literary movements, writers and works of 20th century. Prereq: 311, 312 or equivalent.

475 Social Protest Literature of Latin American (3) Analysis of literature as means of unmasking social ills that have traditionally beset Latin America. Indigenismo, Black literature, women writers, role of writer in Latin American society. Prereq: 311, 312 or equivalent.

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

502 Registration for Use of Facilities (3-15) Required of all majors. Native speakers must receive consent of instructor. May be repeated with consent of department. Maximum 15 hrs.

503-404 Language Study in Spanish (3,3) 503—Advanced conversational and written skills in the descriptive or regional variety of Spanish. Topics vary. May be repeated with consent of instructor. Maximum 15 hrs.
THE MASTER'S PROGRAM

The Master of Science in Social Work program prepares social workers to provide professional leadership in 1) the direct provision of social work services and 2) social welfare administration and planning. These objectives are met through a curriculum requiring of all students a professional foundation and a concentration in either social work treatment or social welfare administration and planning.

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 liberal arts subjects. Those with other academic backgrounds should request consultation regarding ways in which they might be admitted.

2. A grade-point average of 2.5 on a 4.0 scale, with preference given to applicants with 3.0 and above.

3. Personal qualifications acceptable for entrance into the professional practice of social work.

Preference is given to applicants with a B average in undergraduate work and substantial preparation in the social sciences. Applications should be filed no later than March 1 for the year in which admission is desired.

Advanced Standing

The University of Tennessee College of Social Work has an advanced standing program. Admission to advanced standing requires:

1. A B.S.W. from an accredited program.
2. An overall undergraduate GPA of 3.0 or greater.
3. Personal qualifications acceptable for entrance into the professional practice of social work.

Students admitted into advanced standing are required to complete a minimum of 42 hours of study in either of the college's concentrations - social work treatment or social welfare administration and planning. These students will follow the curriculum plan and meet all requirements of the concentration during three semesters of study in the program.

Specific information about the advanced standing program is available from the college. Application for admission to the advanced standing program is through the regular admission process.

Extended Study

Planned part-time programs are available in all three branches of the college. Admission requirements are the same as for full-time study. Coursework may be completed over a three- or four-year period. One year of the student's period of study must be on a full-time basis.

Financial Aid

Students may apply directly to the University's Financial Aid Office for assistance such as the National Direct Student Loan or the Work-Study Program. Other stipends are administered by the College and awarded on the basis of financial need. Applications for these funds must be made to the Branch of the College the student will attend. A student must first apply for University assistance, since College funds are considered a supplement to those of the University. Additional information about College stipends may be obtained from the College of Social Work.

General Requirements

1. A minimum of 57 semester credit hours including a) completion of foundation courses and field practice (15 hours), b) the course Social Work with Oppressed Populations (3 hours), and c) at least six courses (18 hours) and three semesters of field practice (15 hours) in the social work treatment concentration or at least four courses (12 hours) and three semesters of field practice (16 hours) in the social welfare administration and planning concentration.

2. Students may select a thesis or non-thesis option. Those students pursuing the thesis option receive 6 credit hours for successful completion of a thesis.

3. Successful completion of a comprehensive exam or thesis defense.

4. An overall GPA of 3.0 or better on all graded courses and satisfactory performance in field.

The Professional Foundation Curriculum

The foundation curriculum is a 15-semester hour sequence of five basic areas required of all students before entering either of the concentration programs. As the initial phase of the educational program, the foundation curriculum contributes to the process of professional identification while presenting a comprehensive and broad knowledge base from which to operate in the future as practitioners, supervisors, administrators, and planners.

Upon completion of the foundation curriculum (at the beginning of the second semester), students select a concentration in either social work treatment or social welfare administration and planning.

Social Work Treatment: The social work treatment concentration provides the educational basis for practical work with individuals, families, and groups in order to enhance their social functioning, ameliorate problems, and prevent social dysfunction. The concentration provides knowledge of theory and methodology basic to individual, family, and group methods applicable in the treatment of diverse client problems.

Social Welfare Administration and Planning: The administration and planning concentration provides the educational basis for leadership in the design, implementation, and continued delivery of effective human service programs at local, regional, and state levels. This concentration emphasizes theory and skills related to administration and planning, and permits considerable flexibility in tailoring a program to fit the student's individual interests, capabilities, and career goals.

Field Practice

Field instruction is a critical component of the student's first- and second-year programs. Through cooperation with a wide range of social agencies and human service programs throughout Tennessee, the college is able to provide field placements in a variety of social work practice areas. The faculty works closely with the placement agencies and the field instructors to ensure that students have quality field practice experiences, meeting the objectives of the core curriculum and the concentration.

The college uses a concurrent class and field plan. Students are in field two days per week during the first year and three days per week in the second year. First-year agency placements are selected to provide practice experiences related to the foundation curriculum content and beginning concentration. 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 placement coordinator and the educational committee in selection of the second-year placement.

The second-year field placement experience focuses on the integration of social work knowledge and values, and emphasizes the acquisition and development of practice skills.

Students are responsible for meeting the requirements of their placement agencies in terms of office hours and workload coverage. This responsibility takes precedence over scheduled University breaks and may result in variations in holidays and office hours for the student.

Transfer Credits

Coursework equivalent to the first year of the Master's program, completed in another accredited graduate social work program, is usually accepted toward degree requirements. Applicants must meet the admission requirements of The Graduate School and the College of Social Work. Transfer courses must be approved as equivalent to required and/or elective courses taken for graduate credit and passed with a grade of B or better. An S (earned on a S/N system) for the field practicum is also accepted. In addition, transfer courses must be part of an otherwise satisfactory graduate program (B average) and be approved by the dean. This coursework must be completed within the six-year period prior to the receipt of the degree.

A maximum of 6 semester credits from work earned in disciplines other than social work may be transferred as elective credits. The student's academic committee must approve the request and the transfer credit must meet Graduate School requirements.

Proficiency Examination

Students in the Master's program may earn a maximum of nine hours by proficiency examination, with the exception of field practice courses. Students interested in proficiency examinations are referred to The Graduate School statement describing the procedure for applying for examination.

DUAL M.S.S.W./M.P.A. PROGRAM

The Department of Political Science and the College of Social Work offer a dual degree program leading to the conferral of both the Master of Science in Social Work and the Master of Public Administration degrees. In this program, the M.P.A., and M.S.S.W. degrees can be earned on a full-time basis in five consecutive terms rather than seven to eight terms.

Admission

Applicants for the M.S.S.W./M.P.A. program must be admitted to the College of Social Work and to the Department of Political Science. In addition, applications from dual degree students must be reviewed and approved by the dual
the entire fourth year at the Divinity School completing requirements for the M.Div. degree.

Tuition and Financial Aid
Students pay to each institution the tuition charges and fees appropriate to their registration. Financial aid, if awarded, will be handled separately by each school and will apply only to credit being earned at the school providing the aid.

THE DOCTORAL PROGRAM
The College of Social Work offers the Doctor of Philosophy with a major in Social Work. The focus of social work education at the doctoral level is to foster the development of an attitude of scientific inquiry, knowledge of the scientific method, ability to extend the knowledge base of social work practice, and effective participation in leadership roles in social work education, research, and practice.

The emphasis of the doctoral program is upon:
- The analysis of direct intervention and social administration and of the relationships among each of them and their social policy, organizational, and community contexts.
- Research-based knowledge to inform and guide social work practice, social policy, and social welfare program development.

The program consists of foundation courses, elective courses, and dissertation research. The courses are available only in Knoxville. Students and their committees can develop a plan for completing their research in Nashville and Memphis based on the availability of dissertation resources.

Admission Requirements
The Ph.D. program is designed for students who have completed a Master's degree in an accredited school of social work and have post-Master's social work/social welfare experience. Applicants who do not meet these requirements, but believe they have equivalent credentials should contact the Chair of Ph.D. program for further information regarding admissions criteria.

General Requirements
1. A minimum of 60 semester hours beyond the Master's degree including a) completion of 21 credits of required coursework, b) completion of 15 credits of advanced electives, at least 12 of which are taken outside the department, and c) completion of at least 24 credits of dissertation research.
2. Successful completion of qualifying and comprehensive examinations.
3. Completion and defense of the dissertation.

Curriculum
The curriculum of the Ph.D. program consists of foundation course work, electives, and dissertation research. The foundation curriculum consists of 21 hours of coursework in the history and philosophy of social work, issues in direct service and administration and planning, areas of practice, and research methodology and statistics. Upon this foundation, students and their academic committees develop a plan of study consisting of coursework in Social Work and other departments of the University. Typically, the foundation curriculum is completed and elective coursework begun during the first year of study, the elective requirement is completed and dissertation research begun in the second year of study, and dissertation research is conducted 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 part-time basis.

Specific courses required are 601, 602, 612, 613, 640, and Statistics 531 and 532 or any two graduate level statistics courses approved by the Doctoral Program Chair.

Examinations
All doctoral students are required to pass a qualifying examination and a comprehensive examination. The qualifying examination covers the foundation curriculum. The comprehensive examination is administered by members of the doctoral committee and is designed for the student to demonstrate comprehensive knowledge of the major and cognate areas and the dissertation topic. In case of failure of either examination, the student may request a retake. The result of the second examination is final.

Financial Aid
Financial aid is available to qualified students in the form of fellowships, scholarships, and teaching and research assistantships. Graduate assistantships and other forms of assistance are awarded on the basis of merit and interest to applicants who are accepted into the Ph.D. program.

MINOR IN GERONTOLOGY
Graduate students in the College of Social Work may pursue a specialized minor in gerontology. This interdepartmental/interdisciplinary minor gives the student an opportunity to combine the knowledge about aging in American society with his/her major concentration. Please refer to Human Ecology for specific requirements.

ACADEMIC COMMON MARKET
An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S.S.W. and Ph.D. programs in Social Work are available to residents of the state of Arkansas; the Ph.D. to residents of Kentucky or West Virginia. Additional information may be obtained from the Graduate Assistant in the Office of Graduate Admissions and Records.

GRADUATE COURSES
NOTE: Graduate students majoring in fields other than social work are admitted to certain social work courses with the approval of the College of Social Work and the student's major professor.

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

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

508 Practicum in Social Work Research (3-6) Supervised practice in application of research methods to social work. Prereq: 510 and consent of faculty conducting investigation. May be repeated. Maximum 6 hrs. S/NC only. E
509 Graduate Seminar in Public Health (1) Same as Public Health 509, Nutrition 509, Physical Education 509 and Nursing 520.

510 Social Work Research (3) Research methodology applied to problems in social welfare. Problem formulation; research design; ethics; instrument construction; data collection, analysis, and reporting; statistical procedures; research reporting; and evaluation and utilization of research. Prereq: Admission to college or consent of instructor. F

512 Social Work Practice (3) Basic theory, values, and methodology generic to social work practice at various system levels from ecological perspective. Prereq: Admission to college or consent of instructor. F

514 Human Behavior and Social Environment (3) Theories pertaining to individual, family, small group, and community in context of functions, structure, roles, and processes. Systems conceptualized along functional, structural, and social variables. Implications of culture, race, ethnicity, and gender. Prereq: Admission to college or consent of instructor. F

516 Social Welfare Policy and Services (3) Development of contemporary social policy at local, state, national, and international levels. Emphasis on problems of working with individuals and groups in American society whose oppression is based upon distinguishing characteristics: age, sex, economic status, race, sexual preference, handicap- ping conditions, ethnicity and race. Prereq: Admission to college or consent of instructor. Sp

520 Social Work Treatment with Individuals and Families (3) Nature and process of practice with individuals and families in helping them resolve or cope with problems of living. Working with disadvantaged clients and enhancing client competence. Prereq: Foundation or consent of instructor. Sp

522 Social Work Treatment with Groups (3) Theories and practice of social work with small groups, treatment groups, task groups. Prereq: Foundation or consent of instructor.

524 Psychopathology and Social Deviance (3) Theories of and recent research in etiology of psychic dys- function and social deviance from a categorical approach to psychopathology. Prereq: Foundation or consent of instructor.

526 Research for Assessment of Social Work Treatment (3) Application of research methods for assessment of social work treatment. Prereq: Foundation, 520 or 522, or consent of instructor. F, Sp

530 Seminar in Social Work Treatment (2-3) Topics in theory and practice of social work treatment with individuals, couples, families, and groups. Prereq: Foundation, 520, or consent of instructor. Required for group treatment: 522. May be repeated. Maximum 6 hrs.

531 Family Therapy in Social Work Practice (3) Major family therapy models, perspectives on family dynamics and interaction, and techniques of treatment and their application to social welfare service delivery settings. Prereq: Foundation, 520, or consent of instructor.

532 Short-Term Treatment (3) Theory and practice of planned short-term treatment, emergency treatment, and crisis intervention. Prereq: Foundation and 520, or consent of instructor.

533 Social Work Treatment with Couples (3) Theories regarding contemporary marriage styles, problem areas in relationships, and application of treatment methods and skills for problem resolution. Prereq: Foundation and 520, or consent of instructor.

534 Social Work Treatment with Children and Adolescents (3) Examination of various treatment modalities for assessing and treating children and adolescents. Prereq: 520 and 522, or consent of instructor.

540 Administration of Social Welfare Programs and Services (3) Analysis of organizations and provision of services to clients. Models of social welfare administration, their historical and philosophical perspectives, with an emphasis on the design of public policies and programs, and the management of service delivery systems. Prereq: Foundation or consent of instructor.

542 Financial Management and Resource Development in Social Work Administration (3) Administration decision-making related to financial planning and resource allocation in human service organizations. Prereq: 540 or 543, or consent of instructor.

544 Management Information Systems and Evaluation Research (3) Management information systems design and implementation; evaluative research design and methodology; and utilization for organizational decision-making and policy setting. Prereq: Foundation or consent of instructor.

546 Human Resources Development in Social Welfare Administration (3) Administrative and leadership roles needed for development of human resources within context of organization and its environment. Prereq: Foundation or consent of instructor.

550 Seminar in Social Welfare Administration and Planning (2-3) Areas and issues relating to methods and techniques of social welfare administration and planning. Prereq: Foundation or consent of instructor. May be repeated. Maximum 6 hrs.

551 Seminar in Social Welfare (2-3) Social welfare policy area or field of interest. Prereq: Foundation or consent of instructor. May be repeated. Maximum 6 hrs.

552 Community Organization (3) Locality development, social planning and social action as practice models for development of resources to meet human needs. Prereq: Foundation or consent of instructor.

553 Social Planning (3) Theory, philosophy, implications for programs for planning social change in diverse fields of service. Prereq: Foundation or consent of instructor.

554 Social Policy Analysis (3) Techniques for assessing social, political, and economic implications of social policy proposals. Prereq: Foundation or consent of instructor.

556 Seminar in Human Behavior and Social Environment (2-3) Areas of current importance in understanding human behavior and social environment. Specific topics, research, and issues. Prereq: Foundation or consent of instructor. Maximum 6 hrs.

561 Supervision and Consultation in Social Work (3) Roles, techniques, and practices of social work supervision and consultation. Prereq: Foundation or consent of instructor.

562 Social Work and Black Families (3) Historical and contemporary theories about black family systems. Development of frameworks to assess and plan for black families within service delivery systems. Prereq: Foundation or consent of instructor.

563 Social Aspects of Illness (3) Social, economic, and emotional problems related to illness and subsequent social responsibility. Prereq: Foundation or consent of instructor.

564 Substance Abuse (3) Survey and analysis of social, cultural, medical and psychological factors underlying maladaptive drug abuse. Prereq: Research and treatment innovations. Prereq: Foundation or consent of instructor.

565 Roles and Status of Women (3) Causes and consequences of women's social and economic roles and statuses in American society. Prereq: Foundation or consent of instructor.

566 Social Gerontology (3) Physical, psychological and social aspects of aging. Major social policies and programs. Prereq: Foundation or consent of instructor.
Black, James A., Ph.D. ................. Iowa
Cleland, Donald C., Ph.D. .......... Michigan State
Hastings, Donald W., Ph.D. .......... Massachusetts
Hood, Thomas C., Ph.D. .......... Duke
Ploch, Donald R., Ph.D. ......... North Carolina
Shofer, Neal, Ph.D. .......... Illinois
Wallace, Samuel E., Ph.D. ............ Minnesota

Associate Professors:
Benson, Michael L., Ph.D. .......... Illinois
Cable, Sherry, Ph.D. .......... Penn State
Gaventa, John P., Ph.D. .......... Oxford
Kurth, Suzanne B., Ph.D. .......... Illinois (Chicago)
Perrin, Robert G. (Liaison), Ph.D. British Columbia

Assistant Professor:
Jalata, Asafa, Ph.D. .......... SUNY (Binghamton)

The Sociology Department offers graduate study leading to the Master of Arts and the Doctor of Philosophy. The M.A. program includes a thesis and non-thesis option. The graduate program has concentrations in criminology, energy, environment, and resource policy; and political economy. The criminology concentration includes 505, 551, 653, and 655. The energy, environment and resource policy concentration includes 560, 563, 661, 662, 663, and 665. The political economy concentration includes 504, 540, 541, 643, 644, and 645. Both the Master’s and the doctoral program allow for the construction of individualized programs of study. Detailed information may be obtained from the Director of Graduate Studies in Sociology. All incoming students will be advised on their special areas of study.

ADMISSION REQUIREMENTS
1. Acceptable scores on the general Graduate Record Examination (GRE scores in sociology are requested but not required).
2. Three letters of recommendation (forms may be obtained from the department).
3. Completion of the appropriate previous degree (baccalaureate, preferably with a major in one of the social sciences, for the M.A. program; Master's degree in one of the social sciences for the doctoral program).

