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<tr>
<td>June 3 (Thursday)</td>
<td>Classes Begin</td>
</tr>
<tr>
<td>July 5 (Monday)</td>
<td>Independence Day</td>
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<tr>
<td>July 7 (Wednesday)</td>
<td>First Session Ends</td>
</tr>
<tr>
<td>July 8 (Thursday)</td>
<td>Second Session Begins</td>
</tr>
<tr>
<td>August 11 (Wednesday)</td>
<td>Second Session Ends</td>
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<tr>
<td>August 13 (Friday)</td>
<td>Commencement</td>
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## Fall Semester 1999

<table>
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<tr>
<td>August 25 (Wednesday)</td>
<td>Classes Begin</td>
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<tr>
<td>September 6 (Monday)</td>
<td>Labor Day</td>
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<tr>
<td>October 21-22 (Thursday-Friday)</td>
<td>Fall Break</td>
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<tr>
<td>November 25-26 (Thursday-Friday)</td>
<td>Thanksgiving</td>
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<tr>
<td>December 9 (Thursday)</td>
<td>Classes End</td>
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<tr>
<td>December 10 (Friday)</td>
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<tr>
<td>December 11, 13-16 (Saturday, Monday-Thursday)</td>
<td>Final Exams</td>
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<tr>
<td>December 16 (Saturday)</td>
<td>Commencement</td>
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## Spring Semester 2000

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<tr>
<td>January 12 (Wednesday)</td>
<td>Classes Begin</td>
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<tr>
<td>January 17 (Monday)</td>
<td>Martin Luther King Day</td>
</tr>
<tr>
<td>March 20-24 (Monday-Friday)</td>
<td>Spring Break</td>
</tr>
<tr>
<td>April 21 (Friday)</td>
<td>Spring Recess</td>
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<tr>
<td>May 1 (Monday)</td>
<td>Classes End</td>
</tr>
<tr>
<td>May 2-3 (Tuesday-Wednesday)</td>
<td>Study Period</td>
</tr>
<tr>
<td>May 4-6, 8-9 (Thursday-Saturday, Monday-Tuesday)</td>
<td>Final Exams</td>
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<tr>
<td>May 12 (Friday)</td>
<td>Commencement</td>
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## Summer Term 2000

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<td>Classes Begin</td>
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<tr>
<td>July 4 (Tuesday)</td>
<td>Independence Day</td>
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<td>July 5 (Wednesday)</td>
<td>First Session Ends</td>
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<tr>
<td>July 6 (Thursday)</td>
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**NOTE:** Deadlines for degree requirements are at end of section on Degree Program Requirements.
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<th>College or Unit</th>
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<th>Expiration</th>
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<tr>
<td>Agric. Sci. &amp; Natural Resources</td>
<td>Dr. James D. Godkin</td>
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<td>Dr. Robert Auge</td>
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<tr>
<td>Architecture &amp; Planning</td>
<td>Mr. Jon Coddington</td>
<td>July 31, 2001</td>
<td>Dr. Max Robinson</td>
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<td>Arts &amp; Sciences</td>
<td>Dr. Kula Misra</td>
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<td>Dr. Mary Papke</td>
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<td>Dr. L. J. DeCuir</td>
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<td>Dr. Lyle W. Konigsberg</td>
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<td>Dr. Dianne Whitaker</td>
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<td>Dr. Kathleen Davis</td>
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<td>Graduate Student Association</td>
<td>Ms. Kadesha Washington</td>
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<td>Veterinary Medicine</td>
<td>Dr. Kevin Hahn</td>
<td>July 31, 2000</td>
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S. Kay Reed, Assistant to the Dean  
Diana Lopez, Director, Graduate Admissions and Records

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

A wide range of graduate programs leading to master's and doctoral degrees is available. The University offers master's programs in 76 fields, the Educational Specialist degree, doctoral work in 45 fields, and 2 professional programs. More than 5,500 graduate and professional students are enrolled on and off campus under the tutelage of 1,500 faculty members.

The Graduate School brings together faculty and graduate students as a community of scholars with a common interest in creative work and advanced study. Programs are available to individuals desiring work toward the master's and doctoral degrees or professional certification, those interested in continuing education for updating and broadening their knowledge, and those pursuing postdoctoral research. 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. Increasingly the University employs a variety of modes, traditional and non-traditional, in offering quality programs designed to serve a diverse student clientele.