THE MASTER’S PROGRAM

Thesis Option
A minimum of 30 hours beyond the baccalaureate degree, including 24 hours of coursework and 6 hours of Thesis 500, is required. Students must complete Sociology 521, 531, Statistics 531, and one foundation course (504, 505, or 560). At or near the end of all coursework, the student must take an oral examination on course material and thesis. The examination will be administered by the student’s committee.

Non-Thesis Option
A minimum of 30 hours of coursework is required, including Sociology 521, 531, Statistics 531, and one of the following: 504, 505, or 560. Sociology 534, 622, and Statistics 532 are recommended. Sociology courses at the 400 level may not be taken with the approval of the student’s committee. A student’s plan of study should follow one of the following approaches: Plan 1, 6 hours in one of the department’s concentrations and 6 hours in a second area, including areas outside the department, subject to the approval of the student’s committee; Plan 2, 12 hours in a special area of study approved by the student’s committee and the department’s Graduate Program Committee. Students are encouraged to prepare a paper synthesizing their knowledge of the concentration(s). Students who incorporate supervised field experience in their programs are encouraged to prepare a report based on those experiences that demonstrates their understanding of research, theory, and report writing. All students must take final written and oral examinations that include questions on their general coursework in theory and methods and on their special areas of study.

Subject to approval by the student’s committee, up to 12 hours may be taken in courses outside the department for either program.

THE DOCTORAL PROGRAM

Coursework
Twenty-four hours of coursework beyond the Master’s degree are required (exclusive of S/NC credits). Twelve hours of course credit in Sociology at the 600 level are required. Students who enter the program without the courses required for the M.A. degree (521, 531, Statistics 531) or their equivalents must take them as remedial work which does not apply to their residence. Students must complete Sociology 622; 534, 563, 633, or 636; and Statistics 532 or another advanced course in statistics. Completion of 9 hours in each of two concentrations is encouraged. A student who cannot achieve his/her educational goals within the department’s concentrations may construct an individualized course of study subject to the approval of the student’s doctoral committee and the Graduate Program Committee. Sociology courses at the 400 level may not be taken without the consent of the student's advisor and the Graduate Program Committee. Six hours may be taken in related fields without petitioning the Graduate Program Committee for approval. The student’s program may include a minor or cognate field.

Comprehensive Examinations
Written examinations in four areas are required (sociological theory, research methodology, and two substantive areas). Doctoral students are eligible to take the theory and methodology examinations whenever offered. Substantive examinations may be taken upon completion of theory and methodology courses. Detailed information on examination 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 theory and methodology related to the research, in accordance with the deadlines specified by The Graduate School.

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 concentra-

tion. Please refer to Human Ecology for specific requirements.

ACADEMIC COMMON MARKET
An agreement among southern states for sharing graduate programs is available to residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. This Ph. D. program in Sociology is available to residents of the state of South Carolina. Additional information may be obtained from the Resident Advisor in the Office of Graduate Admissions and Records.

GRADUATE COURSES
405 Sociology of Sport (3) Social meaning, organization, and process of sport. Prereq: 291 or consent of instructor. (Same as Physical Education 405.)
414 Sociology of Health Care (3) Organization of health care facilities, staff-patient relationships, demographic characteristics, and prevalence of disease.
415 Sociology of Aging (3) How roles and statuses change with age in relation to major social institutions; impact that rapidly increasing number of older people has on society, effect of society on older people.
446 The Modern World System (3) Critical examination of capitalist world-system as social system, its coherence, boundaries, regions, member groups, cleavages, and processes of change. Analysis of who gets what, why, and how in global political economy.
455 Society and Law (3) How laws and legal processes are affected by social change, social impact of legal sanctions, relations between law and social justice.
459 Organizational and Corporate Crime (3) Analysis of crime and deviance committed by organizations. Case studies of corporate and organizational crime, organizational dynamics of crime, theories of corporate crime, and organized responses to this type of crime by government regulatory agencies.
462 Populations (3) Demographic factors and social structure; trends in fertility, mortality, population growth, migration, distribution, and composition; population policy.
464 Urban Ecology (3) Relation of humans to their urban environment: conservation and use of appropriate technology. (Same as Urban Studies 464.)
471 Sociolingusitics (3) (Same as English 471 and Linguistics 471.)
480 Diffusion of Agricultural Technology (3) (Same as Rural Sociology 480.)
500 Thesis (1-15) P/NP only. E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester. May be repeated. S/NC only. E
504 Sociological Foundations of Political Economy (3) Survey of sociological theories of political economy, sources of political and economic power and conflict.
505 Foundations of Criminology (3) Critical overview of contemporary developments in criminology, theories of crime causation and theories of responses to crime. Prereq: 350 or equivalent.
507 Foundations of Social Psychology (3) Current and classical theoretical perspectives in social psychology.
510 Teaching Sociology (3) Art and craft of teaching sociology from curricular considerations through teaching techniques. May be repeated. Maximum 8 hrs.
531 Research Methods in Sociology (3) Research design, measurement, sampling, quantitative and qualitative data collection techniques, data, reduction, and analysis.

534 Advanced Sociological Analysis (3) Underlying assumptions and logical procedures used by sociologists in formulating explanations; foundations of sociological research strategies and techniques.

540 Occupations (3) Occupations in relation to individuals and society; technology, economic stratification, and social organizations.

541 Collective Behavior, Social Movements, Social Change (3) Basic theory and research on conditions of social unrest in human communities and efforts of collectives to change existing society.

542 Sociological Aspects of Sports and Physical Education (3) (Same as Physical Education 542.)

543 Sociology of Development (3) Sociological theories and studies of development; modernization, colonialism, dependency; comparative impact of various developments 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 on 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, incremental regression models, and survey techniques of population analysis.

580 Advanced Rural Sociology (3) (Same as Rural Sociology 580.)

585 Seminar in Gerontology (1) (Same as Human Ecology 585, Educational and Counseling Psychology 585, Nursing 585, Public Health 585, Human Performance and Sport Studies 585, and Social Work 585.)

591 Foreign Study (1-15) See page 32.

592 Off-Campus Study (1-15) See page 32.

593 Independent Study (1-15) See page 32.

594 Social Theories of Sport (3) (Same as Physical Education 515.)

595 Special Topics in Rural Sociology (1-3) (Same as Rural Sociology 593.)

599 Readings (3) Selected topics. May be repeated. Maximum 6 hrs.

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

602 Sociological Theory II (3) Distinct schools of sociological theory and contributions of their principal exponents. Prereq: 521 or consent of instructor.

629 Supplementary Readings in Sociological Theory (3) Individual guidance. Preparation for comprehensive examination. Prereq: Consent of instructor. S/NC only.

633 Survey Design and Analysis (3) Systematic exploration of survey problems through student participation in the design and analysis of a survey. Prereq: 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. Prereq: 500 or consent of instructor.

638 Supplementary Readings in Methodology (3) Individual guidance. Preparation for comprehensive examination. Prereq: Consent of department. S/NC only.

643 Class Analysis (3) Critical analysis of theories and research on class structure and conflict.

644 Political Sociology (3) Critical examination of theories of state and political processes.

645 Advanced Studies in Political Economy (3) Topical seminar. Prereq: 504 or consent of instructor. May be repeated. Maximum 6 hrs.

653 Sociology of Law (3) Intensive examination of selected topics in sociology of law. Prereq: 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. Prereq: Consent of Instructor.

662 Urban and Regional Sociology (3) Historical and contemporary studies of urban and regional societies 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. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

675 Advanced Studies in Social Psychology (3) Selected contemporary research issues related to social psychological theories. Prereq: 541 or consent of instructor. May be repeated. Maximum 6 hrs.

695 Advanced Special Topics (3) Topic of special interest to student-initiated courses that will not be regularly offered. Prereq: Consent of department. May be repeated. Maximum 6 hrs.


**Spanish**

See Romance and Asian Languages

---

**Special Programs**

(College of Liberal Arts)

**James R. Stokely Institute**

Lynn Champion, Director

The Stokely Institute curriculum comprises three seminars which are offered once annually during the summer term. The seminars are interdisciplinary in focus and are team-taught by faculty representing the humanities and fine arts, the natural sciences, and the social sciences. The content of the three seminars embraces three major areas of inquiry in the liberal arts, with an emphasis on understanding the characteristic methods and goals of each mode of inquiry and the kind of knowledge each mode yields. Seminar participants are encouraged to think critically and to reflect on the intellectual and practical implications of their learning.

Enrollment in the following courses is restricted to participants in the James R. Stokely Institute Fellows Program in the College of Liberal Arts and requires the Program Director's approval. Tennessee elementary and secondary school teachers who are certified and have a minimum of five years teaching experience may apply to participate in the Institute. Selection of participants is based on academic ability, references, an application essay and an interview of final candidates.

**GRADUATE COURSES**

510 Humanities Perspectives in the Liberal Arts (2) Seminar on nature of inquiry in humanities. Emphasis on nature and special forms of human experience and its interpretation through study of formal and critical figures.

520 Natural Science Perspectives in the Liberal Arts (2) Seminar on nature of inquiry in physical and biological sciences drawing on history of science, critical figures in shaping of scientific thought, and methodology for observation and experimentation in natural sciences.

530 Social Science Perspectives in the Liberal Arts (2) Seminar on nature of inquiry in social sciences. Emphasis on methodology for observation and research in study of human beings, their social environments and their behavior.

---

**Special Services Education**

(College of Education)

**MAJORS**

**DEGREES**

<table>
<thead>
<tr>
<th>Major</th>
<th>Degree</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special Education</td>
<td>M.S.</td>
<td>Tennessee</td>
</tr>
<tr>
<td>Rehabilitation Counseling</td>
<td>M.S.</td>
<td>Tennessee</td>
</tr>
<tr>
<td>Education</td>
<td>Ph.D.</td>
<td>Tennessee</td>
</tr>
</tbody>
</table>

**Professors:**

Benner, Susan M., Ed.D. ............ Columbia
Coleman, Laurence J., Ph.D. ........ Kent State
Doll, E. E. (Emeritus), Ph.D. ....... Pennsylvania
Frey, R. M. (Emeritus), Ed.D. ........ Illinois
George, Thomas, Ed.D. .............. Tennessee
Hargis, Charles H. (Liaison) ....... Ed.D. 
Kronick, Robert F., Ph.D. .......... Tennessee
McClam, T., Ph.D. ................. South Carolina
Miller, James H. (Liaison), Ed.D. ... Auburn
Schindler, W. Jean, Ph.D. .......... Kent State
Woodrick, William E., Ed.S. ........ Mississippi
Woodside, M. R., Ed.D. ............. VPI

**Associate Professors:**

Cassell, Jack L., Ph.D. .............. Kansas
Colvin, John, Ed.D. ................. Virginia
Hannum, Michael C., Ed.D. .......... Northern Colorado
Greenberg, Katherine H., Ph.D...... George Peabody
Mulkey, S. Wayne, Ph.D. ............ Florida State
Welch, Olga, Ed.D. .................. Tennessee

**Instructors:**

Ashmore, Don L., M.S. .............. Tennessee
Barnes, Wendell W., Jr., M.Ed. ..... Georgia
Butterworth, J., Ph.D. .............. Vanderbilt
Griffin, M., M.S. ......... Tennessee
Lacava, C., M.S. .................... Tennessee
Sandefur, R., M.S. ................. South Carolina

**Lecturer:**

Byrd, H. L., Jr., M.S. .............. Tennessee
THE DEPARTMENT OF SPECIAL SERVICES

Education offers graduate programs leading to the Master of Science in Special Education or in Rehabilitation Counseling. The department also participates in the Doctor of Philosophy program in Education as described under Education.

THE MASTER’S PROGRAMS

Special Education

The department offers two tracks for the Master’s degree in Special Education for all areas of concentration. Track 1 is for students who are already licensed to teach in special education or a related field or those who are seeking a Master’s degree without teacher licensure. Track 2 is for students seeking initial licensure. Thesis and non-thesis options are available for both tracks. An area of concentration may be selected from the following: early childhood special education, general special education, or education of the hearing impaired.

Track 1 students select coursework based on their area of concentration as described below. Some coursework may apply toward State of Tennessee endorsements (add-on certification in specific licensure areas). The non-thesis option requires 36 hours, including a minimum of 18 in special education, and a final written and oral comprehensive examination. The thesis option requires 39 hours including 6 hours of Thesis 500.

Track 2 students select coursework based on a specified course of study required for teacher licensure and options for areas of specialization and/or cognates as described below. The non-thesis option requires 24 hours of internship year coursework and an additional 12 hours prescribed by the student's committee, for a total of 36 hours. The thesis option requires 6 additional hours of Thesis 500 for a total of 42 hours.

Students completing a program of study in the early childhood special education concentration area are qualified to be preschool teachers, home-based interventionists, educational consultants, and family service coordinators. The curriculum is interdepartmental in nature, with most of the coursework offered by the Departments of Special Services Education and the Department of Child and Family Studies. Additional department offerings may be included through elective hours.

Students completing a program of study in the general special education concentration area are qualified to be teachers and/or consultants in a variety of special education programs providing services to people certified as mentally retarded, learning disabled, emotionally disturbed, gifted, physically disabled, multiply disabled, and socially or emotionally disturbed.

General special education majors, in conjunction with their committees, select one or more specializations for their program of study. Six to nine hours of coursework in the designated area should be taken. Approved specializations in specific, affective/motivational, assessment/diagnosis, cognitive education, early childhood, gifted education, rehabilitation, and technology. Students also may select a cognate of three to six hours of coursework taken outside the department.

Students completing a program of study in the education of the hearing impaired concentration area are qualified to teach in public or residential schools for the hearing impaired. Graduates are eligible for both Council on Education of the Deaf (CED) certification and Tennessee state certification. Internships (student teaching) may be completed at the Tennessee School for the Deaf, in mainstream programs in the state or in programs for the hearing impaired in North Carolina, Kentucky, Georgia, Virginia, and the District of Columbia.

Rehabilitation Counseling

The Rehabilitation Counseling program enables counselors to acquire competencies which facilitate the movement of a person with disabilities toward optimal functioning in the three broad areas of living, learning, and working. The rehabilitation counselor works primarily with adults who are being served in various public and private settings. Students should expect to spend four semesters, including summer, in classwork and in internship. The program requires 54 semester hours. Thesis and non-thesis options are available.

ADDITIONAL PROGRAMS

Under the sponsorship of the Office of Special Education and Rehabilitative Services (R.S.A.), specialized institutes for the preparation of professionals to adapt their skills toward services to hearing impaired and deaf people are provided. A federally supported Educational Consortium provides staff development and technical assistance for postsecondary programs serving hearing impaired students in a 13-state southeastern region.

Details concerning each program can be obtained by writing to the department head.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. program in Special Education is available to residents of the states of Kentucky (concentrations in hearing impaired and early childhood only), South Carolina (concentration in hearing impaired only), Virginia (concentration in hearing impaired only), or West Virginia; the M.S. in Rehabilitation Counseling is available to residents of Alabama or Louisiana. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

Special Education

GRADUATE COURSES

410 Pre-Internship Seminar (1) Orientation, objectives and policies of internship program. Must be completed term immediately preceding internship. Prereq: Admission to teacher education program. S/NC only. 0-2

415 Language Development of Hearing Impaired I (3) Language problems of hearing impaired contrasted with scope and sequence of normal language development. Formal linguistic systems used to describe language development problem.


419 Speech Development of Hearing Impaired (4) Theories of speech development, approaches in training perception and production of speech, and aural habilitation. Praculum experiences.

421 Field Experience in Modified Programs (3) Practicum in teaching in modified programs: planning, developing, implementing and evaluating instruction. Prereq: Special Education Principles and Special Education Strategies, Admission to Teacher Education and Curriculum and Instruction 422. Coreq: 420. S/N.C. only. F


424 Nature of Hearing Impairments (3) Basic principles of audiologic services to medical and other rehabilitative disciplines.

425 Introduction to the Psychology and Education of the Hearing Impaired (2) Primarily for those planning to teach hearing impaired. Overview of research related to psychology, social adjustment, communication methods, language development and educational problems of hearing impaired. Survey of audiologic services to medical and other rehabilitative disciplines.

430 Psychology and Education of Students with Moderate/Severe Disabilities (6) Nature and characteristics of persons with moderate/severe disabilities and educational strategies appropriate for those persons. Prereq: Special Education Principles and Special Education Strategies, Admission to Teacher Education and Curriculum and Instruction 422. Coreq: 430. S/N.C. only.

431 Field Experience in Comprehensive Programs (3) Practicum in Special Education Principles and Special Education Strategies, Admission to Teacher Education and Curriculum and Instruction 422. Coreq: 430. S/N.C. only.

433 Observation of Clinical Practice (1) (Same as Audiology and Speech Pathology 433.)

434 Clinical Practice in Speech-Language Pathology II (1-4) (Same as Audiology and Speech Pathology 434.)

440 Voice Disorders (3) (Same as Audiology and Speech Pathology 440.)

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.

456 Speech and Language Basis of Learning Disabilities in the Classroom (3) Normal communication development; understanding of speech and language impairments in school-age students; integration of oral/written communication skills into curriculum, especially for high incidence special education students.

470 Psychology of the Exceptional Child (3) Varieties of exceptional children; general characteristics and educational needs. Implications of developmental variations for functioning as adults. Opportunity to expand study upon particular exceptionality. Enrollment limited to non-special education majors.

471 Internship I: Special Education (3-15) Intensive experience designed to allow student to practice art and science of teaching exceptional children under supervision of experienced teachers. Prereq: 480.

473 Audiology II (3) (Same as Audiology and Speech Pathology 473.)

482 Speech and Language Services in the Schools (3) Organization and implementation of speech and language programs in schools. IEP process as it affects assessment, case-selection, and programming for students aged 4-21. Procedures and materials, group interaction and classroom consultation.

483 Clinical Practice in Communication Disorders in Schools (3) Supervised practice with children with communication disorders. Coreq: 433, 434 (80-100 clinical contact hrs.), 482.

484 Internship with Hearing Impaired Children (6) Supervised internship with preschool, day school and residential students.
**Speech Communication**

*(College of Liberal Arts)*

**Faculty:***

- **Faye D. Julian, Head**
- **Professors:**
  - Julian, Faye D., Ph.D. ............... Tennessee
  - Lester, Lorayne W., Ed.D. ............. Tennessee
  - Yeomans, G. Allan (Emeritus), Ph.D. .... Louisiana State
  - Ambrester, M. L., Ph.D. ............... Ohio State
  - Buckley, J. E., Ph.D. ................. Northwestern
  - Cook, N. C., M.A. .................... Alabama
  - Glenn, Robert W., Ph.D. .............. Northwestern
  - Ambler, R. S., Ph.D. ................. Ohio State
  - Haas, John W., Ph.D. ................. Kentucky

**Graduate courses in Speech Communication provide opportunities for students in a variety of disciplines to investigate how oral language can effect changes in the knowledge, the understanding, the ideas, the attitudes, or the behavior of other human beings.**

**Graduate Courses**

- 420 Communication and Conflict (3) Communication as significant factor in development, management, and resolution of conflict at interpersonal, small group, organizational or societal levels.
- 440 Organizational Communication (3) Organizational setting and varieties of communication processes that affect quality of human interaction both within and outside organization.
- 465 Studies in Rhetorical History and Criticism (3) May be repeated. Maximum 6 hrs.
- 468 Rhetoric of the Woman's Rights Movement to 1930 (3) Historical and critical study of public address in campaign for women's rights in United States from 1830's through 1930's. (Same as Women's Studies 468.)
- 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.)
- 490 Ensemble Interpretation (3) Study and presentation of literary texts through group performance.

**Statistics**

*(College of Business Administration and Intercollegiate Program)*

**MAJORS DEGREES**

**Statistics** ........................................................................... M.S.

**Business Administration** .................................................. MBA

- **Professors:**
  - David L. Sylvester, Head
  - Downing, Darryl J. (Adjunct), Ph.D. ............ Florida
  - McLean, Robert A. (Emeritus), Ph.D. ............ Purdue
  - Pann, William C., Ph.D. ............ Southern Methodist
  - Philpot, John W., Ph.D. .................... VPI
  - Sanders, Richard D., Ph.D. ............ Texas
  - Sanders, William L. (Adjunct), Ph.D. .......... Tennessee

- **Associate Professors:**
  - Bozdogan, Hamparsum, Ph.D. ............... Illinois
  - Guess, Frank M., Ph.D. .................... Florida State
  - Leitnaker, Mary G. (Liaison), Ph.D. ......... Kentucky
  - Leon, Ramon V., Ph.D. .................... Florida State
  - Mee, Robert W., Ph.D. .................... Iowa State
  - McGuire, Stephen S. (Adjunct), Ph.D. ......... Kansas State
  - Ranney, Gipsie B. (Adjunct), Ph.D. ............ NC State
  - Wright, Tommy (Adjunct), Ph.D. .............. Ohio State

- **Assistant Professor:**
  - Lin, Dennis K. J., Ph.D. .................... Wisconsin

**Lecturers:**

- Schmidthammer, James L., Ph.D. ............... Pittsburgh

**Instructors:**

- Neidert, Sharon M., Ph.D. ............... Miami (Ohio)
- Cwik, Charles M., Ph.D. .................... Tennessee
- Wright, S. Paul, M.S. ..................... Tennessee

**Additional Intercollegiate Program Committee Members:**

- Bunting, Dewey, Liberal Arts
- Dessart, Don, Education
- Fribourg, Henry, Plant and Soil Science
- Gilson, Charles, Social Work
- Huck, Schuyler W., Educational Counseling Psychology
- Ladd, R. T., Management
- McLaren, J. B., Animal Science
- Miller, Mark, Communications

**THE MASTER'S PROGRAM**

The M.S. program in Statistics provides students with the foundations in theory and practice required for careers in applied statistics. In addition to the education traditionally offered in such a program, the department offers a concentration in industrial statistics, which provides unique opportunities for experiences in practical applications of statistics. Through involvement in The University of Tennessee Institute for Productivity Through Quality and Related programs, department faculty participate in a variety of consulting and research projects in industry. Students may supplement their classroom study with an industrial internship and participation in research projects dealing with industrial problems. Department faculty also collaborate with researchers from many academic disciplines and hold joint appointments with the College of Agriculture, the Computing Center and the Medical Center. Statistics graduate students may gain consulting experience by working with faculty involved in these consulting activities. All students are required to participate in supervised internships or consulting activities as part of their graduate program.

Individuals with undergraduate or graduate degrees in other disciplines are encouraged to enter the program. The candidate's mathematics background should include differential and integral calculus of several variables. Individuals with limited mathematics background should seek departmental guidance regarding specific ways in which they may prepare themselves for the program by taking coursework as non-degree students. Requests for application forms and further information may be sent to the Director of Graduate Studies, Department of Statistics, Stokely Management Center, University of Tennessee, Knoxville, TN 37996-0532.

**Admission Requirements**

General admission requirements for The Graduate School are stated beginning on page 12. Applicants for Statistics must submit results of the Graduate Record Examination (GRE) general portion, although GMAT exam scores may be substituted. Applicants for the statistics program must have completed at least two years of college-level mathematics, including the calculus of several variables and matrix algebra, and be proficient in a computer language. Applicants whose native language is other than English must submit results of the Test of English as a Foreign Language (TOEFL).

**Curriculum**

A minimum of 33 credit hours must be completed for the Master's degree. Required of all students are 6 hours in statistical methods, 6 hours in statistical theory, 1 hour in statistical...
Along with specified sequences of statistics courses, exclusive of consulting, internship, independent study, or thesis.

**Thesis or Independent Study**

The thesis option for the Master's degree requires the student to complete 6 hours for the thesis. Alternatively, the non-thesis option requires a minimum of 3 hours for an independent study project.

**Comprehensive Examination**

Students must pass a two-part written comprehensive examination covering 1) theory and 2) methods. Upon failing either part of the examination, the student may retake it. The result of the second examination is final. For students writing a thesis, this examination must be passed before the thesis is defended.

**INTERCOLLEGIATE GRADUATE STATISTICS PROGRAM**

The Intercollegiate Graduate Statistics Program is a formal University of Tennessee academic program established to recognize graduate students for completing the requirements of a major or minor in Statistics as part of their degrees. The program enables a student to obtain the M.S. in Statistics simultaneously with the Ph.D. or Ed.D. in another department. The program also enables a student to obtain a Statistics minor along with the M.S., Ph.D., or Ed.D. in another department. The program is administered by an executive committee with advisory input from the program faculty. The program is open to well-qualified graduate students in all departments which have an approved Statistics minor and/or joint major curriculum offered through the program. Curriculum requirements for the statistics component of each joint degree are specified in terms of completion of alternative sequences of course options. Course options consist of courses in statistics, offered either by the Department of Statistics or by other departments, that have been reviewed and approved by the Executive Committee. Interested students should contact their major department head for information on specific course requirements.

**General Admission Requirements**

1. The student's sponsoring department must have established with the executive committee an approved joint degree program along with specified sequences of statistics courses taught by the Statistics Department and/or other departments.

2. The student's Admission to Candidacy form must contain a list of courses required for the Statistics minor/major set off in a group and labeled "Statistics courses required for the minor/major.",

3. In many cases, a student may not decide to apply for participation in the program until he/she has completed two or three statistics courses. In that case the student's major professor should file a program change with the cooperating department and assist the student in obtaining a Statistics Department faculty member to serve on the student's committee.

**Degree Requirements**

The program offers the M.S. in Statistics with a minor in another department, a joint major program in which the student earns a Master's or doctoral degree in the student's sponsoring department along with the M.S. in Statistics, and a joint major and minor program in which the student earns a Master's or doctoral degree in the student's sponsoring department along with a minor in Statistics. The table below presents the minimum number of semester hours in statistics for each of these alternatives. The hours do not represent the minimum required for the degree program. The student selects courses to satisfy the requirements established by the student's sponsoring department and approved by the Program Executive Committee.

The student's committee must include a faculty member of the Statistics Department at the rank of Assistant Professor or above. The student's formal examination procedure as established by the sponsoring department must include an appropriate section on statistics. Successful completion of the Statistics minor/major is recognized by appropriate documentation on the student's transcript. Students who do not complete all requirements for the Statistics major/minor will still receive academic credit for statistics courses they have successfully completed.

**Degree Program:**

<table>
<thead>
<tr>
<th>Program Requirement</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.S. in Statistics, minor outside of Statistics</td>
<td>21</td>
</tr>
<tr>
<td>M.S. outside of Statistics, minor in Statistics</td>
<td>9</td>
</tr>
<tr>
<td>M.S. outside of Statistics, minor in Statistics</td>
<td>15</td>
</tr>
<tr>
<td>M.S. in Statistics</td>
<td>24</td>
</tr>
<tr>
<td>M.S. in Statistics (33 hours total)</td>
<td>24</td>
</tr>
<tr>
<td>Approved Statistics courses from the Department of Statistics and/or other departments</td>
<td>24</td>
</tr>
<tr>
<td>Courses taken for the minor or the Master's degree in Statistics may fulfill requirements for the doctoral degree.</td>
<td></td>
</tr>
</tbody>
</table>

**ACADEMIC STANDARDS**

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

**GRADUATE COURSES**

411 Introduction to Statistical Computing

3 Use of computer operating system commands and packaged programs for statistical analysis and file management. Not available for credit for statistics majors. Prereq: 201 or 251.

461 Applied Regression Analysis

3 Linear regression and correlation, multiple regression, polynomial regression, selection of variables, use of dummy variables, analysis of residuals. Logistic regression and its applications. Use of standard computer packages. Major writing requirements. Prereq: Probability and Statistics for Scientists and Engineers II and Introduction to Statistical Software or graduate standing and consent of instructor.

462 Analysis of Variance and Experimental Design

3 Analysis of variance techniques for single and multifactor models, past hoc procedures. Design considerations for completely randomized, hierarchical and split-plot experiments, balanced incomplete block, and design of experiments. Prereq: Probability and Statistics for Scientists and Engineers II and Introduction to Statistical Software or graduate standing and consent of instructor.

571 Statistical Models

3 Functions of random variables, multivariate distributions, conditional expectations, waiting time distributions, random processes, Markov chains, queuing theory. Prereq: 251. F

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

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty before degree requirements. 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 of relationships for categorical and numerical data, including Chi-square tests and simple linear and quadratic regression. Use of computing facilities required. Credit not given for both 531 and 537. Prereq: 1 yr. college mathematics. E

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. E

537 Statistics for Research I

3 Principles and application of statistical methodology, integrated with considerable use of major statistical computing system. Probability and probability distributions, forming and testing hypotheses using parametric and nonparametric Inference methods. Matrix-based simple linear regression and correlation. Credit not given for both 531 and 537. Prereq: 1 yr. undergraduate mathematics and 1 undergraduate statistics course.

538 Statistics for Research II

3 General linear model as applied to multiple regression and analysis of variance. Diagnostic and influence techniques. One-way, factorial, and nested designs, preplanned versus post-hoc contrasts. Random factors and repeated measures. Prereq: 537 or 532. F

561 Introduction to Computing for Data Management and Analysis

1 UTK computing environment for beginning statistics graduate students. Use of operating system commands, system editor, utility programs and SAS statistical package for data entry and editing, file management and statistical analysis. Use of UTCC computing facilities required. Coreq: 531, 537 or 571, or consent of instructor.

563 Introduction to Mathematical Statistics

3 Basic probability models and theory of distributions of random variables. Prereq: Mathematics 241.

564 Theory of Statistical Inference

3 Introductory theory concerning common statistical procedures of hypothesis testing and estimation. Prereq: 563.

566 Statistical Techniques in Industrial Processes

3 Applications of control charts and other statistical techniques in industrial setting. Attributes and variables control charts, process capability analysis, aspects of sampling, statistical tolerancing, estimation of variance components, problems of measurement, special industrial applications. Prereq: 571, or equivalent.

567 Applied Reliability


571 Statistical Methods

572 Applied Linear Models (3) Simple and multiple linear regression using matrix algebra and general linear model; polynomial regression, weighted least squares regression, variable selection techniques, multicollinearity, regression diagnostics, general linear model approach to analysis of data from designed experiments. Use of standard computer packages. Prereq: 571 and matrix algebra.

573 Design of Experiments (3) One-way ANOVA, multiple range tests, equal and unequal variances, transformations; random and complete random designs, completely randomized designs, analysis of covariance, split-plot and nested designs, fractional factorials, sequential designs. Prereq: 571.

585 Principles of Statistical Process Management (3) Control charts and other statistical techniques applied to management of business processes. Prereq: Consent of department head.

587 Graduate Seminar (1-3) Directed readings and active participation in colloquium program of Department of Statistics and of student's minor program. Prereq: Consent of statistics department director of graduate studies. May be repeated. Maximum 2 hrs. S/NC only.

592 Internship (1-6) Supervised off-campus experience in application of statistical principles and methods in business, industry, or government. Written and oral report. Prereq: 4 courses in graduate-level statistics and consent of statistics department director of graduate studies. May be repeated. Maximum 6 hrs. S/NC only.

593 Independent Study (2-6) Faculty directed readings and investigation of specific topic in probability or statistics. Written report and oral presentation. Prereq: 2 courses in statistics and consent of the statistics department director of graduate studies. May be repeated. Maximum 6 hrs. S/NC only.

595 Statistical Consulting Practicum (1-4) Supervised experience helping on-campus researchers plan, manage data, and develop and perform analyses specific to designs and hypotheses. Discussion of activities in regular seminar meetings. Final written reports and detailed diaries. Prereq: 572 or 538. May be repeated. Maximum 6 hrs. S/NC only.

671 Applied Multivariate Methods (3) Aspects of multivariate analysis, tests of significance with multivariate data, multivariate analysis of variance, multivariate regression, principal component analysis, factor analysis, discriminant analysis and classification. Prereq: Matrix-based regression and analysis of variance, experience using SAS or SPSS.

673 Linear Models (3) Review of full rank models and models not of full rank with application to unbalanced designs, generalized inverses, estimable functions, based regression and analysis of variance, discriminant analysis and classification. Prereq: Matrix-based regression and analysis of variance, general linear model approach to analysis of data from designed experiments. Prereq: 571 and matrix algebra.

681 Special Topics in Probability (1-3) Presentation of specialized topics in probability and stochastic processes. May be repeated. Maximum 6 hrs.

683 Special Topics in Statistics (1-3) Presentation of specialized topics in statistics. May be repeated. Maximum 6 hrs.

THE MASTER'S PROGRAM

The Department of Technological and Adult Education offers graduate programs leading to the Master of Science with a major in Technological and Adult Education. Two tracks are available. Track 1 is for students who are already certified to teach or those who are seeking a Master's degree without certification. Track 2 is for students seeking initial licensure. Thesis and non-thesis options are available for both tracks.

Track 1 - Concentrations are available in adult education, business and marketing education, industrial education, industrial training, and vocational-technical education. The thesis option requires the completion of 33 semester hours including 6 hours of thesis. The non-thesis option requires the completion of 36 hours of coursework.

Track 2 - Concentrations are available in business and marketing education, and technology education. The non-thesis requirements are Education 574 and 591, 6 hours; for business and marketing education, 531 and 532, 6 hours; for technology education, 535 and 595, 6 hours; internship, 12 hours; and 12 hours of specialty courses as approved by the student's committee for a total of 36 hours. The thesis option requires 6 additional hours of thesis for a total of 42 hours.

THE SPECIALIST PROGRAM

The Ed.S. program is a cooperative undertaking involving all vocational service areas. Concentrations are available in agricultural, business, marketing and distribution, home economics, industrial, and technical education, and in general vocational education.

The degree requires a minimum of 60 hours of graduate study. Credits earned for the Master's degree may meet program requirements in the courses which contribute to the program objectives of the candidate. A major core of studies offers advanced concepts in technological and adult education.

THE DOCTORAL PROGRAM

The comprehensive Ed.D. program in the department is designed to provide opportunities for graduate students to achieve professional objectives, develop needed competencies, and gain desirable experiences and understanding of technological and adult education.

The minimum requirements in the doctoral program consist of the following: departmental specialization, 12 hours; departmental core and electives, 21 hours; cognate field, 9 hours; professional education core, 9 hours; research techniques, 12 hours; and dissertation, 21 hours. A minimum of 80 hours above the baccalaureate is required.