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

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

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

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

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

Graduate education has been conducted at The University of Tennessee since 1821. The first known master's degree was awarded in 1827. In 1879 the Board of Trustees created a graduate department with authority to confer the Master of Arts, the Doctor of Philosophy, Civil Engineer, and Mining Engineer degrees. The Graduate Department was renamed The Graduate School in 1912. Although a Ph.D. degree was awarded in 1886 and in 1887, formal doctoral programs were not instituted until 1929 for Biological Sciences at Memphis and 1943 for Chemistry on the Knoxville campus. A Committee on Graduate Study was appointed in 1904 and coordinated the graduate programs until the Graduate Council was formed in 1949. More than 8,400 doctoral degrees and 48,900 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 striven to maintain the rich heritage and the highest quality of graduate programs at UTK.
Graduate Majors and Degree Programs

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

<table>
<thead>
<tr>
<th>MAJOR</th>
<th>DEGREE</th>
<th>GRE</th>
<th>RATING</th>
<th>DEPT. REQ.</th>
<th>THESIS REQ.</th>
<th>LANGUAGE REQ.</th>
<th>CONCENTRATIONS AVAILABLE/ EVALUATION DATES/PHONE (AREA CODE: 423)</th>
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<tr>
<td></td>
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<td>Agricultural education, agricultural extension education.</td>
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<td></td>
<td>(974-7308, <a href="mailto:riessly@utk.edu">riessly@utk.edu</a>)</td>
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<tr>
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<td></td>
<td>MS-agribusiness, agricultural economics, rural sociology.</td>
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<td></td>
<td></td>
<td>PhD-agricultural marketing &amp; price analysis, agricultural policy, farm management &amp; production economics, natural resource economics, rural development.</td>
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<td></td>
<td></td>
<td>(974-7231, <a href="mailto:jbrooker@utk.edu">jbrooker@utk.edu</a>)</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>MS &amp; PHD - animal breeding, animal management, animal nutrition, animal physiology.</td>
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<tr>
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<td>PHD - only-animal anatomy.</td>
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<td></td>
<td>(974-7296, <a href="mailto:jgodkin@utk.edu">jgodkin@utk.edu</a>)</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>PHD-agricultural electrical &amp; electronic systems, agricultural power &amp; machinery, agricultural structures &amp; environment, food &amp; process engineering, soil &amp; water conservation engineering.</td>
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<td></td>
<td></td>
<td>(974-7266, <a href="mailto:cmote@utk.edu">cmote@utk.edu</a>)</td>
</tr>
<tr>
<td>Entomology &amp; Plant Pathology</td>
<td>MS</td>
<td>G</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Entomology, plant pathology. Evaluate Mar 15 for Fall and Summer, Oct 15 for Spring.</td>
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<td></td>
<td>(974-7135, <a href="mailto:rgerhard@utk.edu">rgerhard@utk.edu</a>)</td>
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<tr>
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<td></td>
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<td></td>
<td>MS-food chemistry, food microbiology, food processing, sensory evaluation of foods.</td>
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<td></td>
<td>(974-7247, <a href="mailto:dgolden@utk.edu">dgolden@utk.edu</a>)</td>
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<td>(974-7126, <a href="mailto:ghopper@utk.edu">ghopper@utk.edu</a>)</td>
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<tr>
<td>Plant &amp; Soil Science</td>
<td>MS</td>
<td>G</td>
<td>3</td>
<td>X</td>
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<td>(974-7324, <a href="mailto:auger@utk.edu">auger@utk.edu</a>)</td>
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<td>First professional degree. Admit Summer and Fall only. Evaluate Feb 1.</td>
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<td>(974-5565, <a href="mailto:joodding@utk.edu">joodding@utk.edu</a>)</td>
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<tr>
<td>Anthropology</td>
<td>MA + G</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>MA &amp; PHD-archaeology, biological anthropology, cultural anthropology, zooarchaeology. Admit Fall only. Evaluate Jan 15.</td>
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<tr>
<td></td>
<td>PHD + G</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>(974-4408, <a href="mailto:jdoffton@utk.edu">jdoffton@utk.edu</a>)</td>
</tr>
<tr>
<td>Art</td>
<td>MFA + G</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Ceramics, drawing, graphic design, media arts, painting, printmaking, sculpture, watercolor, inter-area studies. Portfolio required.</td>
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<td>(974-3408, <a href="mailto:chodgel@utk.edu">chodgel@utk.edu</a>)</td>
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<tr>
<td>Audiology</td>
<td>MA + G</td>
<td>2</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Admit Fall only.</td>
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<td></td>
<td>(974-5019, <a href="mailto:kgross@utk.edu">kgross@utk.edu</a>)</td>
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<tr>
<td>Biochemistry and Cellular and Molecular Biology</td>