The Doctor of Philosophy with a major in Education includes concentrations and specializations as listed under Education.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. and Ed.D. programs in Technological and Adult Education are available to residents of the state of South Carolina; the Ed.D. program is available to residents of Kentucky and West Virginia. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

GRADUATE COURSES

401 Utilization of Community Resources (3) Strategies of developing linkages between vocational education and private sector through advisory committees, councils, and working partnerships. Development and management of public relations programs. Prereq: 3 yrs teaching experience. Sp

415 Coordination Techniques (3) Necessary procedures, duties and responsibilities to implement, maintain, and evaluate successful cooperative education program. Prereq: Senior standing and consent of instructor. Sp

430 Principles and Organization of Business and Marketing Education (3) Historical background and development needs. Philosophies of vocational education, in business and marketing, curriculum implications; establishing, evaluating, and improving programs.

432 Methods and Materials in Business and Marketing Education (3) Teaching techniques, aids and evaluation in subject matter fields. Prereq: Consent of instructor. F, Su

436 Supervised Occupational Experience (3-9) Practical field experience in business and marketing settings under supervision of practitioner and departmental representative. May be repeated. Maximum 9 hrs.

439 Areas of Marketing (3) Marketing, personnel development, operations, and management as affects instructional leadership program in marketing education. Prereq: 432. F, Su

454 Training Aids Development (3) Study and preparation of instructional aids and non-print media commonly used by technical instructors and trainers. Prereq: Senior standing or consent of instructor. F, Su

455 Performance-Based Evaluation (3) Assessing effectiveness of training through development of performance-based measures. Prereq: Performance in incumbent worker job performance. Prereq: Senior standing or consent of instructor. Sp, Su

456 Organization and Operation of VICA/HOSA (3) Planning, organizing and implementing youth-club activities in vocational-technical programs. Prereq: Senior standing or consent of instructor. Sp, Su

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

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any
Textiles, Retailing and Interior Design

(The College of Human Ecology)

MAJORS

Interior Design.................................. M.S.
Textiles, Retailing and Consumer Sciences M.S.
Human Ecology .................................... Ph.D.

Nancy B. Fair, Head

Professors:
Blakemore, R. G. (Emeritus), Ph.D. Florida State
DeLong, A. J. (Liaison), Ph.D. Penn State
DeJonge, Jacquelyn O., Ph.D. Iowa State
Drake, Mary Fran, Ph.D. .......... Penn State
Duckett, Kermit E., Ph.D. .......... Tennessee
Wadsorth, Larry C., Ph.D. .......... NC State

Associate Professors:
Breezer, Randall R. (Liaison), Ph.D. Florida State
Canestaro, Nancy, Ph.D. .......... Michigan
Dyer, C. L., Ph.D. .......... North Carolina
Fair, Nancy B., Ph.D. .......... NC State
Rabun, Josette, Ph.D. .......... Tennessee

Assistant Professors:
Bhat, Gajanan, Ph.D. .......... Georgia Tech
Dillard, Susan, Ph.D. .......... Florida State
Gupta, Millend, Ph.D. .......... Missouri
Houser, T. L., M.S. .......... Tennessee
Lee, Jinkook, Ph.D. .......... Ohio State

Research Assistant Professors:
Dever, Molly, Ph.D. .......... Kansas State
Huang, Xuan Chao, Ph.D. .......... Leeds
Ko, Wen-Chien, Ph.D. .......... Tennessee
Malkan, Sanjiv, Ph.D. .......... Tennessee
Tsai, Peter, Ph.D. .......... Tennessee

Instructor:
Weiss, Kurt, M.S. .......... Tennessee

The Department of Textiles, Retailing, and Interior Design offers Master's degrees with majors in Interior Design and in Textiles, Retailing and Consumer Sciences. The program in Textiles, Retailing and Consumer Sciences offers concentrations in textile science and in retail and consumer sciences. An 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 Master's program in Interior Design will provide a balance between creative and theoretical foundations of the field; emphasis is placed on the dissemination of knowledge. The program is accredited by the Foundation for Interior Design Education Research (FIDER). The goal of the graduate program in interior design is to provide the student with scholarly and professional experiences through seminars, studio work, and research. Interdisciplinary thrusts will increase the depth of understanding of the field of interior design essential to function as educators or as independent professionals.

- Areas of emphasis within interior design may include: historic preservation and adaptive reuse of interior design, computer-aided design, and human environment interaction.
- Supporting courses are available in lighting, furniture design, business, etc.

The programs in Textiles, Retailing and Consumer Sciences 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 consumer behavior. Research and professional experiences through seminars, studio work, and research. Interdisciplinary emphases will increase the depth of understanding of the field of interior design essential to function as educators or as independent professionals.

- Areas of emphasis within interior design may include: historic preservation and adaptive reuse of interior design, computer-aided design, and human environment interaction.
- Supporting courses are available in lighting, furniture design, business, etc.

The Master's program in Interior Design will provide a balance between creative and theoretical foundations of the field; emphasis is placed on the dissemination of knowledge. The program is accredited by the Foundation for Interior Design Education Research (FIDER). The goal of the graduate program in interior design is to provide the student with scholarly and professional experiences through seminars, studio work, and research. Interdisciplinary emphases will increase the depth of understanding of the field of interior design essential to function as educators or as independent professionals.

- Areas of emphasis within interior design may include: historic preservation and adaptive reuse of interior design, computer-aided design, and human environment interaction.
- Supporting courses are available in lighting, furniture design, business, etc.

The programs in Textiles, Retailing and Consumer Sciences 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 consumer behavior. Research and professional experiences through seminars, studio work, and research. Interdisciplinary emphases will increase the depth of understanding of the field of interior design essential to function as educators or as independent professionals.

- Areas of emphasis within interior design may include: historic preservation and adaptive reuse of interior design, computer-aided design, and human environment interaction.
- Supporting courses are available in lighting, furniture design, business, etc.

The Master's program in Interior Design will provide a balance between creative and theoretical foundations of the field; emphasis is placed on the dissemination of knowledge. The program is accredited by the Foundation for Interior Design Education Research (FIDER). The goal of the graduate program in interior design is to provide the student with scholarly and professional experiences through seminars, studio work, and research. Interdisciplinary emphases will increase the depth of understanding of the field of interior design essential to function as educators or as independent professionals.

- Areas of emphasis within interior design may include: historic preservation and adaptive reuse of interior design, computer-aided design, and human environment interaction.
- Supporting courses are available in lighting, furniture design, business, etc.

The programs in Textiles, Retailing and Consumer Sciences 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 consumer behavior. Research and professional experiences through seminars, studio work, and research. Interdisciplinary emphases will increase the depth of understanding of the field of interior design essential to function as educators or as independent professionals.

- Areas of emphasis within interior design may include: historic preservation and adaptive reuse of interior design, computer-aided design, and human environment interaction.
- Supporting courses are available in lighting, furniture design, business, etc.

The Master's program in Interior Design will provide a balance between creative and theoretical foundations of the field; emphasis is placed on the dissemination of knowledge. The program is accredited by the Foundation for Interior Design Education Research (FIDER). The goal of the graduate program in interior design is to provide the student with scholarly and professional experiences through seminars, studio work, and research. Interdisciplinary emphases will increase the depth of understanding of the field of interior design essential to function as educators or as independent professionals.

- Areas of emphasis within interior design may include: historic preservation and adaptive reuse of interior design, computer-aided design, and human environment interaction.
- Supporting courses are available in lighting, furniture design, business, etc.

The programs in Textiles, Retailing and Consumer Sciences 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 consumer behavior. Research and professional experiences through seminars, studio work, and research. Interdisciplinary emphases will increase the depth of understanding of the field of interior design essential to function as educators or as independent professionals.

- Areas of emphasis within interior design may include: historic preservation and adaptive reuse of interior design, computer-aided design, and human environment interaction.
- Supporting courses are available in lighting, furniture design, business, etc.

The Master's program in Interior Design will provide a balance between creative and theoretical foundations of the field; emphasis is placed on the dissemination of knowledge. The program is accredited by the Foundation for Interior Design Education Research (FIDER). The goal of the graduate program in interior design is to provide the student with scholarly and professional experiences through seminars, studio work, and research. Interdisciplinary emphases will increase the depth of understanding of the field of interior design essential to function as educators or as independent professionals.

- Areas of emphasis within interior design may include: historic preservation and adaptive reuse of interior design, computer-aided design, and human environment interaction.
- Supporting courses are available in lighting, furniture design, business, etc.

The programs in Textiles, Retailing and Consumer Sciences 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 consumer behavior. Research and professional experiences through seminars, studio work, and research. Interdisciplinary emphases will increase the depth of understanding of the field of interior design essential to function as educators or as independent professionals.

- Areas of emphasis within interior design may include: historic preservation and adaptive reuse of interior design, computer-aided design, and human environment interaction.
- Supporting courses are available in lighting, furniture design, business, etc.

The Master's program in Interior Design will provide a balance between creative and theoretical foundations of the field; emphasis is placed on the dissemination of knowledge. The program is accredited by the Foundation for Interior Design Education Research (FIDER). The goal of the graduate program in interior design is to provide the student with scholarly and professional experiences through seminars, studio work, and research. Interdisciplinary emphases will increase the depth of understanding of the field of interior design essential to function as educators or as independent professionals.

- Areas of emphasis within interior design may include: historic preservation and adaptive reuse of interior design, computer-aided design, and human environment interaction.
- Supporting courses are available in lighting, furniture design, business, etc.

The programs in Textiles, Retailing and Consumer Sciences 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 consumer behavior. Research and professional experiences through seminars, studio work, and research. Interdisciplinary emphases will increase the depth of understanding of the field of interior design essential to function as educators or as independent professionals.

- Areas of emphasis within interior design may include: historic preservation and adaptive reuse of interior design, computer-aided design, and human environment interaction.
- Supporting courses are available in lighting, furniture design, business, etc.
THE PH.D. CONCENTRATIONS

Consumer Environments

Students enrolled in the Ph.D. program with a concentration in consumer environments are provided with a foundation in management and retail and consumer sciences or in understanding the consumer in the designed environment and management of facilities. From this base, students focus on retail and consumer sciences or on areas of specialization including historic preservation and adaptive use, human environment interaction and facilities management to further theory and application in advanced study and research. See the consumer environments concentration under Human Ecology.

Textile Science

Students enrolled in the Ph.D. program in Human Ecology with a concentration in textile sciences take one common course which provides a foundation for the integration of textiles and apparel in the context of the near environment. A required departmental research seminar exposes students to research being conducted in all areas of study in the department.

1. College Professional Seminar, HE 610 (3 hours);
2. RCS 552 (3 hours);
3. Research Methods which must include 6 hours of laboratory techniques in materials analysis and characterization;
4. TS 590 (2 hours). Attendance at seminar is required for all full-time students;
5. Six hours in statistics at the 500-600 level;
6. Eighteen hours in textile science courses;
7. Nine hours in a cognate area;
8. Fourteen hours of other courses which may include up to 6 hours of dissertation; and

Note: Students must take a minimum of 9 hours at the 600-level in the College of Human Ecology, exclusive of dissertation. Transfer students with a Master's degree from another institution are required to complete at least 42 hours (including dissertation hours) from UTK.

ACADEMIC STANDARDS

1. Evaluation of student progress will normally occur prior to enrollment for thesis hours (or the non-thesis option) and during the second semester of full time enrollment in the program. The review of the student will be undertaken by the faculty with consideration given to factors such as: GPA (minimum 3.0), portfolio evaluation, and demonstrated research capability.
2. If progress or performance is deemed insufficient, the faculty may recommend probation with specific goals set for a specified time or termination.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. program in Interior Design is available to residents of the states of Kentucky, Louisiana, or Virginia. The M.S. program in Textiles, Retailing and Consumer Sciences is available to residents of the state of Mississippi. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records. For the Ph.D., see Human Ecology.

Interior Design

GRADUATE COURSES

400 Proxemics (3) Space and behavior within cultural context. Application to design and design process. Theoretical foundations of U.S. concepts from environment and behavior. Simulation techniques and methods for identifying behavioral design requirements. Prereq: Human Ecology, Design or consent of instructor. F

450 Advanced Interior Design II (5) Comprehensive studio problems of advanced complexity. Integration and extension of experiences utilizing systematic design methodologies. Prereq: Advanced Interior Design or consent of instructor. 2 hrs and 3 labs. Sp


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

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

510 Needs Assessment and Design Programming (3) Use of systematic design methodology and design research methods as part of design problem-solving experience. Lecture and studio. May be repeated. Maximum 6 hrs. Prereq: Admission to graduate program. F

520 Integrative Interior Design Studio (3) Identification, integration and synthesis of multidisciplinary data input. Advanced programming techniques and design evaluation. Lecture and studio. Prereq: 510, 564, or consent of instructor. Sp

531 Research Methods in Historic Preservation (3) Methodology for historic preservation problems in interior design. Prereq: Architecture 403 or consent of instructor. Sp

552 Seminar in Interior Design (3) Twentieth-century design concepts, persons, motivation, and creative components leading to visual innovation. Prereq: 470 or consent of instructor. F

555 Micro-computer Research Applications in Interior Design (3) Systems and micro-computer concepts and applications for research in interior design. Project design and management, optimization of design criteria, programming, schematic design, computer-aided design, advanced spreadsheet and database analysis, and desktop presentation. Prereq: Consent of instructor.

564 Environmental Factors in Interior Design (3) Human factors and associated research techniques and design methodologies related to interior architectural environments. Design requirements from anatomy, physiology, anthropometry and social and behavioral science. Prereq: 6 hrs behavioral science and 6 hrs natural science, or consent of instructor. Sp

570 Facilities Planning (3) Considerations in programing, design, management and operation of specialized facilities: hotels and restaurants, work environments, day care facilities, retailing-consumer interface and environments for elderly.

575 Environment and Aging (3) Seminar on design of physical environment and relationship to aging process. Concepts and theories from design, and social and behavioral sciences. Prereq: 6 hrs social/behavioral science or consent of instructor. Sp

580 Directed Study in Interior Design (1-3) Independent advanced research in selected areas from field of interior design. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. F

581 Directed Study in Historic Preservation (1-3) Independent advanced research in historic preservation relevant for interior design. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E

582 Directed Study in Historic Design (1-3) Independent advanced research in historic stylistic movement in interior design. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E

584 Directed Study in Environmental Design (1-3) Independent advanced research in environmental design analysis. Prereq: 574 or consent of instructor. May be repeated. Maximum 9 hrs. E

585 Directed Study in Facilities Planning (1-3) Independent advanced research in facilities management. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

590 Research Seminar (1-2) S/NC only. E

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

610 Issues in Interior Design (1) Readings, reports, and discussion concerning current research and related issues in interior design: history of interior design, historic preservation, environment and behavior. Registration each semester of residence.

620 Advanced Topics in Interior Design (3) Selected topics of major interest: history of interior design, advances in historic preservation, environment and behavior. Topics vary. Prereq: 510, 552, 562, 564. May be repeated. Maximum 9 hrs.

625 Integrative Facilities Design in Consumer Environments (3) Methodologies and skills necessary for creation of settings responsive to needs of users. Techniques for programmatic analysis and development: goals, user requirements, technical, functional, and behavioral analysis of consumer in business and built environment.

630 Advanced Directed Study in Interior Design (3) Individual study in aspect of interior design culminating in scholarly paper. May be repeated. Maximum 6 hrs.

Retail and Consumer Sciences

GRADUATE COURSES

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

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

510 Retail Strategy and Decision Making (3) Strategy, strategic management and strategic process in retail sector: analytical decision-making skills in retailing. Retail industry structure. International differences in retail systems. Prereq: Retail Management or equivalent. Sp


540 Socio-Psychological Aspects of Apparel (3) Apparel and human behavior in social situations. Prereq: 6 hrs or equivalent from sociology and psychology.

550 Consumer Economics and Market Choices (3) Economic framework for analyzing consumer behavior and consumer choice within market system. Theory of consumer preferences and decision making; consumption and demand models for individuals and households. International consumer economics, issues and policies. Prereq: Textile and Apparel Economics, Mathematics 503 or equivalent. F,A

552 Economics of Textile Complex (3) Economics concerning U.S. textile complex. Quantitative approaches to industry structure, production, marketing, distribution and institutions within both global and domestic settings. Current and future international issues.
and implications. Prereq: Calculus III or equivalent; microeconomics, F.A

562 Research Methods (3) Fundamentals of science method, advancements 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. SNC 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 Advanced Topics in Textiles and Apparel (1-3) Lecture, group discussion on specialized topics: apparel production management, functional design, handicapped/elderly, historic costume, historic textiles, international issues, non-wovens, thermal properties. Prereq: 9 hrs textiles/apparel graduate coursework. May be repeated. Maximum 9 hrs. Su

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


615 Retail and Consumer Sciences Literature and Thought (3) Evaluation of retail and consumer sciences literature with emphasis upon research literature, development of scholarly thought, and identification of potential areas of further study. Prereq: 562, Marketing 501, Economics 501, F.A

616 Research Methods, Models and Measurement in Retail and Consumer Sciences (3) Quantitative methods and analytical concepts in research process. Mathematical and statistical formulation of retail and consumer sciences phenomena, utilizing models, model building and measurement constructs. Prereq: 562, Statistics 598, Sp.A

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 frameworks. Implications of consumer issues and policy alternatives. Literature and research focus. Prereq: 550 or consent of instructor.

655 Advanced Topics in Retail and Consumer Sciences (3) Lecture, group discussion, individual research on advanced topics and research areas of current significance: future direction, professional issues, theoretical approaches. Prereq: 562. May be repeated. Maximum 9 hrs.

590 Research Seminar (1) Research topics in textiles science. Prereq: 9 hrs textiles graduate coursework. May be repeated. Maximum 9 hrs.

595 Advanced Topics in Textile Science (1-3) Lecture, group discussion on specialized topics. Prereq: 9 hrs textiles graduate coursework or consent of instructor. May be repeated. Maximum 9 hrs.

625 Physical Chemistry of Fibers (3) Chemical, physical and thermal properties. Prereq: 510.

626 Physics of Fiber Structures (3) Morphology of polymeric structures; thermal and processing history on mechanical, electrical and chemical properties of fibers. Prereq: 510.

626 Advanced Topics in Textile Science (3) Lecture, group discussion, individual research on advanced topics and research areas of current significance: future direction, professional issues, theoretical approaches. Prereq: Doctoral student and 9 hrs textiles graduate coursework. May be repeated. Maximum 9 hrs.

Theatre
(College of Liberal Arts)

MAJOR

Tom Cooke, Head


Associate Professor: Black, W., M.F.A. .......... IIIinois


Adjunct Faculty: Arnoux, P., M.A. .......... Catholic

The Department of Theatre offers the Master of Fine Arts degree in Theatre with area concentrations in acting, directing, playwriting, dramaturgy, scene design, costume design, lighting design and theatre technology. Not all areas of concentration accept applicants every year.

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

The Graduate Record Examination, three letters of recommendation and interviews with appropriate faculty are required of all applicants. Applicants for admission to the M.F.A. design/technical theatre and playwriting/dramaturgy programs must submit samples of their work. Auditions are required of M.F.A. degree acting and directing applicants.

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

THE MASTER OF FINE ARTS PROGRAM

At least 60 semester hours, 40 of which must be at the 500 level or above, are required for the degree of Master of Fine Arts with a major in Theatre, which is normally to be completed in three consecutive years of full time residence. Theatre 501 is required the first year of residence. Proficiency in theatre history, as demonstrated by examination in the department is required in addition to 6 hours of drama and/or technical theatre and playwriting/dramaturgy. Students in the M.F.A. degree program are evaluated annually by juried performance or portfolio submission. Continuation in the program is with the approval of the faculty committee for the M.F.A. degree program.

Satisfactory completion of the comprehensive examination is prerequisite to entry into the third year. 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 the first year of residence.

Acting

Theatre 520-21, 22-23, 24-25 Master Class are required, along with one course in directing and two hours each in voice and dance.

Directing

Required courses are 430 Directing, 520-21 Master Class for first year acting candidates and 9 hours of 536 Projects in Play Directing.

Playwriting

Required are 470-71 Playwriting, at least 12 hours of 573 Playwriting Seminar, and at least 3 hours of 585 Production Workshops.

Dramaturgy

An additional two courses in dramatic theory and criticism are required as are Theatre 570 Dramaturgy: Theory and Practice, at least 6
hours of 585 Production Workshops, 430 Play Directing, 3 hours of 536 Projects in Directing, and 12 hours of 573 Seminar and Projects. In addition, students must select an arts and humanities specialization comprising at least one year of language study plus 6 hours in the selected area.

REQUIREMENTS FOR SECOND MASTER’S DEGREE

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

Any such credits applied from a previous graduate program would be from courses that are directly relevant to the student’s MFA curriculum and must have been earned within the time limit (6 years) established for completion of the MFA degree.

ACADEMIC COMMON MARKET

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

GRADUATE COURSES

401 Principles of Theatrical Design (3) Fundamental principles of design; visual and structural relationships. Projects assigned to develop understanding and perception.

409 Stage Make-up (2) Problems in make-up design and application, character analysis, physiognomy and characterouro. Prereq: 100

410 Dramatic Theory and Criticism (3) Theatre aesthetics from Aristotle to present.

420 Special Studies in Acting (3) Consent varies. Exercises in selected areas such as style, techniques, approaches, e.g., Shakespeare, movement, humor. Prereq: Advanced Acting and consent of instructor. May be repeated. Maximum 9 hrs.

426 Applied Phonetics (3) Development of skills in transcription and reproduction of principal varieties of language. Prereq: Consent of instructor.

430-41 Advanced Theatre Costume Design (3) Study and practice of stage rigging for theatrical productions; production participation required. Prereq: 250. Graduate credit to theatre M.F.A. students only.

434 Scenery Painting (2) Introduction to materials, techniques, and principles of craft. Gaining skill and understanding through studio experience. Prereq: Consent of instructor.


462 Advanced Lighting Design (3) Advanced problems in lighting design and theory. Lighting musical theatre, opera, and dance. Prereq: 362 or consent of instructor.

463 Sound Design (3) Sound design for performing arts. Review of equipment and acoustical factors that affect sound production. Sound design plotted from selected plays. Final projects mixed, edited, and cued for production.

465 Aesthetics of Lighting Design (3) Theory and practice of stage lighting design, relationship between designers and non-practioners: directors, actors, choreographers, architects, etc.

470-71 Playwriting (3,3) Advanced instruction in writing of plays. Prereq: Consent of instructor.

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 semester when student uses University facilities and/or transportation. Pre req: University facilities and/or transportation. Prereq: Consent of advisor. May be repeated. Maximum 6 hrs.

506 Production Workshops (1-6) Directed experience in production coordination. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

510 Studies in Theatre History (3) Intensive study of selected topics in theatre history. May be repeated. Maximum 9 hrs.

520-21-22-23-24-25 Master Classes in Acting (4,4,4,4,4,4) Master classes in acting techniques, voice, and movement. Theatre M.F.A. students only.

536 Projects in Play Directing (3) Practical work in play direction involving various lengths and kinds of scripts. May be repeated. Maximum 6 hrs.

547 Painting and Dyeing for the Theatre (2) Fibers, properties, dyes, and dye processes, color matching and distressing. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.


553 Projects in Stage Design (1-3) Conception and completion of major projects, both theoretical and actual, in scene design. May be repeated. Maximum 9 hrs.

554 Studies in Scene Design (3) Advanced scene design techniques and approaches to design for complex dramas and varied dramatic forms. May be repeated. Maximum 6 hrs.

555 Advanced Scenery Painting (2) Advanced instruction in materials, techniques and principles of scene painting; studio experience in dimensional simulation, layout and carving detail. Prereq: 454 or consent of instructor.

560 Projects in Lighting Design (1-3) Conception and completion of major projects; both theoretical 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: 462 or consent of instructor.

563 Projects in Sound Design (1-6) Production assignment as sound designer on approved play and/or relevant projects in field of sound design and technology. Prereq: 463 or approval of instructor. May be repeated. Maximum 9 hrs.

570 Dramaturgy: Theory and Practice (3) Methods and materials. Prereq: Consent of instructor.

573 Seminar in Playwriting (3) Exercises and projects tailored for advanced students in playwriting. Prereq: Consent of instructor. May be repeated. Maximum 18 hrs.

575-76 Studies in Dramatic Theory and Criticism (3,3) Broad-based study of major ideas about drama.

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.


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.

Transportation

See Marketing, Logistics and Transportation

(Urban Practice)

(College of Veterinary Medicine)

MAJOR DEGREE

Veterinary Medicine ......................... D.V.M.

D. J. Krahwinkel, Head

Professor:

Brace, J., D.V.M .................... California (Davis)

Bright, R. M., D.V.M ................... Ohio State

Dorr, A. S., D.V.M .................... Illinois

Krahwinkel, D. J., D.V.M .................. Auburn

Legender, A. M., D.V.M .................. Auburn

Associate Professors:

Bright, J. M., D.V.M .................... Purdue

Daniel, G. B., D.V.M .................... Auburn
Veterinary Medicine

(College of Veterinary Medicine)

MAJOR DEGREE
Veterinary Medicine D.V.M.
Comparative and Experimental Medicine M.S., Ph.D.

THE PROFESSIONAL PROGRAM

Admission Requirements
To qualify for admission to the professional program of the College of Veterinary Medicine, a candidate must have completed at least the minimum pre-veterinary requirements listed below. These may be completed at any accredited college or university that offers courses equivalent to those at The University of Tennessee, Knoxville. Pre-veterinary course requirements must be completed by the end of spring term of the year in which the student intends to enroll. Biochemistry requirements must have been satisfactorily completed within five years of the time the student wishes to enter the program.

Subject Area Semester Hours
English 6
Humanities and Social Sciences* 18
Physics 8
General Chemistry 8
Organic Chemistry 8
Biochemistry** 4
General Biology 8
Genetics 3
Cellular Biology*** 3
TOTAL 86

*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. An appropriate microbiology course may be approved if cellular or molecular biology is not offered.

Admission Procedures
Admission of new students is for the fall semester, with first priority given to residents of Tennessee.

Forms and instructions for making application for admission may be obtained, after September 1 each year, from Office of Computer Assisted Registration Services, 201 Student Services Building, The University of Tennessee, Knoxville, TN 37996-0300.

Applications must be completed and mailed in time to reach the UT Knoxville Director of Admissions by January 15 each year. All supporting documents, official transcripts, Veterinary College Admission Test (VCAT) results from a test taken within 24 months of the January 15 application deadline date, and letters of reference must arrive not later than 30 days after the application deadline date. NON-TENNESSEE APPLICANTS MUST HAVE A MINIMUM CUMULATIVE GRADE-POINT AVERAGE OF 3.2 ON A 4.0 SCALE.

Applications are accepted only from U.S. citizens or permanent residents of the U.S.

Veterinary Medicine

500 Thesis (1-15) P/NP only. E
501 Special Topics in Small Animal Medicine and Surgery (1-4) May be repeated. Maximum 6 hrs. E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student 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
600 Doctoral Research and Dissertation (3-15) P/NP only. E

D.V.M. Curriculum

The curriculum of the College of Veterinary Medicine is a nine-semester, four-year program. Each class begins in August and graduates four years later in May. The first three years follow the traditional fall and spring semesters with the summer break following years one and two. The final year of the professional curriculum begins immediately following semester six and is a continuous clinical rotation extending over one calendar year.

The first year consists mostly of the preclinical subjects of anatomy, physiology, histology, and microbiology. Also included in the first year are clinical subjects of physical diagnosis and anesthesiology. Considerable integration of subject matter is incorporated during this year.

The second and third years include the study of diseases, their causes, diagnosis, treatment and prevention, and courses are team-taught on an organ system basis.

The final year (three semesters) is devoted to intensive education in solving animal disease problems, involving extensive clinical experience in the Veterinary Teaching Hospital. Each student will rotate through a series of clinical blocks.

An innovative feature of this curriculum is the designation of semester six as one in which the individual student may select his or her courses of study. This allows select students who have specific educational goals (such as advanced or dual degree programs) to enroll in all, some, or none of the regularly scheduled courses during that semester. Students enrolled in the D.V.M. program are required to complete at least 16 credit hours in the sixth semester and may register for up to 10 credit hours of graduate courses without enrolling in The Graduate School and these hours will be credited toward the D.V.M. degree. This semester of elective study offers a unique educational alternative for select students in the CVM and is intended to enhance professional growth, concentration in an area of interest and career opportunities.

In addition to education in the science and art of veterinary medicine, students receive instruction in paramedical subjects such as animal behavior, medical communication, professional ethics, jurisprudence, economics, and practice management.

The curriculum requires successful completion of 154 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. Because of the interdisciplinary departmental administration of the College of Veterinary Medicine, the faculty have opportunities in the graduate programs of other instructional units, including Animal Science (nutrition, physiology, genetics and animal management), Microbiology (bacteriology, virology and immunology), Ecology (environmental toxicology), Public Health, and Comparative and Experimental Medicine. (Refer to other sections of this catalog for a full description of these programs.) The majority of the graduate students and graduate faculty of the College of Veterinary Medicine are involved in the Comparative and Experimental Medicine program. This program provides a wide spectrum of interdisciplinary training that
PREPARING GRADUATES FOR TEACHING AND/OR RESEARCH CAREERS IN THE HEALTH SCIENCES.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. and Ph.D. programs in Comparative and Experimental Medicine are available to residents of the state of Kentucky. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

PROFESSIONAL COURSES


817 Special Problems in Microbiology (1-8) Extramural and specially designed study for students interested in select topics in bacteriology, mycology, virology and immunology.

821-22 Anatomy I, II (4,4) Gross and applied anatomy: neural structures of common domestic animals; dog, cat, horse, cow. Dissection of embalmed specimens, preparations, slides, models, and live animals.

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 pharmacology, medicine, pathology, and surgery. Cellular, neural, cardiovascular, renal, respiratory, digestive, endocrine, and reproductive physiology.


827 Special Problems in Animal Science (1-8) Extramural and specially designed study for students interested in select topics in bacteriology, mycology, virology and immunology.

830 Art of Veterinary Medicine I (1) Paramedical subjects important to veterinary medicine: practice management, interpersonal relations, communications, jurisprudence, ethics, careers, animal behavior and veterinary history. May be repeated. S/NC only.

831 Physical Diagnosis (1) Basic care, feeding, restraint, and handling domestic animals. Introduction to physical examination and diagnostic techniques used by veterinarians.

832 Anesthesiology (2) Principles of anesthesiology: pharmacology of anesthetics, agents, and introduction to anesthetic techniques in veterinary medicine.

833 Epidemiology/Public Health (4) Principles of epidemiology and public health. Host-agent relationships, public health aspects of veterinary medicine, and role of the veterinarian in ecology and food hygiene.

834 Hematopoietic System (3) Pathophysiology, special pathology, and clinical management of diseases of the hematopoietic and lymphoid organs and tissues. Principles, methods of laboratory evaluation of diseases of other organ systems.

835 Medical Interaction (2) Multidisciplinary laboratories and lectures of physiologic, pharmacologic and surgical concepts. Applied techniques in animal handling to facilitate anesthesia, surgery, post-surgical recovery and wound healing. Demonstration of physiologic and pharmacologic principles and introduction to instrument action to measure physiological processes and drug effects.

836 Toxicology (2) Principles of toxicology, molecular mechanisms, pathologic processes and clinical features of animal diseases caused by common toxic agents.

840 Integumentary System (3) Pathophysiology, special pathology, medicine and surgery of diseases of integumentary system. Laboratory examination, pathology, diagnosis and treatment.

841 Reproductive System (4) Pathophysiology, special pathology, medicine and surgery of diseases of male and female reproductive systems and mammary glands.

842 Alimentary System (5) Pathophysiology, special pathology, medicine and surgery of diseases of alimentary systems.

843 Musculoskeletal Systems I (3) Pathophysiology, special pathology, medicine and surgery of diseases of muscular and skeletal systems. Basic principles, pathologic changes and radiographic interpretation.

844 Musculoskeletal Systems II (3) Pathophysiology, special pathology, medicine and surgery of diseases of muscular and skeletal systems. Advanced principles, radiographic interpretation and surgical procedures.

845 Principles of Medical Science (2) Physiologic and pathologic principles underlying mechanisms of disease. Selected examples of human and animal diseases: recent scientific advances in biomedical sciences.

846 Multispecies Medicine (4) Anatomy, pathophysiology, medicine, and surgery of avian species, laboratory and zoo animals and reptiles. Species and diseases seen by the practicing veterinarian. Current topics on foreign animal diseases.

847 Current Topics in Veterinary Medicine (1-3) Elective subjects in veterinary medicine: basic sciences, clinical specialties and issues related to veterinary practice.

848 Art of Veterinary Medicine II (1) Paramedical subjects important to veterinary practice: practice management, interpersonal relations, communication, jurisprudence, ethics, careers, animal behavior and veterinary history. May be repeated. S/NC only.

849 General Elective in Clinics (2) Special rotation with clinical training in urban practice, rural practice, environmental practice and pathology. S/NC or letter grade.

850 Introduction to Clinics (1) Clinical veterinary practice with discussions and practical experience. Problem-solving and integration of basic sciences with clinical applications. Problem-oriented veterinary medical record.

851 Urinary System (3) Pathophysiology, special pathology, medicine and surgery of diseases of urinary system. Urinary system in health and disease.

852 Cardiovascular System (2) Pathophysiology, special pathology, medicine and surgery of diseases of cardiovascular system. Anatomic, physiologic and pharmacologic principles which provide basis for treatment.


854 Respiratory System (3) Pathophysiology, special pathology, medicine and surgery of diseases of respiratory system. Upper and lower respiratory system: infections and noninfectious diseases.

856 Radiology (3) Basic, advanced and special techniques in radiology with interpretation and use of radiologic and related techniques in diagnosis and treatment of animal diseases.

858 Special Senses (2) Pathophysiology, special pathology, medicine and surgery of diseases of visual and auditory systems.

859 Nervous System (3) Pathophysiology, special pathology, medicine and surgery of diseases of nervous system. Clinical neurology and neuropathology.

860 Clinical Rotation in Specialties (2) Clinical training in specialty services: anesthesiology, ophthalmology or dermatology: responsibility for diagnosis, patient care, and treatment of clinical cases in both urban and rural practice.

861 Clinical Clerkship (2) Advanced clinical training in urban practice, rural practice, environmental practice, and pathology. S/NC or letter grade.

861 Pharmacology (4) Principles of pharmacokinetics and pharmacodynamic properties of veterinary drugs: mode of action, pharmacologic effects, chemical and physical properties, metabolism, toxicities, important drug interactions and clinical application.

865 Clinical Rotation in Environmental Practice (2) Clinical training in avian medicine, laboratory animal and zoo animal medicine, epidemiology, public health, and other related disciplines.

867 Special Problems in Environmental Practice (1-8) Extramural and specially designed study for students interested in select topics in avian medicine, laboratory animal medicine, zoo animal medicine, epidemiology, public health, pharmacology or toxicology.

871 General Pathology (4) Principles of pathology: causes based on disturbances of cell growth, inflammation, and neoplasia.

873 Parasitology (3) Principles of parasitology: protozoology, helminthology, and entomology and relationship to diseases in animals.