<td>MS + G</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Biochemistry, biophysics, cellular, developmental &amp; mammalian biology, genetics, radiation biology.</td>
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<td></td>
<td>PHD + G</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>(974-1227, <a href="mailto:rjbecker@utk.edu">rjbecker@utk.edu</a>)</td>
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<td>Biomedical Sciences</td>
<td>PHD, G, S</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>MS &amp; PHD-anatomy, histology, cytogenetics, cytology, ecology, genetics, mycology, morphology, mycology, microbiology, physiology, physics, psychology, zoology. Evaluate for Fall Jan 7.</td>
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<td>(974-2258, <a href="mailto:waine@utk.edu">waine@utk.edu</a>)</td>
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<tr>
<td>Botany</td>
<td>MS + G</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Botany.</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>(974-3141, <a href="mailto:cfeigerle@utk.edu">cfeigerle@utk.edu</a>)</td>
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<tr>
<td>Chemistry</td>
<td>MS + G</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Chemistry.</td>
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<td>PHD + G</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>(974-7266, <a href="mailto:cmote@utk.edu">cmote@utk.edu</a>)</td>
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<tr>
<td>Computer Science</td>
<td>MS</td>
<td>G</td>
<td>3</td>
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<td>PHD</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>(974-5067, <a href="mailto:cmote@utk.edu">cmote@utk.edu</a>)</td>
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<tr>
<td>Ecology and Evolutionary Biology</td>
<td>MS</td>
<td>G</td>
<td>3</td>
<td>X</td>
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<td>Ecology and Evolutionary Biology.</td>
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<td>PHD</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>(974-3065, <a href="mailto:cbooke@utk.edu">cbooke@utk.edu</a>)</td>
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<tr>
<td>English</td>
<td>MA, G, S</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>English.</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>(974-3421, <a href="mailto:ecampion@utk.edu">ecampion@utk.edu</a>)</td>
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<td>French</td>
<td>MA</td>
<td>G</td>
<td>3</td>
<td>X</td>
<td>X</td>
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<td>French.</td>
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<td>See Modern Foreign Languages for PHD, (974-3421, <a href="mailto:ecampion@utk.edu">ecampion@utk.edu</a>)</td>
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<td>Geography</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Geography.</td>
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<td>PHD</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>(974-2418, <a href="mailto:utkgeog@utk.edu">utkgeog@utk.edu</a>)</td>
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<td>MAJOR</td>
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<td>LANGUAGE REQ'D.</td>
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<td>Geology*</td>
<td>MS</td>
<td>G</td>
<td>2</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Evaluate Feb 15. (974-6002, <a href="mailto:sdiocese@utk.edu">sdiocese@utk.edu</a>)</td>
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<tr>
<td>German*</td>
<td>MA</td>
<td></td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>See Modern Foreign Languages for PHD. (974-3421, <a href="mailto:sauernkr@utk.edu">sauernkr@utk.edu</a>)</td>
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<tr>
<td>History*</td>
<td>MA</td>
<td>G</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>PHD-american, european. Admit Fall only. Evaluate Feb 15. (974-5421, <a href="mailto:pharrington@utk.edu">pharrington@utk.edu</a>)</td>
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<td>Life Sciences*</td>
<td>MS</td>
<td>G</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>MS &amp; PHD- plant physiology &amp; genetics. MS only-biotechnology. (974-6841, <a href="mailto:maattingly@utk.edu">maattingly@utk.edu</a>)</td>
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<tr>
<td>Mathematics*</td>
<td>MM</td>
<td>G</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>MS-applied mathematics. PHD-mathematical ecology. (974-2464, <a href="mailto:gpd@newell.math.utk.edu">gpd@newell.math.utk.edu</a>)</td>
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<td>Microbiology*</td>
<td>MS</td>
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<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>(974-3441, <a href="mailto:gtafay@utk.edu">gtafay@utk.edu</a>)</td>
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<tr>
<td>Modern Foreign Languages*</td>
<td>PHD</td>
<td>G</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>First concentration-French, German, Spanish. Second concentration-applied linguistics, French, German, Italian, Portuguese, Russian, Spanish. (974-3421, <a href="mailto:sauernkr@utk.edu">sauernkr@utk.edu</a>)</td>
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<tr>
<td>Music*</td>
<td>MM</td>
<td></td>
<td>2</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Accompanying, choral conducting, composition, instrumental conducting, jazz, music education, music theory, musicology, performance, piano pedagogy &amp; literature. Audition required. (974-3331, <a href="mailto:canders@utk.edu">canders@utk.edu</a>)</td>
</tr>
<tr>
<td>Philosophy*</td>
<td>MA</td>