875 Clinical Rotations in Pathobiology (2) Clinical training and demonstrations in laboratory diagnosis: post-mortem examination and clinical pathologic parasiologic and microbiologic techniques.

876 Clinical Rotations in Pathobiology II (2) Clinical training and demonstrations in laboratory diagnosis: post-mortem examination and clinical pathologicparasiologic and microbiologic techniques.

877 Special Problems in Pathobiology (1-8) Extramural and specially designed study for students interested in select topics in morphologic pathology, clinical pathobiology, and clinical microbiology and parasitology.

881 Clinical Rotations in Urban Practice I (4) Clinical training in medicine, surgery and specialty disciplines for companion animals. Direct responsibility for diagnosis, care, and treatment of clinical patients.

882 Clinical Rotations in Urban Practice II (4) Clinical training in medicine, surgery and specialty disciplines for companion animals. Direct responsibility for diagnosis, care, and treatment of clinical patients.

883 Clinical Rotations in Urban Practice III (4) Clinical training in medicine, surgery and specialty disciplines for companion animals. Direct responsibility for diagnosis, care, and treatment of clinical patients.

884 Clinical Rotations in Urban Practice IV (4) Clinical training in medicine, surgery and specialty disciplines for companion animals. Direct responsibility for diagnosis, care, and treatment of clinical patients.

885 Clinical Rotation in Radiology (2) Clinical training in radiographic techniques and interpretation of radiographs as part of diagnostic process.

887 Special Problems in Urban Practice (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.

891 Clinical Rotations in Rural Practice I (4) Clinical training in medicine, surgery, specialty disciplines and herd health of food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

892 Clinical Rotations in Rural Practice II (4) Clinical training in medicine, surgery, specialty disciplines and herd health of food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

893 Clinical Rotations in Rural Practice 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.

894 Clinical Rotations in Rural Practice IV (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.
Zoology (College of Liberal Arts)

MAJOR DEGREES

Zoology ........................................ M.S., Ph.D.

Arthur C. Echternacht, Head

Professors:
Bagby, R. M., Ph.D. ......................... Illinois
Bunting, Dewey L., Ph.D. ................. Oklahoma State
Carlson, J. G. (Emeritus) (Distinguished Prof.), Ph.D. .... Pennsylvania
Chen, T. T., Ph.D. ......................... Florida
Echternacht, Arthur C., Ph.D. ............ Kansas
Etieier, D. A., Ph.D. ........................ Minnesota
Handel, Mary Ann, Ph.D. ................. Kansas State
Hochman, B. (Emeritus), Ph.D. .......... California
Joan, K. W., Ph.D. .......................... London
Joy, D. C. (Distinguished Scientist), Ph.D. ............... Oxford (UK)
Kennedy, J. R., Ph.D. ........................ Iowa
Lies, J. N. (Emeritus), Ph.D. ............. Ohio State
MacCabe, J. A. (Liaison), Ph.D. ......... California (Davis)
McCracken, G. F., Ph.D. ................. Cornell
Pimm, S. L., Ph.D. ............................. New Mexico State
Riechert, Susan E., Ph.D. ................. Wisconsin
Roth, L. Evans, Ph.D. ....................... Chicago
Shivers, C. A., Ph.D. ....................... Michigan State
Vaughan, G. A., Ph.D. ..................... Duke
Watson, H. G. (Emeritus), Ph.D. .......... Florida
Whitton, G. L., Ph.D. ..................... Iowa

Associate Professors:
Burnham, K. D. (Emeritus), Ph.D. ...... Iowa
Drake, J. A., Ph.D. .......................... Purdue
Fox, David J., Ph.D. ....................... Johns Hopkins
Ganguly, R., Ph.D. ........................... Nebraska
Greenberg, Neil, Ph.D. ................. Rutgers
McKee, B. D., Ph.D. ....................... Michigan State
Pan, M. L., Ph.D. .............................. Pennsylvania

Research Associate Professor:
Tindall, R., Ph.D. ............................. Penn State

Assistant Professors:
Boake, C. R. B., Ph.D. ....................... Cornell
Gittleman, J. L., Ph.D. ....................... Sussex
Hall, J. C., Ph.D. ............................. Illinois

The Department of Zoology offers the Master of Science and Doctor of Philosophy with concentrations in aquatic biology, ecology, cell and molecular biology, physiology, genetics, and reproductive and developmental biology.

REQUIREMENTS FOR ADMISSION

Applicants for graduate study are expected to have a background no less extensive than that required of undergraduate majors in this department. This includes a knowledge of the basic principles of cell biology, genetics, and ecology. Other requirements for admission are:
1. one year of general zoology or biology;
2. 18 semester hours of upper division zoology or biology;
3. two years of chemistry including one year of general inorganic chemistry;
4. one year of mathematics including calculus;
5. one year of physics;
6. Graduate Record Examination scores (general and biology); and
7. a grade-point average of 3.0 out of 4.0.

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

THE MASTER'S PROGRAM

Special requirements in Zoology are as follows:
1. completion of course requirements as determined by the candidate's faculty committee, including a course in biostatistics;
2. achievement of a 3.0 or better GPA in all courses taken for graduate credit; (3) completion of a thesis.

THE DOCTORAL PROGRAM

Special requirements in Zoology are as follows:
1. courses as determined by the candidate's faculty committee, including a course in biostatistics;
2. an oral and comprehensive written examination in zoology and allied fields in which the candidate has had training;
3. a reading knowledge of at least one foreign language in which there exists a sizeable amount of literature relevant to the major field of study. The student has the option of demonstrating a reading knowledge of this foreign language by (a) passing the official reading examination given by the language department or (b) earning a grade of at least a B in the second semester of a special language reading course for graduate students. This foreign language requirement must be fulfilled before a student can take the comprehensive examination.

GRADUATE COURSES

403 General Genetics Laboratory (2) Experiments designed to illustrate basic principles of inheritance; primary organism -- Drosophila. Prereq: Biology 220. 2 labs.
405-06-11-12 Minicourse in Zoology (2,2,2,2) Select advanced topics in zoology, concentrated in time and subject matter. Consult departmental listing for topics offered. Prereq: As announced. May be repeated. Maximum 4 hrs may apply toward zoology major.
420 Cell and Tissue Structure and Function (4) Study of animal cells and tissues at light and electron microscope levels. Prereq: Biology 210. 2 hrs and 2 labs.
430 Immunology (3) (Same as Microbiology 430.)
439 Immunology Laboratory (2) (Same as Microbiology 439.)
449 Laboratory in Physiology (2) Prereq or coreq: 440 or 445.
450 Comparative Animal Behavior (3) Principles and methods of ethology; ecological, developmental, physiological and evolutionary aspects. (Same as Psychology 480.)
459 Comparative Animal Behavior Laboratory (3) Introduction to observational and experimental research in ethology. Coreq: 450. (Same as Psychology 459.)
460 Evolution (3) Modern concepts of animal evolution. Prereq: Biology 220.
465 Human Genetics (3) Genetic and molecular principles and problems of human inheritance. Prereq: Biology 220.
470 Aquatic Ecology (3) Introduction to physicochemical nature of inland waters with description of biotic communities and their interrelationships. Prereq: Chemistry 120-30 and Biology 230. 2 hrs and 1 lab.
472 Arachnology (3) Biology of spiders, mites, scorpions and relatives. Prereq: 366 or 386. 2 hrs and 1 lab.
473 Herpetology (3) Biology of amphibians and reptiles, ecology and adaptive radiation. Prereq: Biology 230. 2 hrs and 1 lab.
474 Ichthyology (4) Evolution, classification, collection and identification, distribution and biology of fishes, freshwater fauna of Eastern North American. Prereq: Biology 230 or consent of instructor. 2 hrs and 2 labs.
475 Ornithology (3) Behavior, ecology, populations, evolution and field identification of birds. Prereq: Biology 230. 2 hrs and 1 lab.
476 Mammalogy (3) Evolution, classification, biogeography, ecology, behavior and functional anatomy of mammals. Prereq: Biology 230 or equivalent. 2 hrs and 1 lab.
480 Physiology of Exercise (3) (Same as Physical Education 480.)
490 Comparative Endocrinology (3) Comparative analysis of physiology and morphology of endocrine glands in vertebrates and invertebrates, their role and interaction in maintenance of organism and species. Prereq: 440 or equivalent.
500 Thesis (1-15) P/NP only, E.
501 Graduate Research Participation (3) Advanced research techniques studied under supervision of staff research director. Open to all graduate students in good standing. Prereq: Consent of department and research director. S/NC only.
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only, E.
503 Zoology Seminar (1) Advanced topics in zoology. Senior zoology majors encouraged. Required of all first- and second-year graduate students. May be repeated. Maximum 4 hrs. S/NC only.
504 Special Topics (1-2) Selected directed readings or special course in topics of current interest. Consult departmental listing for offerings. May be repeated with consent of instructor. Maximum 6 hrs. S/NC only.
506 Research Methods (1-3) Instruction in methods and techniques of research. Consult departmental listing for offerings. May be repeated with consent of instructor. Maximum 9 hrs.
507 Animal Cell Culture (2) Techniques for culture of animal cells, tissues and organs. 1 hr and 1 lab.
510 Introduction to Electron Microscopy - Transmission Electron Microscope (4) Practical application of techniques for preparation of biological samples for viewing in transmission electron microscopy. Use of microscope and ancillary equipment, darkroom techniques, preparation of materials for publication and special project. Admission limited only to departmentally approved graduate students. (Same as Botany 510.) 2-3 hr labs. Sp

511 Introduction to Electron Microscopy - Scanning Electron Microscope (3) Practical introduction to techniques of electron microscopy and to scanning electron microscopy. 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

513 Advanced Developmental Biology (3) Molecular and genetic aspects of differentiation and morphogenesis; current literature. Recommended prereq: Life Sciences 511-12.

516 Colloquium in Ethology (1) (Same as Psychology 516.)

521 Advanced Mammalian Physiology I (4) (Same as Animal Science 521.)

522 Advanced Mammalian Physiology II (4) Respiratory renal, gastrointestinal, and reproductive physiology, acid-base mechanisms, and metabolism. Prereq: 521. (Same as Animal Science 522.)

523 Physiology of Hormones (3) Cellular and organismal action of hormones in invertebrate and vertebrate animals. Prereq: 490 or consent of instructor. Recommended prereq: Biochemistry 410. 2 hrs and 1 lab.

524 Physiological Ecology of Animals (3) Adaptive physiological response of animals to natural changes in or extremes of physical and biotic environment. Terrestrial vertebrates. Prereq: Undergraduate courses in animal physiology and ecology, 440 and Biology 230 or equivalent.

525 Physiological Ethology (3) Behavioral endocrinology and neurology from ethological perspective; reciprocal relationships of physiology and behavior in natural contest. Term paper, review of assigned topic, creative development of special aspect. Prereq: 450 or undergraduate physiology, or consent of instructor.

526 General Vertebrate Neuroanatomy (3) (Same as Psychology 526.)

540 Insect Taxonomy I: Major Orders (3) Survey of classification of major orders of insects, with practical experience in identification of insects at family level. Prereq: Consent of instructor. 4 hrs combined lecture and lab.

541 Insect Taxonomy II: Minor Orders (3) Survey of classification of minor orders of insects, with practical experience in identification of insects at family level. Prereq: 540 or consent of instructor. 4 hrs combined lecture and lab.

542 Insect Structure and Function (3) Integrated study of morphology and physiology at tissue and cellular level of insects. Prereq: Consent of instructor.

543 Aquatic Insects (3) Taxonomy and biology of aquatic insects; immature forms. Prereq: Consent of instructor. 2 hrs and 1 lab.

544 Fresh Water Invertebrate Zoology (3) Ecology and taxonomy of fresh water invertebrates exclusive of insects. Prereq: 360. 3 hrs lab and field study.

545 Advanced Animal Behavior (3) Second-level course in ethology, stressing evolution, genetics, physiology, ecology and human behavior. Prereq: 450 or equivalent. (Same as Psychology 545.)

560 Biometry (3) Statistical methods in analysis of quantitative biological data. Prereq: Statistics course or consent of instructor.

573 Population Biology (3) Genetics and ecology of natural populations of plants and animals and aspects of behavior in determining population structure. Prereq: Introductory courses in ecology and genetics. (Same as Botany 573 and Ecology 573.)

575 Ecological Genetics (3) Genetics of natural populations, using both single-locus and quantitative genetic approaches. Prereq: 573 and statistics course.

583 Zoogeography (3) Processes determining geographic distribution of animals and distribution and composition of animal communities. Prereq: Ecology course or consent of instructor.

591 Foreign Study (1-15) See page 32.

592 Off-Campus Study (1-15) See page 32.

593 Independent Study (1-15) See page 32.

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

601 Advanced Topics (1-3) Readings and discussion of recent advances. Consult the departmental listing for offerings. May be repeated with consent of department. Maximum 9 hrs.

602 Seminar in Cell and Molecular Biology (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs.

603 Seminar in Genetics (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs.

604 Seminar in Developmental Biology (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs.

605 Seminar in Physiology (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs.

606 Seminar in Aquatic Biology (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs.

607 Seminar in Ecology (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs.

608 Seminar in Ethology (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs.

609 Seminar in Organic Evolution (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs.

610 Current Topics in Cell and Developmental Biology (1) Critical analyses of current literature in journal club format. May be repeated. Maximum 10 hrs. S/NC only.
FACILITIES FOR RESEARCH AND SERVICE
Facilities for Research and Service

Bureau of Educational Research and Service
(College of Education)

Carol E. Kasworm, Director

Four major types of activities—research, development, educational services, and publications—are channeled through the Bureau of Educational Research and Service (BERS), located in 212 CEB. The research activities relate to the development of research proposals, conducting and/or assisting in research, and assisting others in development of research proposals in the College of Education. Educational services include a wide list of activities such as in-service educational programs, consultant services, and technical assistance and administrative training programs. Official publications of the College of Education are developed through the Bureau. A limited number of graduate student assistantships are available.

Center for Information Studies
Graduate School of Library and Information Science

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 364 Temple Court, has performed research for the federal government, state and local governments, companies, etc. Projects have ranged from strategic planning efforts to information system and service evaluations, to modeling of scientific and technical communication. Staff of the Center have been actively involved in proposal development and project performance with faculty and staff in other centers and departments at the University.

Areas of interest to the Center include information systems design, information organization and retrieval in very large databases, directories and locator tools in a networked environment, design of regional library and information system networks, new technology applications, information system support for educational reform, modeling of information processes, development of measures and methods for evaluating information system performance and effectiveness.

Centers of Excellence

Give a few outstanding academic programs in state-aided colleges and universities a special push toward prominence, well beyond regular annual increases for all programs. In 1984, the General Assembly appropriated and the governor approved $10 million for the first Centers of Excellence throughout the state. The public colleges and universities submitted their proposals for Centers of Excellence to the Tennessee Higher Education Commission, which made the final determinations. Funding has been extended each successive year, and now five of the University's ten Centers of Excellence are sponsored by UT Knoxville. Concurrently, the University has received state funding, which it must match dollar for dollar, for Chairs of Excellence. These Chairs are $1 million endowed professorships in areas of significance to the University and to the individual, foundation, or corporation providing the matching gift money.

The combination of the Centers of Excellence and Chairs of Excellence adds a dimension to The University of Tennessee that is not easily equaled by other institutions. UT plays a unique role in regional and national leader in instruction, research, and public service is enhanced as a result of the infusion of these special funds. For information concerning the individual centers sponsored by UT, contact:

Center for Laser Applications
Dr. Dennis Keefer, Director
UT Space Institute
Tullahoma, TN 37388-8897
(615) 455-0631 Ext. 475

Center for Livestock Diseases and Human Health
Dr. G. M. H. Shires, Director
College of Veterinary Medicine
UT Knoxville
Knoxville, TN 37996
(615) 974-7262

Center for Laser Applications
Dr. Dennis Keefer, Director
UT Space Institute
Tullahoma, TN 37388-8897
(615) 455-0631 Ext. 475

Center for Laser Applications
Dr. Dennis Keefer, Director
UT Space Institute
Tullahoma, TN 37388-8897
(615) 455-0631 Ext. 475

Center for Laser Applications
Dr. Dennis Keefer, Director
UT Space Institute
Tullahoma, TN 37388-8897
(615) 455-0631 Ext. 475

Center for Laser Applications
Dr. Dennis Keefer, Director
UT Space Institute
Tullahoma, TN 37388-8897
(615) 455-0631 Ext. 475
Child Development Laboratories
(College of Human Ecology)

Anne Miller, Staff Director

The Child Development Laboratories, operated by the Child and Family Studies department within the College of Human Ecology since 1927, currently offer child care programs for 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 a tele-teleradiology laboratory that features unique videotaping capabilities in all classrooms, small group research rooms, and observation booths that facilitate teacher training and research. A variety of specialty projects (such as the development of creativity in young children, parental listening behaviors, 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 Association of Early Childhood Programs, a division of the National Association for the Education of Young Children.

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 communications, and others interested in improving the quality of human communications.

Computing Center
Fred H. Harris, Interim Director

Faculty Associates:
Instructional Technology: Dr. Patricia L. Fisher; Art: Susan E. Metros; Computer Science: Dr. David W. Straight; Engineering: Dr. Osama Solomon; Physics: Dr. William E. Blass; Statistics: Dr. James G. Schmidhammer.