<td>G</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>MA &amp; PHD-medical ethics, philosophy. MA only-religious studies. Admit Fall only. (974-3255, <a href="mailto:jschultze@utk.edu">jschultze@utk.edu</a>)</td>
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<tr>
<td>Physics*</td>
<td>MS</td>
<td>G</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>MS &amp; PHD-astrophysics, atomic &amp; low temperature physics, biophysics, chemical physics, condensed matter &amp; surface physics, elementary particle physics, molecular spectroscopy, nuclear physics, theoretical physics. MS only-geophysics, health physics. Rating forms required only for consideration for teaching assistantships. (974-3342, <a href="mailto:rrobinson@utk.edu">rrobinson@utk.edu</a>)</td>
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<tr>
<td>Planning*</td>
<td>MSP</td>
<td>G</td>
<td>2</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Environmental planning, land use planning, real estate development planning, transportation planning. Admit Summer and Fall only. (974-5227, <a href="mailto:dawson@utk.edu">dawson@utk.edu</a>)</td>
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<td>Political Science*</td>
<td>MA</td>
<td>G</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>MA-experimental psychology, general psychology. PHD-clinical psychology, experimental psychology. Admit Fall only. Evaluate Feb 15. (974-3328, <a href="mailto:dpays@utk.edu">dpays@utk.edu</a>)</td>
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<td>Psychology*</td>
<td>MA</td>
<td>GS</td>
<td>4</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Dual JD-MPA program available. (974-2281, <a href="mailto:1fiz@utk.edu">1fiz@utk.edu</a>)</td>
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<tr>
<td>Public Administration*</td>
<td>MPA</td>
<td></td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>MA &amp; PHD-criminology; energy, environment &amp; resource policy; political economy. Admit Fall only. Evaluate Feb 15. (974-7032, <a href="mailto:rgerman@utk.edu">rgerman@utk.edu</a>)</td>
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<td>Sociology*</td>
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<td>G</td>
<td>3</td>
<td>X</td>
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<td>X</td>
<td>See Modern Foreign Languages for PHD. (974-3421, <a href="mailto:cavers@utk.edu">cavers@utk.edu</a>)</td>
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<td>Spanish*</td>
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<td></td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Audiology, hearing science, speech &amp; language pathology, speech-language science. (974-6019, <a href="mailto:kcgross@utk.edu">kcgross@utk.edu</a>)</td>
</tr>
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<td>Speech &amp; Hearing Science*</td>
<td>PHD</td>
<td>G</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Admit Fall only. (974-5019, <a href="mailto:kcgross@utk.edu">kcgross@utk.edu</a>)</td>
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<td>Speech Pathology*</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>Costume design, international performance studies in acting, international performance studies in directing, lighting design, scenic design, theatre technology. Audition required. (974-4011, <a href="mailto:cjohnson@utk.edu">cjohnson@utk.edu</a>)</td>
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<tr>
<td>Theatre*</td>
<td>MFA</td>
<td></td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Financial auditing, systems, taxation. Evaluate Mar 1. (974-2551, <a href="mailto:rlewis@utk.edu">rlewis@utk.edu</a>)</td>
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<tr>
<td>Accounting*</td>
<td>MAcc</td>
<td>+</td>
<td>2</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>MBA-economics, environmental management, finance, forest industries management, global business, logistics &amp; transportation, management, manufacturing management, marketing, new venture analysis &amp; entrepreneurship, statistics, PHD-accounting, finance, logistics &amp; transportation, management, marketing, statistics. Admit Fall only. Evaluate Mar 1. Dual JD-MBA, MS-MBA, Executive MBA, BA/MBA, Professional MBA, programs available. (974-5003, <a href="mailto:jmoser@utk.edu">jmoser@utk.edu</a>)</td>
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<tr>
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<td>MBA</td>
<td>+</td>
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<td>GMAT may be substituted for GRE. Admit Fall only. Evaluate Feb 1. (974-3303, <a href="mailto:dkelmer@utk.edu">dkelmer@utk.edu</a>)</td>
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<td>Economics*</td>
<td>MA</td>
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<td>3</td>
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<td>Admit Fall only. Evaluate Feb 1. Use forms obtained from department. Degree-seeking students only. (974-4043, <a href="mailto:rbov@utk.edu">rbov@utk.edu</a>)</td>
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<td>Industrial &amp; Organizational Psychology*</td>
<td>PHD</td>
<td>G</td>
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<td>GMAT may be substituted for GRE. (974-4116, <a href="mailto:rbov@utk.edu">rbov@utk.edu</a>)</td>
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<td>Industrial statistics. GMAT may be substituted for GRE. (974-2556, <a href="mailto:rlewis@utk.edu">rlewis@utk.edu</a>)</td>
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<tr>
<td>Statistics*</td>
<td>MS</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>MS &amp; PHD-advertising, broadcasting, journalism, public relations, speech communication. PHD only-information sciences. Admit Fall only. (974-6651, <a href="mailto:bbradley@utk.edu">bbradley@utk.edu</a>)</td>
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## College of Education