The University of Tennessee Computing Center (UTCC), which is part of the Division of Computing and Telecommunications, provides computing facilities and services for the University's teaching, research, public service, and administrative activities. UTCC offices and principal computing facilities are located on the first two floors of Stokely Management Center (SMC) and on the third floor of Dunford Hall.

The Computer Access for Education (CAE) program provides every UT Knoxville student, faculty, and staff member the opportunity for computing experience through an individual UTCC account. Student accounts for use in coursework are requested by the department through which the course is offered. Faculty and staff members can request a UTCC account for research or administrative services of the department and other university faculty and students; to prepare undergraduate students for the dynamic world of computing; and to provide a model early childhood education program for children, families and early childhood professionals.

The programs are equipped with a teletelmetry laboratory that features unique videotaping capabilities in all classrooms, small group research rooms, and observation booths that facilitate teacher training and research. A variety of research projects (such as the development of creativity in young children, parental listening behaviors, 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 Association of Early Childhood Programs, a division of the National Association for the Education of Young Children.

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 communications, and others interested in improving the quality of human communications.

Computing Center
Fred H. Harris, Interim Director

Faculty Associates:
Instructional Technology: Dr. Patricia L. Fisher; Art: Susan E. Metros; Computer Science: Dr. David W. Straight; Engineering: Dr. Osama Solomon; Physics: Dr. William E. Blass; Statistics: Dr. James G. Schmidhammer.

The University of Tennessee Computing Center (UTCC), which is part of the Division of Computing and Telecommunications, provides computing facilities and services for the University's teaching, research, public service, and administrative activities. UTCC offices and principal computing facilities are located on the first two floors of Stokely Management Center (SMC) and on the third floor of Dunford Hall.

The Computer Access for Education (CAE) program provides every UT Knoxville student, faculty, and staff member the opportunity for computing experience through an individual UTCC account. Student accounts for use in coursework are requested by the department through which the course is offered. Faculty and staff members can request a UTCC account for research or administrative services of the department and other university faculty and students; to prepare undergraduate students for the dynamic world of computing; and to provide a model early childhood education program for children, families and early childhood professionals.

The programs are equipped with a teletelmetry laboratory that features unique videotaping capabilities in all classrooms, small group research rooms, and observation booths that facilitate teacher training and research. A variety of research projects (such as the development of creativity in young children, parental listening behaviors, 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 Association of Early Childhood Programs, a division of the National Association for the Education of Young Children.

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 communications, and others interested in improving the quality of human communications.

Computing Center
Fred H. Harris, Interim Director

Faculty Associates:
Instructional Technology: Dr. Patricia L. Fisher; Art: Susan E. Metros; Computer Science: Dr. David W. Straight; Engineering: Dr. Osama Solomon; Physics: Dr. William E. Blass; Statistics: Dr. James G. Schmidhammer.

The University of Tennessee Computing Center (UTCC), which is part of the Division of Computing and Telecommunications, provides computing facilities and services for the University's teaching, research, public service, and administrative activities. UTCC offices and principal computing facilities are located on the first two floors of Stokely Management Center (SMC) and on the third floor of Dunford Hall.

The Computer Access for Education (CAE) program provides every UT Knoxville student, faculty, and staff member the opportunity for computing experience through an individual UTCC account. Student accounts for use in coursework are requested by the department through which the course is offered. Faculty and staff members can request a UTCC account for research or administrative services of the department and other university faculty and students; to prepare undergraduate students for the dynamic world of computing; and to provide a model early childhood education program for children, families and early childhood professionals.

The programs are equipped with a teletelmetry laboratory that features unique videotaping capabilities in all classrooms, small group research rooms, and observation booths that facilitate teacher training and research. A variety of research projects (such as the development of creativity in young children, parental listening behaviors, 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 Association of Early Childhood Programs, a division of the National Association for the Education of Young Children.

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 communications, and others interested in improving the quality of human communications.
integrated tablets, and graphics plotters. Many of the terminals and microcomputers in the user work areas are capable of being used for graphics.

A CalComp 1051 vector plotter is used to produce graphics output from jobs run on the IBM and the DEC VAXcluster computers. An Imagen laser printer is used to produce high quality printed output. The Imagen printer can also produce graphics at 300 dots per inch.

A Xerox DocuTech Production Publishing System, located at UT Graphic Arts Services includes a 600 dpi laser printer connected to a scanner and network media server. It permits electronic transmission of documents for processing from computers on the UTCC network.

Continuing Education and Public Service

Laverne B. Lindsey, Associate Vice Chancellor for Academic Affairs and Dean

The Division of Continuing Education, Knoxville, is the administrative unit of UT Knoxville that extends academic courses, educational services, and other programs to the non-traditional student. While most people who participate in the programs are adults, persons of all ages and academic levels enroll in the credit and non-credit offerings of the Division.

Programs and courses are based upon student needs and desires, whether for self-motivated learning; for leisure and recreational programs; or for professional promotion, certification, licensure, re licensure, or mid-career changes. The Division provides these educational opportunities through program coordination and development of the five departments: the University Evening School, Non-Credit Programs, Department of Conferences, Department of Independent Study, and English Language Institute.

UNIVERSITY EVENING SCHOOL

Sam C. Bills, Associate Dean of Continuing Education and Director

The University Evening School, in conjunction with academic colleges and departments, administers credit programs for those students attending classes on- and off campus in a variety of nontraditional formats. Support services are provided to assist students in their educational pursuits.

On-Campus Evening Program

Classes are offered during late afternoon and evening hours for those students who work or have other commitments during the day. Some departments within the Colleges of Communications, Education, and Engineering offer all courses required for an advanced degree during the evening. For other majors, consult the appropriate academic department.

Mini-Term

The University Evening School offers a Mini-Term during May. Students may enroll in one concentrated credit course during the Mini-Term period.

Courses and instructors listed for the Mini-Term are carefully selected to reflect a broad academic base of individualized offerings suited to an intensive program of study. Courses cover material and information included in regular semester offerings.

Off Campus Programs

The Evening School makes arrangements for departments to conduct undergraduate and graduate courses in many locations away from the Knoxville campus. The courses are scheduled in response to requests and identifiable needs of adult part-time students who live some distance from the UT Knoxville location. All course offerings and instructors are approved by the appropriate academic departments, and the credit awarded is resident credit.

The College of Education offers the following graduate degree programs: Doctor of Education with a major in Educational Administration and Supervision (Chattanooga); Specialist in Education with a major in Educational Administration and Supervision (Chattanooga); Master of Science with a major in Technological and Adult Education (Statewide).

The Evening School administers an off-campus center at Oak Ridge where courses leading to advanced degrees in science and engineering are offered (see listing under Off-Campus Graduate Centers).

Distance Education

The Evening School in concert with several academic departments at UT Knoxville offers interactive telecourses which allow students at distant locations to see and participate actively with the instructor teaching in Knoxville. Graduate courses in various disciplines are transmitted to several sites through use of this advanced technology. Offerings are expected to increase through the 1990s.

Videotaped courses in engineering and other fields are sent to a variety of sites to accommodate UT Knoxville students pursuing advanced degrees at distant locations.

Workshops

Credit workshops are coordinated through various academic departments of the University and give students the opportunity to participate in short periods of intensive study. Workshops offer flexibility of timing, location, and content. Summer workshops are particularly popular with teachers and school administrators. Although most workshops are held on the UT Knoxville campus, geography is not a limiting factor.

Student Services

A comprehensive program of services including academic advising and financial aid information is provided by the University Evening School for both on- and off-campus students.

Registration

Registration by mail, FAX, or phone is offered as a convenience to former Evening School students. Secondary registration at both on- and off-campus locations is also available.

For information, contact the UT Evening School, 451 Communications Bldg., University of Tennessee, Knoxville, TN 37996-0341, or telephone (615) 974-5361 or 1-800-567-4VOLS, FAX (615) 974-2027.

NON-CREDIT PROGRAMS

Cheryl LaBerge, Director

Non-Credit Programs provide a comprehensive array of courses and seminars designed to serve the needs of individuals and businesses in Knoxville and surrounding communities. Most courses are offered on a quarterly basis in the evening on the University campus and at selected off-campus locations. Courses are taught by University faculty when possible and citizens of the community who have gained a reputation for certain competencies or technical skills. Courses also are delivered "on-site" for business or industrial clients, with instructional services tailored to the needs of each individual group.

Courses range from computer literacy and management, to gardening, exercise and music. There are also courses which meet requirements of the state or other agencies for certification in fields such as real estate, aviation, CEBS (Certified Employee Benefit Specialist) and CCA (Certified Credit Administrator). The department co-sponsors the Smoky Mountain Field School with the Great Smoky Mountains National Park.

Continuing Education Units (CEUs) are awarded to students satisfactorily completing selected courses and seminars offered by the department.

For further information or to register, contact Non-Credit Programs, 600 Henley Street, Suite 105, Knoxville, TN 37902 or telephone (615) 974-0100 or 1-800-284-8885.

DEPARTMENT OF CONFERENCES

Novel L. Burkett, Director

UT Conferences, housed in the Conference Center in downtown Knoxville, provides management services to individuals or groups who desire to hold a high quality convention, conference or meeting anywhere in the state of Tennessee or across the United States. Utilizing the new Conference Center, statewide University system facilities, major hotels and convention centers across Tennessee and the U.S., the department assists University organizations and outside groups in designing programs to meet the needs of clients. The staff provides professional guidance and management for small group meetings as well as for major conventions of several thousand delegates. Consulting and support services range from planning and budgeting to lodging, food services, speakers, promotional material, meeting rooms, and all details to assure a successful event. Programs which meet appropriate criteria qualify for Continuing Education Credits, which become a permanent record maintained by the Division. Transcripts are available upon written request.

The Department cooperates with UT CTV to provide teleconferencing services for the University and community. Professional groups and interested individuals may arrange interactive videoconferencing to locations worldwide. Arrangements may also be made to receive (downlink) programming or to transmit (uplink) programming via satellite capabilities.

Additional information may be obtained from UT Conferences, P.O. Box 2648, Knoxville, TN 37901, or by calling (615) 974-0250. FAX (615) 974-0264.
Energy, Environment, and Resources Center
(Office of Associate Vice Chancellor)

Jack N. Barkenbus, Acting Director
The Energy, Environment, and Resources Center, 329 South Stadium Hall, was created in 1973 to encourage interdisciplinary research directed at solutions to problems related to energy and the environment. The Center involves faculty and students in research and public service projects, manages research and development projects that involve several disciplines, and assists government and industry in specific problems related to energy, environmental, resource, and technology policy issues. The Center has a close working relationship with researchers at the Oak Ridge National Laboratory and the Tennessee Valley Authority. Sponsors include federal and state agencies, industry, and foundations.

Current research includes solid, hazardous, and radioactive waste management, information systems, environmental assessment, applications of biotechnology, global environmental problems, pollution prevention, and ethical and value issues in technology policy. The Center operates the Waste Management Research and Education Institute, a state-funded Center of Excellence. Current grants and contracts of both centers are approximately eight million dollars per year.

Institute of Agriculture

D. M. (Pete) Gossett, Vice President
The Institute of Agriculture traces its history to 1869 when the University was designated as Tennessee's Federal Land-Grant Institution. Under terms of the Federal Land-Grant Act, the University was directed to offer instruction in agriculture and the mechanic arts for the first time. Since 1869, agricultural programs at the University have been expanded to include research for the development of new knowledge and extension for dissemination of such knowledge to rural people. Thus the Institute of Agriculture has come to include the work of four main divisions: Agricultural Experiment Station, Agricultural Extension Service, College of Agricultural Sciences and Natural Resources, and College of Veterinary Medicine.

Agricultural Experiment Station

Don O. Richardson, Dean
John I. Sewell, Associate Dean
Thomas H. Knoll, Associate Dean
The Agricultural Experiment Station was established by The University’s Board of Trustees on June 8, 1882, five years before the passage of the Hatch Experiment Station Act by the U.S. Congress. The University was one of the first five institutions in the U.S. to establish an Agricultural Experiment Station. Since its beginning, the Station has given first attention to investigations of concern to the agriculture of Tennessee.

The objectives of the Tennessee Agricultural Experiment Station are the creation and utilization of new knowledge through research. Fundamental research is directed toward: (a) Understanding the basic science of the processes of plant and animal production through conversion into usable products and services, (b) Understanding the resources and market forces which affect the production, transfer, processing, and utilization of agricultural commodities and the resulting impact on the economic well-being of the agricultural sector, rural areas, and the State of Tennessee; (c) Understanding the interaction of agricultural production and land uses on natural resources and the environment as they relate to long-term productivity and the quality of rural life; (d) Understanding the impact of food and fiber resources and the chemicals used in their production on people's well-being and the quality of life. Applied research utilizes these understandings to formulate effective production and marketing systems and to foster the development of a physical and economic environment that provides for the needs of rural, farm, and urban citizens.

The investigations of the Station follow a systematic method of gaining and applying knowledge efficiently to the biological, physical, and economic phases of producing, 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.

Agricultural Extension Service

Don O. Richardson, Dean
John I. Sewell, Associate Dean
Thomas H. Knoll, Associate Dean

The Agricultural Extension Service was established in 1914. Its purpose is to extend through various educational means agricultural and home economics information to farm families and others in the state who do not have the opportunity to enroll in resident courses of instruction at colleges.

The educational program is carried on through offices in each of the 95 counties of the state. Educational emphasis includes work in four major program areas: agriculture and natural resources, community resource development, home economics, and education of young people through 4-H Clubs. County Extension staff members working directly with local people are supported in the various information fields by a specialist staff, members of which are stationed either in Knoxville, Nashville, or Jackson.

The Agricultural Extension Service operates administratively as one of four units of the Institute of Agriculture. For administration, the state is divided into five districts, with supervisors located in their respective districts. District headquarters are maintained in Knoxville, Chattanooga, Cookeville, Nashville, and Jackson.

The Agricultural Extension Service operates as a three-way partnership among county, state, and federal governments. The University of Tennessee represents state and federal government and a County Agricultural Extension Committee represents county government in this partnership.

Libraries, The University of Tennessee, Knoxville

Paula T. Kaufman, Dean
Aubrey H. Mitchell, Associate Dean for Access Services
Diane E. Perushek, Associate Dean for Collection Services

Professors:
The University of Tennessee, Knoxville Libraries own* approximately 1.75 million volumes, more than 3.5 million manuscripts, 1.95 million microforms, 29,000 audio and video recordings, plus United States and United Nations documents. The UT Knoxville Libraries currently subscribe to more than 14,000 periodicals and other serial titles. The Libraries' membership in the Association of Research Libraries reflects the University's emphasis on graduate instruction and research and the support of large, comprehensive collections of library materials on a permanent basis.

The UT Knoxville Libraries consists of the main library (the John C. Hodges Library), five branches on the Knoxville campus (the Agriculture-Veterinary Medicine Library, the Cartographic Information Center, the Music Library, Special Collections Library, and the University Archives), and the Social Work Library in Nashville.

The John C. Hodges Main Library (1015 Volunteer Blvd.) is a 350,000 square-foot facility housing collections in all subject areas. The Hodges Library has comfortable study space for 3,500 people, 308 graduate student carrels, and 196 faculty studies.

The Hodges Library's research holdings are augmented by Reference Services and by Interlibrary Services. Reference Services provides research assistance and access to commercially available databases. In the reference room, users may also search a number of CD-ROM databases at no charge. Interlibrary Services borrows monographs and obtains copies of other material from libraries around the world. Library holdings are accessible via a sophisticated online catalog which can be searched in the Hodges Library, the branch libraries, and from home and office computers.

The services and facilities of the University Libraries are accessible to persons with disabilities. Adaptive equipment such as a Kurzwell Personal Reader and TDD are available at the Hodges Library.

The Agriculture-Veterinary Medicine Library (Room A-113, Veterinary Teaching-Hospital) has a strong collection in agriculture; veterinary, comparative and human medicine; and related biological sciences. It has a wide-ranging audiovisual collection and an extensive reference collection.

The Cartographic Information Center (Room 15, basement of the Hodges Library, Cumberland Ave., & 15th St.) contains a worldwide collection of over 300,000 maps covering all subjects. Maps are received from the U.S. Geological Survey, Defense Mapping Agency, and the National Ocean Survey. Maps, atlases, globes, and books relating to cartography may be borrowed for reference, research, and teaching.

The Music Library (301 Music Bldg.) has a comprehensive collection of music and music literature, including books, scores, audio and video recordings, current periodicals, and microfilm. All materials in the Library of Congress "M" classification are located here. The Special Collections Library (2nd floor, west wing of the Hodges Library) is a repository of regional and local materials, Tennesseeana, and other specialties, including legislative papers and mementoes of many Tennessee political figures. Special Collections materials are of particular interest to scholars in the fields of history, political science, social sciences, biological sciences, and the arts.

The University Archives (Room 2, Hodges Library) contains official records of the University; items published officially and unofficially by its units, departments, and agencies; and other materials that document University of Tennessee life.

The Social Work Library (1720 West End Ave., Nashville) serves College of Social Work students in field practice across the state. The library has a working collection of materials in social work and related disciplines.

The Law Library on the Knoxville campus and the libraries located on the campuses in Chattanooga, Martin, Memphis, and Tullahoma are individually administered. Each library at The University of Tennessee is accessible to all students and faculty in the system.

*Data excludes Law Library faculty and statistics.
Pattern recognition research deals with the development of techniques for the automatic detection of flaws in both continuous and piece-part produced products. Process diagnostics research involves the application of signal validation and sensor fault monitoring techniques to modern process control systems. Finally, fiber optic sensor systems development is underway for monitoring and control of chemical processes.