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### Evaluation Dates/Phone (Area Code: 423)

- **College of Education**: Evaluate Mar 15. (974-2216)
- **Mental health counseling, rehabilitation counseling, school counseling, Evaluate Feb 1 and Nov 1. (974-5131)**
- **Adult education, individual & collaborative learning.** (974-8145)
- **Exercisescience, sportmanagement, sportstudies.** (974-1272)
- **Educationaladministration & supervision, Evaluate Jun 1. (974-2216)**

## College of Engineering

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### Concentrations Available

- **MS & PHD**: aeroacoustics, aerodynamics & performance, energy conversion & utilization, flight & aerospace mechanics, gasdynamics, heat transfer & fluid mechanics, propulsion, space engineering, structures, stress analysis, thermodynamics. (974-5115, maesinfo@enr.utk.edu)
- **MS & PHD**: advanced control systems, chemical bioengineering, chemical engineering, polymer science & engineering. Evaluate Feb 1 for financial aid. Qualified applicants are encouraged to apply directly to the PhD program. PhD applicants receive financial aid preference. (974-2421, cheinfo@utk.edu)
- **MS & PHD**: construction engineering, environmental engineering, geotechnical/materials engineering, public works engineering, structural engineering, transportation engineering. (974-2503, cee@utk.edu)
- **PHD**: electrical engineering, computer science, computer systems, electrical engineering, electromagnetic theory, plasma engineering, power electronics, power systems, solid-state electronics. (974-3461, karim@utk.edu)
- **MS & PHD**: biomedical engineering, computational mechanics, fluid mechanics, industrial engineering, mechanics of composite materials, computational engineering (UTSI only), solid mechanics, MS only applied artificial intelligence. (974-5115, maesinfo@engr.utk.edu)
- **MS**: air quality, environmental risk assessment, mixed waste management, waste management, water quality, water resources. See Civil Engineering for PhD. (974-2503, cee@utk.edu)
- **MS**: aeroacoustics, aerodynamics & performance, energy conversion & utilization, flight & aerospace mechanics, gasdynamics, heat transfer & fluid mechanics, propulsion, space engineering, structures, stress analysis, thermodynamics. (974-5115, maesinfo@enr.utk.edu)
- **MS & PHD**: corrosion behavior, failure analysis, materials processing, mechanical & physical behavior of materials, physical metallurgy, welding metallurgy & materials joining. (974-5336, spruiell@utk.edu)
- **MS**: radiological engineering. (974-2525, utne@utk.edu)
- **MS**: aeroacoustics, aerodynamics & performance, energy conversion & utilization, flight & aerospace mechanics, gasdynamics, heat transfer & fluid mechanics, propulsion, space engineering, structures, stress analysis, thermodynamics. (974-5115, maesinfo@enr.utk.edu)
- **MS & PHD**: corrosion behavior, failure analysis, materials processing, mechanical & physical behavior of materials, physical metallurgy, welding metallurgy & materials joining. (974-5336, spruiell@utk.edu)
### College of Human Ecology

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<td>Child &amp; Family Studies*</td>
<td>MS + G</td>
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<td>Child and family studies, early childhood education. Evaluate Jan 1, Mar 1, May 1. (974-5316, <a href="mailto:avalenti@utk.edu">avalenti@utk.edu</a>)</td>
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<tr>
<td>Health Promotion &amp; Health Education</td>
<td>MS</td>
<td>3</td>
<td>X</td>
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<td>Evaluate Jan 1, Mar 1, May 1. (974-5224, <a href="mailto:jmorant@utk.edu">jmorant@utk.edu</a>)</td>
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<td>Human Ecology*</td>
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<td></td>
<td>Child and family studies, community health, human resource development, nutrition science, retail &amp; consumer sciences, textile science. Evaluate Jan 1, Mar 1, May 1. (974-5224, <a href="mailto:jmorant@utk.edu">jmorant@utk.edu</a>)</td>
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<td>Human Resource Development</td>
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<td>Teacher licensure (does not require test scores or rating forms, but does require admission to teacher education), training and development (MAT also accepted). Evaluate Jan 1, Mar 1, May 1. (974-2374, <a href="mailto:hrd@utk.edu">hrd@utk.edu</a>)</td>
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<td>Nutrition science, public health nutrition. Evaluate Jan 1, Mar 1, May 1. Dual MS-MPH program available. (974-5445, <a href="mailto:cythere@utk.edu">cythere@utk.edu</a>)</td>
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<td>Public Health*</td>
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<td>Community health education, gerontology, health planning/administration. Admit Summer and Fall only. Fall deadline - Apr 1, Summer deadline - Feb 1. Dual MS-MPH program available. (974-6674, <a href="mailto:cbhamilton@utk.edu">cbhamilton@utk.edu</a>)</td>
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<td>Recreation, Tourism, &amp; Hospitality Management</td>
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<td>Hospitality management, recreation administration, therapeutic recreation, tourism. (974-3141, <a href="mailto:nbfair@utk.edu">nbfair@utk.edu</a>) (974-6481)</td>
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<tr>
<td>Textiles, Retailing &amp; Consumer Sciences*</td>
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<td>Retail and consumer sciences, textile science. Evaluate Jan 1, Mar 1, May 1. (974-2141, <a href="mailto:nbfair@utk.edu">nbfair@utk.edu</a>)</td>
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### College of Law

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<td>Advocacy &amp; dispute resolution, business transactions. Contact College of Law for Bulletin. Dual JD-MBA and JD-MPA programs available. (974-4191)</td>
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### College of Nursing

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<td>MSN-adult health nursing, family nurse practitioner, mental health nursing, nursing administration, nursing of women and children. Evaluate Dec 1 and Feb 1. (MSN-974-7906, Student Services) (PHD-974-7581, <a href="mailto:sfhpool@utk.edu">sfhpool@utk.edu</a>)</td>
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<td>MSSW-clinical social work practice, social welfare management &amp; community practice. Programs offered in Knoxville, Memphis and Nashville. Evaluate Mar 1. (MSSW-974-6697, <a href="mailto:snash@utk.edu">snash@utk.edu</a>) (PHD-974-6481, <a href="mailto:ckliff@utk.edu">ckliff@utk.edu</a>)</td>
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### College of Social Work

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<td>Contact College of Veterinary Medicine for application. (974-7263, <a href="mailto:jbrace@utk.edu">jbrace@utk.edu</a>)</td>
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### School of Information Sciences

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<td>Distance education available in TN and VA. Evaluate July 1, Dec 1 and Apr 1. See College of Communications for PHD. (974-2148, <a href="mailto:hloosen@utk.edu">hloosen@utk.edu</a>)</td>
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### Intercollegiate

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<td>Aviation Systems*</td>
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<td>Only offered at UT Space Institute, Tullahoma, Tennessee. Evaluate Apr 15 - Summer, Jul 1 - Fall, Nov 15 - Spring. Will accept early applications. (974-5576, <a href="mailto:potgieter@utk.edu">potgieter@utk.edu</a>)</td>
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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 or admission to candidacy for the degree desired.

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

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

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

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

Application Procedures

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

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

Application forms for the above tests can be obtained by writing:
Educational Testing Service
Princeton, NJ 08450
UT Knoxville is an approved testing center for all examinations. Examination results reach the University in approximately six weeks. All of the above documents become the property of the University and will not be returned.

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

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 any additional program requirements (see Admission Requirements). Refer to the appropriate field of instruction for specific requirements for admission to the degree program.

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

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

NON-DEGREE ADMISSION

Applications may apply for non-degree status who, for example:
1. need additional time to fulfill application requirements for a degree program.
2. do not wish to pursue a degree program.

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

There is no specific limit on the number of courses that a student may take in non-degree status. However, before accumulating 15 hours of graduate coursework in this status, the student must either:
1. apply and be admitted to a specific degree program (see Revision of Admission Classification for procedures); or
2. submit a Plan of Study form to the Associate Dean of The Graduate School for approval to continue taking courses in non-degree status. The plan of study must include a stated educational objective and a list of courses proposed to achieve that objective. A maximum of 15 graduate hours taken before acceptance into a degree program may be applied toward a graduate degree, if approved by the student's committee. Courses applied toward any graduate degree must fall within the time limit specified for the degree.

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

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

TRANIENT ADMISSION

A student who is enrolled in good standing in a graduate degree program at another institution and who wishes to take courses for transfer to that institution may be admitted after submitting a completed Graduate Application for Admission, the $35 application fee, and a Transfer of Student Certification 10 days prior to registration. Only one semester, or a maximum of 12 hours, of coursework can be taken in transient status. Necessary forms may be obtained from the Office of Graduate Admissions and Records.

POST-DOCTORAL ADMISSION

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

Admission of
International Students

The Graduate School accepts only
students who have superior records. An
international student must have an equivalent
4-year Bachelor's degree with at least a B
average on all previous coursework and a B+
on all previous graduate work. On various
grading scales, this corresponds to:
a. 14 on a 20-point scale
b. 80.0 from Taiwanese institutions
c. 1st Class or Division from Indian
institutions
d. Upper 2nd Class Honors on various
British systems

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

International students may apply for
admission any semester, but normally enter the
summer or fall semester. The Graduate
School deadlines for submission of applications are:
Fall 1 March
Spring 15 July
Summer 15 November
The Office of Graduate Admissions and
Records must be notified of any change in
entering date after admission has been
granted.

The following items must be received before
admission will be considered:
1. A completed Graduate Application for
Admission.
2. A $35 non-refundable processing fee.
Payment should be made in United States
dollars by a cashier's check, money order, or
personal check. If payment is by personal
check, it must be drawn on a United States
bank to be honored in United States currency.
Checks drawn on overseas banks are not
accepted. International money orders are
suggested.
3. Official or attested university records,
with certified translations if the records are not in
English (Notarized copies are not
accepted).
4. Certification of English proficiency. Refer
to section on English Certification.
5. Documented evidence of financial
resources sufficient to support the student, as
stated on the financial statement form supplied
to the applicant. This form is sent to the
applicant after receipt of application.
6. Additional departmental/program
requirements (refer to Major and Degree
Programs chart in front of Graduate Catalog).
a. Reference letters or rating forms. All
program forms should be sent to the college
or department.

b. Scores from the Graduate Record
Examination (GRE) or Graduate Manage-
ment Admission Test (GMAT).
Admission must be granted, and financial
documentation and degree certification must
be received, prior to issuance of an 1-20 or
IAP-66 form needed to obtain a visa. The
Graduate School will not issue these forms
after the following dates:
Fall 15 June
Spring 1 November
Summer 15 March
The University will not enroll any student
who has not been approved initially, or for
transfer, by the Immigration and Naturalization
Services (INS) to attend UT Knoxville.
An international student may not enroll as a
non-degree student nor on probation.

English Certification

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

All students whose native language is not
English must take an English proficiency
test before arrival at UTK. Refer to
section on English Proficiency.

Admission of Faculty and
Staff Members

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

Faculty members of UT Knoxville or the
Institute of Agriculture at the rank of assistant
professor or above, and members of the
administrative staff at UT Knoxville, the UT
Central Administration, and the Institute of
Agriculture will normally be admitted to an
Ed.D. or Ph.D. degree program at UT
Knoxville. Exceptions may be granted on
an individual basis upon petition to The Graduate
School. Petitioners must present their request
in writing, providing adequate assurance that
the residence requirement will be met and that
there will be no conflict of academic or
administrative interest. Written endorsements
must be provided by the respective deans and
department heads of the units in which
members are employed and in which the
degree programs are to be pursued. Requests
should be directed to the Associate Vice
Chancellor and Dean of The Graduate School.