Oak Ridge Associated Universities

The University of Tennessee is a sponsoring institution of Oak Ridge Associated Universities (ORAU), a not-for-profit consortium of 62 colleges and universities and a management and operating contractor for the U.S. Department of Energy (DOE) with principal offices located in Oak Ridge, Tennessee. Founded in 1946, ORAU identifies and helps solve problems in science, engineering, technology, medicine, and human resources, and assists its member universities to focus their collective strengths in science and technology research on issues of national significance.

ORAU manages the Oak Ridge Institute for Science and Education (ORISE) for DOE. ORISE is responsible for national and international programs in science and engineering education, training, and management systems, energy and environment systems, and medical sciences. ORISE's competitive programs bring students at all levels, pre-college through postgraduate, and university faculty members into federal and private laboratories.

ORAU's office for University, Industry, and Government Alliances (UIGA) seeks out opportunities for collaborative alliances among its member universities, private industry, and federal laboratories. Current alliances include the Southern Association for High Energy Physics (SAHEP) and the Center for Bio- Electromagnetic Interaction Research (CBEIR). Other UIGA activities include the sponsorship of conferences and workshops, the Visiting Scholars program, and the Junior Faculty enhancement Awards.

Contact Dr. Lee Riedinger, Acting Associate Vice Chancellor for Research, for more information about ORAU programs.

Off-Campus Graduate Centers

Kingsport University Center

UT Knoxville offers at Kingsport resident graduate programs in science and engineering at the Master's level. The program is operated within the policies formulated by the Graduate Council of UT Knoxville.

Students who enroll in this program must be admitted to The Graduate School of UT Knoxville. Information and application forms may be obtained from the Kingsport University Center, The University of Tennessee, 1501 University Boulevard, Kingsport, Tennessee 37660.

Oak Ridge Graduate Program

UT Knoxville offers graduate study programs at Oak Ridge leading to Master's and doctoral degrees in engineering and supporting areas. Courses are offered in the evenings with research facilities provided by and used in cooperation with the Oak Ridge Associated Universities (ORAU).

This program is supported under a subcontract with ORAU with principal support coming from the Martin Marietta Corporation. UT is one of the sixty-two colleges and universities which sponsor ORAU, a nonprofit educational and research management corporation.

Students who enroll in this program must be admitted to The Graduate School at UT Knoxville. Information and application forms may be obtained from the UT-Oak Ridge Graduate Program, Post Office Box 117, TMSD Building, Oak Ridge, Tennessee 37831-0117.

Nashville Engineering Graduate Program

Opportunities for graduate study leading to the Master of Science in Industrial Engineering and other disciplines, as the need and resources permit, are offered by UT Knoxville. Students who enroll in these programs must be admitted to The Graduate School of UT Knoxville. Information and application forms may be obtained from the Nashville Engineering Graduate Program, P.O. Box 24180, Nashville, Tennessee 37202-4180.

Chattanooga Graduate Education Program

UT Knoxville offers a graduate program in education leading to the Specialist in Education and the Doctor of Education degrees with a major in Educational Administration and Supervision.

Students who enroll in this program must be admitted to The Graduate School of UT Knoxville. Information and application forms may be obtained from the UTK/UTC Graduate Program, Post Office Box 117, TMSD Building, Chattanooga, Tennessee 37403.

The University of Tennessee-Oak Ridge Graduate School of Biomedical Sciences

The University provides programs leading to the M.S. and Ph.D. degrees in various areas of biomedical sciences. Graduate students have the opportunity to study and do research in conjunction with the Biology Division of the Oak Ridge National Laboratory.

For complete information concerning the program, see Biomedical Sciences under Fields of Instruction.

College of Social Work

UT Knoxville offers a fully accredited two-year program leading to the Master of Science in Social Work through the College of Social Work, with programs in Knoxville, Nashville, and Memphis.

The UT Knoxville College of Social Work also offers a Doctor of Philosophy with a major in Social Work.

For complete information concerning the programs, see Social Work under Fields of Instruction.

The Psychological Clinic

(College of Liberal Arts)

Robert G. Wahler, Director

The Psychological Clinic supports graduate training in clinical psychology. Psychological diagnosis and psychotherapy are offered on an outpatient basis, with medical consultants, to the general public as well as to University students, upon referral by a physician.

Textiles and Nonwovens Development Center

(College of Human Ecology)

Larry C. Wadsworth, Director

The Textiles and Nonwovens Development Center (TANDEC) was officially dedicated in October 1990. TANDEC was made possible through a grant from Exxon Chemical Company. Nonwovens products loom large in a number of markets and TANDEC looms large in both basic research and nonwoven product development. Nonwovens research programs at UT Knoxville include structure-property-process relationships in melt blowing polyolefins, polyesters, nylon, elastomers, and the field of engineering thermoplastics and recycled plastics; mechanisms of melt blown web formation; modeling of the melt blowing and spunbonding processes; development of nonwoven materials; 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.

The primary missions of TANDEC are to conduct nonwoven and textile grant research programs and to develop new product applications. The TANDEC facilities further allow production of nonwovens on a limited basis for participating companies while equipment is not being used for research activities. The nonwovens laboratory hosts numerous guests from industry and academic, and the facilities are planned to meet their needs, while safeguarding research confidentiality.

Transportation Center

(Office of Associate Vice Chancellor)

Stephen H. Richards, Director

The Transportation Center was created in 1970 to foster and facilitate interdisciplinary research and public service in the field of transportation at The University of Tennessee. It began operating full-time in 1972 and since then has contributed greatly to the overall research program of The University.

The Center, 357 South Stadium Hall, is a University-level organization administratively positioned within the Office of the Associate Vice Chancellor for Research at UT Knoxville.
The Center's multidisciplinary staff includes over 100 full-time researchers and technicians augmented with numerous faculty and students. The Center is presently organized into four major divisions: Logistics and Systems Analysis; Infrastructure and Environment; Safety and Traffic Operations; and Mobility Services and Policy.

The Center has three goals. The first is to conduct a program of research in transportation that is recognized for its excellence, comprehensiveness, innovation, productivity, and national leadership. The second is to develop and sustain the technical expertise for high quality transportation research by the faculty and students within the various departments and colleges of UT. The third goal is to serve the transportation research, service, and training needs of state and local government, business, and industry in Tennessee, the southeast region, and the nation.

The University of Tennessee Space Institute

Joel W. Muehlhauser, Interim Vice President

The Space Institute is a graduate education and research institution located on a 365 acre lakeshore campus in Middle Tennessee. UTSI was established in 1964 and has evolved into an internationally recognized institution for graduate study and research in engineering, physics, mathematics, and computer science. The accredited academic programs and educational policies of the Space Institute have their origins in appropriate departments of The University of Tennessee, Knoxville. The more than 45 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, and Physics. In addition to the fundamental studies characteristic of each discipline, research opportunities are available in many areas including aerodynamics, atmospheric science, fluid mechanics, advanced space propulsion, neural networks, energy conversion processes, thermal sciences, coal combustion, magnetohydrodynamics, plasma physics, space systems, propulsion, computational fluid dynamics, and other aspects of atmospheric and space flight.

The Institute has an established Center of Excellence in Laser Applications and offers graduate studies and research opportunities in laser diagnostics, laser materials interactions, pico-second processes, and coherent and nonlinear optics.

The Institute was established in part to increase the research and engineering resources of Tennessee through education and practice in relevant scientific and technical areas and in part to interface University faculty and student research with the Air Force Arnold Engineering Development Center. The faculty, research activities, and facilities of the Institute, and those available at Arnold Center through appropriate contractual arrangements, provide students an unusual opportunity for significant research in these areas. Students who enroll at UTSI are admitted to The Graduate School, The University of Tennessee, Knoxville. Graduate Research Assistantships are available for qualified students. Further information may be obtained from the Dean for Academic Affairs, The University of Tennessee Space Institute, Tullahoma, Tennessee 37388.

Water Resources Research Center

(Office of Associate Vice Chancellor)

Bruce A. Tschantz, Acting Director

The Water Resources Research Center, 428 South Stadium Hall, is a federally designated institute for sponsoring and coordinating water research for the state. The purposes of the Center are: (1) to assist and support all the academic institutions of the state, public and private, in pursuing water resources research which addresses a wide range of problems of interest to the state, region, and nation; (2) to provide for information dissemination and technology transfer services to state and local government bodies, academic institutions, professional groups, environmental organizations, and others, including the general public, who have an interest in water resources matters; (3) to promote education and training in fields relating to water resources and to encourage the entry of promising students into careers in these fields.
Index

A
Academic Calendar, 4
Academic Common Market, 51, 52, 53, 55, 57, 62, 69, 70, 73, 74, 76, 80, 82, 83, 91, 100, 103, 105, 107, 109, 110, 111, 112, 120, 125, 130, 137, 139, 141, 143, 147, 159, 157, 181, 182, 163, 167, 170, 172, 174
Academic Honesty, 15
Academic Probation, 16
Academic Standards, 16
Accounting, 43
Accounting and Business Law, 36, 43
Activity Fee (University Programs and Services Fee), 23
Adding Courses, 15
Administration, Graduate School, 6, 9
Administration, University, 5
Administration, UT, Knoxville, 5
Administration of Graduate Assistantships, 12
Architectural Engineering, 37, 65
Art, 38, 53
Asian Languages, 154
Asian Studies, 114
Assistantships, inside front cover, 26
Assistantships, Policy for the Administration of, 27
Astronomy, 144
Audiology, 55
Audiology and Speech Pathology, 38, 55
Auditors and Audited Courses, 14, 24
Automobile Registration, 32
Average, Required, 18
Aviation Systems, 57
B
Biochemistry, 38, 57
Biomedical Sciences, 58, 184
Biotechnology, 120
Black Cultural Center, 30
Board of Trustees, 5
Botany, 38, 59
Broadcasting, 36, 61
Bureau of Educational Research and Service, 36, 179
Business Administration, 36, 43, 61, 80, 96, 121, 122, 124, 165
Business Administration, College of:
Accounting and Business Law, 36, 43
Economics, 36, 80
Finance, 36, 96
Management, 36, 121
Management Science, 36, 122
Marketing, Logistics and Transportation, 36, 124
Statistics, 36, 165
Business and Economic Research, Center for, 36, 179
C
Calendar for 1993-94, 4
Campus Map, inside back cover
Campus Security Information, 27
Candidate, Admission to, 18, 19, 20, 21-22
Career Services, 30
Catalog, inside front cover
Cellular, Molecular and Developmental Biology, 120
Center for Applied and Professional Ethics, 38
Center for Business and Economic Research, 36, 179
Center for Environmental Biotechnology, 38
Center for Environmental/Energy/Science Education, 37
Center for Information Studies, 179
Center for International Education, 35, 45
Center for Laser Applications, 179
Center for Measurement and Control Engineering, 37, 183
Center for Nursing Practice, 39
Center for Nursing Research, 39
Center for Physical Activity and Health, 37
Center for Psychoanalysis and the Humanities, 38
Center for Quaternary Studies of the Southeastern U.S., 38
Center for Research, Service and Inquiry, 35
Center for the Study of War and Society, 38
Center of Excellence for Materials Processing, 37, 179
Centers of Excellence, 179
Change (Revision) of Program, 13
Change of Registration, 15
 Chattanoogan Graduate Education Program, 184
Chemical Engineering, 37, 65
Chemistry, 38, 67
Child and Family Studies, 37, 68
Child Behavior Institute, 38
Child Care, 30
Child Development Laboratories, 37, 180
Cinema Studies, 114
Civil Engineering, 69
Civil and Environmental Engineering, 37, 69
Classics, 38, 72
Classifications:
Admission, 12
Residency, 23
Classified Research, 17
College Student Personnel, 85
Colleges, 35
Agricultural Sciences and Natural Resources, 35
Architecture and Planning, 35
Business Administration, 36
Education, 37
Engineering, 37
Agricultural Sciences and Natural Resources, 35, 45
Animal Science, 35, 48
Animal Science-Veterinary Medicine, 35, 50
Antropology, 38, 50
Appellate Procedure, 17
Application, Inside back cover, 12-13
Application Fee, 12, 13, 23
Application Procedures, 12
Architecture, School of, 35, 52
Architectural and Planning, College of:
Architecture, 35, 52
Planning, 35, 146
Arts and Sciences, 35
Astronomy, 144
Audiology, 55
Audiology and Speech Pathology, 38, 55
Auditors and Audited Courses, 14, 24
Automobile Registration, 32
Average, Required, 18
Aviation Systems, 57

D
Dance, 111
Dates of Registration, 4
Defense of Dissertation, 20
Deferred Payment Service Fee, 24
Definition of Graduate Terms, 17
Degree Program Admission, 12
Degree Programs, 10-11
Degree Program Requirements, 17-22
Departmental Liaison, 15
Diagnostic Examination, 20
Disabled, 14
Doctoral Degrees, 19-20
Enrollment, 13-17
Grades, 16
Graduate School, 12-22
Graduation, 21-22
Language, 10-11, 20
Master's Degrees, 18
Research, 18-20
Residence, 19, 20
Specialist in Education Degree, 18-19
Research Centers and Institutes, 179
Research Registration, 18-20
Research Requirements, 18-20
Residence Halls, inside front cover, 31
Residency Classification, Fees, 23
Responsibility, Graduate Students, inside front cover
Restricted Programs, 10-11, 12
Restricted Theses and Dissertations, 17
Retail and Consumer Sciences, 169
Returned Check Policy, 24
Revision of Admission Classification, 13
Romance and Asian Languages, 38, 154
Rural Practice, 39, 157
Rural Sociology, 45
Russian, 104
S
Safety, 104
Safety Center, 37
Safety Education and Service, 104
Scholarships, inside front cover, 26
Schools:
  Architecture, 52
  Biomedical Sciences, 58, 184
  Library and Information Science, 119
  Planning, 146
  Science Alliance, 38, 179
  Second Master's Degree, 18, 138, 172
  Section 504/EEO/Title IX, 27
  Security Information, 27
  Seniors, 14
  Services Fee, 24
  Services, Student, 30-32
  Services to the Physically Disabled, 31
  Short Courses and Workshops, 14, 181
  Small Animal Research Laboratory, 37
  Social Science Research Institute, 37
  Social Security Number, 26
  Social Work, 39, 157, 184
  Social Work, College of, 39, 157, 184
  Sociology, 38, 160
  Soil Science, 147
  Space Institute, 37, 185
Spanish, 154
Special Education, 162
Special Programs, 162
Special Services Education, 37, 162
Special Federal and State Laws and University Policies, 26
Specialist in Education Committee, 19, 21
Specialist in Education Degree, 10-11, 18, 21, 76, 83, 86, 104, 167
Speech and Hearing Science, 55
Speech Communication, 38, 165
Speech Pathology, 55
Speech Services, 31
Sponsored International Students, 26
Staff Members, Admission of, 13
State and Federal Laws, 26
State Testing and Evaluation Center, 37
Statistics, 36, 165
Student Apartments, inside front cover, 31
Student Counseling Services Center, 31
Student Employment, inside front cover, 26
Student Health Insurance, 25
Student Health Service, 31
Student Housing, inside front cover, 31
Student Identification Number, 26
Student Loans, 26
Student Services, 30-32
Summary of Procedures for Degrees, 21-22
Summer Term Fees and Expenses, 25
T
Table of Contents, 2-3
Teacher Certification, 37
Technological and Adult Education, 36, 167
Termination, 16
Terminology, 17
Terms, Definition of, 17
Test of English as a Foreign Language, 13, 14
Textile Science, 169
Textiles and Nonwovens Development Center, 37, 184
Textiles, Retailing and Interior Design, 37, 169
Theatre, 38, 171
Theses, 10-11, 18, 21
Theses and Dissertations, 18, 19, 20, 21-22
Thesis Registration, 18
Time Limit, 18, 19, 20
Timetable of Classes, inside front cover, 15
Title IX/Section 504/EEO, 27
Traffic Rules, 32
Transcripts, inside front cover, 12, 13
Transfer Credits, 17
Transit Admission, 13
Transportation and Logistics, 124
Transportation Center, 184
Trustees, Board of, 5
Tuition, 24
Tuition Payment Plans, 24
U
Undergraduate and Professional Students, 14
University Administration, 5
University Apartments, 31
University Calendar, 4
University Computing Center, 160
University Evening School, inside front cover, 181
University Fees, 23-25
University International House, 30
University Libraries, 182
University Policies, 26
University Programs and Services Fee, 24
Urban Practice, 39, 172
Urban Studies, 115
Use of Facilities Registration, 15
Use of Social Security Number, 26
UT, Knoxville Administration, 5
V
Vehicle Operation, 32
Venture Analysis, 62
Veterans' Benefits, 26
Veterinary Medicine, 39, 49, 96, 134, 142, 157, 172, 173
Veterinary Medicine, College of:
  Animal Science--Veterinary Medicine, 39, 49
  Environmental Practice, 39, 96
  Microbiology--Veterinary Medicine, 39, 134
  Pathobiology, 39, 142
  Agricultural Practice, 39, 157
  Rural Practice, 39, 172
  Veterinary Medicine Students, 14, 173
  Vocational-Technical Education, 167
W
Waiver of Fees, 25
Waste Management Research and Education Institute, 179
Water Resources Research Center, 185
Wildlife and Fisheries Science, 98
Withdrawal, 15, 25
Women's Center, 32
Women's Studies, 115
Workshops and Short Courses, 14, 181
Work-Study, inside front cover, 26
Written Examination, 18, 19
Z
Zoo, 38, 175