Readmission

A student who has not attended The
Graduate School at UT Knoxville for three
consecutive terms (including summer) must
apply for readmission. A readmission applica-
tion should be submitted to the Office of
Graduate Admissions and Records at least two
weeks prior to the desired reentry date. A
student who has attended another institution
since enrollment at UT Knoxville must submit
one official transcript showing all coursework
and any degrees earned at that institution.
The student will be notified when action has been
taken by the department program and The
Graduate School. A student who is permitted to
enroll and is subsequently denied readmission
will receive credit for courses completed
successfully. Future registration will not be
allowed until readmission is granted.

Revision of Admission
Classification

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

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

Registration and
Enrollment Requirements

Graduate Credit

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

Courses numbered at the 500 level, as well
as those 400-level courses approved for
graduate credit, must be taught by faculty
members who (1) meet the criteria of an
assistant professor or above as defined in the
Faculty Handbook and (2) have been
designated by the department head as being
appropriate. Graduate teaching associates are
ineligible to teach courses approved for
graduate credit.
Consistent with the accreditation requirements of the Southern Association of Colleges and Schools (SACS) that graduate curricula must be different from undergraduate curricula, classes at the 400-level in which both graduate and undergraduate students are enrolled must be structured so as to reflect this distinction. That is, course requirements for graduate credit will be more rigorous and thus will exceed expectations for undergraduates. Graduate and undergraduate completion of the same course will not be considered equivalent, and therefore petitions for retroactive changing of undergraduate to graduate credit will not be accepted.

Courses at the 600 level are taught by faculty who have been approved by the Associate Vice Chancellor and Dean of The Graduate School to do so. Criteria for eligibility to teach at the 600 level are available from The Graduate School.

Law Courses

A graduate student may take up to 6 semester hours of law courses and apply them toward a graduate degree, upon approval of the College of Law and the student's major professor. The graduate student must register for law courses during the registration period at the College of Law and request an S/N grade. If the student earns a 2.0 or better, an S will be recorded on the transcript. Below 2.0, an NC will be recorded, and the course cannot be used toward meeting degree requirements. Grades for law courses will not be reflected in the cumulative grade-point average, as law courses do not carry graduate credit.

Different rules apply to students enrolled in the Dual J.D.-MBA and J.D.-MPA programs. Grades must be earned according to the grading system of the respective colleges, e.g., numerical grades for law courses, letter grades for graduate courses. Refer to sections on Business Administration, Political Science, and Law under Fields of Instruction for grades acceptable to meet degree requirements.

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

Senior or Disabled Citizens

Legislation gives Tennessee citizens who are 60 years of age or older, 30-year state retirees, or those who are totally disabled, the opportunity to attend credit and non-credit courses at the University at no charge on an audit, space available basis. Legal verification of any of these conditions is required for enrollment. Students who are 65 or over, or who are totally disabled, and who desire to receive UT credit for their courses, may pay a reduced charge of $7 per credit hour up to a maximum of $75 for a full-time load. Registration for day and evening classes is handled by the Evening School, 451 Communications and University Extension Building, (423) 974-5361 or 1-800-676-8657.

Auditors and Audited Courses

Persons who wish to attend certain classes regularly, without taking examinations or receiving grades or credit, may do so by registering as an auditor and paying regular fees. Graduate students paying regular fees also are entitled to audit courses.

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

Courses in Non-Standard Format

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

1. The number of contact hours should never be fewer than the equivalent of one hour per week during the term for each hour of credit awarded, i.e., 15 hours per semester hour.
2. For every contact hour, there should be at least two hours of student preparation.
3. For each hour of graduate credit under the semester system, there should be a minimum elapsed time of one week.

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

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

Correspondence Study

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

Proficiency Examinations

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

English Proficiency

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

Prerequisites

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

Advisor/Major Professor

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

Departmental Liaison

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

Registration

Registration is required of all graduate students when using University facilities and/or faculty time. The minimum number of hours for registration is three. Registration allows use of services such as library checkout, laboratories, and recreation facilities not open to the public. Information concerning registration is available in the Graduate School News and Timetable of Classes each term. Registration is accomplished via telephone. During priority registration, a schedule and bill is mailed to the registrar. Payment is due by the deadline noted on the bill. A graduated late fee is assessed to any student who fails to register during priority registration. Additional information can be obtained from the Computer Assisted Registration Services Office, (423) 974-2223. Failure to pay tuition and fees before the deadline, as noted each semester on the schedule/bill, will result in cancellation of the schedule. Retroactive registration is not allowed. Non-degree students in unrestricted programs (see Majors and Degree Programs Chart) may obtain permission to register from the Office of Graduate Admissions and Records. Non-degree students with no declared major must obtain permission from the department/program head to register for courses in restricted fields.

Conditional Registration

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

Registration for Use of Facilities

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

Course Description

Each course listed in the Graduate Catalog contains information in abbreviated form. The course number indicates the level at which the course is taught. All 500- and 600-level courses are graduate courses. The 400-level courses are upper division courses available for graduate credit only if listed in the Graduate Catalog. To receive graduate credit for these, a student must so request at registration. The official course title appears following the course number. Numbers in parentheses following the course title indicate the semester hours credit. If the credit is variable, to be determined in consultation with the instructor, the minimum and maximum are shown (e.g., 2-3). The credit hours are followed by a course description indicating the content to be covered.

Prerequisite courses must be taken prior to the course in question. Corequisite courses may be taken prior to or concurrently with the specific course. Both prerequisites and corequisites are checked during registration. Recommended prerequisites should be taken previously but are not mandatory. Required background is the knowledge base needed before taking the course.

Some courses may be repeated for a maximum number of hours allowable toward a degree program. This number is stated for each repeatable course with the exception of Thesis 500, Dissertation 600, and Registration for Use of Facilities 502. Courses may be cross-listed with two or more departments, an arrangement indicated by a parenthetical statement: (Same as Psychology 543). The course description is given only under the primary department. “S/N Only” indicates that the course may be taken only for Satisfactory/No Credit grading. Refer to section on Grades. A symbol indicating the semester or frequency that the course is normally offered is included at the end of many course descriptions:

F-Fall
Sp-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 prior to registration for each semester, is the official notification of courses offered for a given semester. Students should contact the appropriate department/program head concerning courses to be offered in future semesters.

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. Students have the responsibility to assure that they have been dropped. Otherwise they may receive a grade of F in the course.

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

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

If the student withdraws from a course, or from the University, after the first 29 calendar days of classes and before the change of registration deadline, a grade of W will be entered on the permanent record. After the change of registration deadline, a student withdrawing from a course or from the University will receive a grade of F unless it can be demonstrated that the request for withdrawal is based on circumstances beyond the student's control. In the latter case, a grade of W will be entered on the permanent record.

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

Course Loads

The maximum load for a graduate student is 15 hours, and 9 to 12 hours are considered a full load. For the summer term, graduate students may register for a maximum of 12 semester hours in an eight-week summer session or for a maximum of 6 semester hours in a five-week summer session. Students may enroll in only one course during a mini-term session.

Students holding a one-half time assistantship normally should enroll for 6-11 semester hours. A one-fourth time graduate assistant normally should take 9-13 semester hours. A student on a one-half time assistantship who takes six semester hours will be considered full time. Refer to the Policy for the Administration of Graduate Assistantships for additional information.

Students receiving financial aid should consult with the department/program head concerning appropriate course loads. Courses audited do not count toward minimum graduate hours required for financial assistance.

Registration for more than 15 hours during any semester, or for more than 12 hours in the summer term, is not permissible without prior approval 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 incomplete. 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:

- A (4 quality points per semester hour), superior performance.
- B+ (3.5 quality points per semester hour), better than satisfactory performance.
- B (3 quality points per semester hour), satisfactory performance.
- C+ (2.5 quality points per semester hour), less than satisfactory performance.
- C (2 quality points per semester hour), performance well below the standard expected of graduate students.
- D (1 quality point per semester hour), clearly unsatisfactory performance and cannot be used to satisfy degree requirements.
- F (no quality points), extremely unsatisfactory performance and cannot be used to satisfy degree requirements.
- I (no quality points), a temporary grade indicating that the student has performed satisfactorily in the course but, due to unforeseen circumstances, has been unable to finish all requirements. An I is NOT given to enable a student to do additional work to raise a deficient grade. All incompletes must be removed within one semester, excluding the summer term. If a supplementary grade report has not been received in the Office of Graduate Admissions and Records at the end of the semester, the I will be changed to F. The course will not be computed in the cumulative grade-point average until a final grade is assigned. No student may graduate with an I on the record.
- S/NC (carries credit hours, but no quality points). S is equivalent to a grade of B or better, and NC means no credit earned. Courses where NC is received may be repeated for a grade of S. A grade of S/NC is allowed only where indicated in the course description in the Graduate Catalog. The number of S/NC courses in a student's academic file is limited to one-fourth of the total credit hours required.
- P/NP (carries credit hours, but no quality points). P indicates progress toward completion of a thesis or dissertation. NP indicates no progress or inadequate progress. W (carries no credit hours or quality points), indicates that the student officially withdrew from the course.

The grading system available for a course is based on the level of the course. Courses numbered 100-499 are graded letter grade or S/NC, except where noted otherwise in the catalog. Courses numbered 500-699 are graded letter grade only, except where the graduate catalog indicates S/NC only or optional S/NC or letter grade. Veterinary Medicine courses are letter grade only except where noted S/NC only. Law courses are numeric, except where noted otherwise. There are restrictions regarding the use of S/NC graded courses, including the number of hours that may be used toward any degree program.

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

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

Academic Standards

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

The academic records of all graduate students are reviewed at the end of each semester, including the summer term. Graduate students must maintain a cumulative grade-point average (GPA) at or above 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 are deemed to justify continuation, and upon recommendation of the appropriate academic unit and approval of The Graduate School, a student on probation whose semester GPA is below a 3.0 may be allowed to continue on a semester-by-semester basis.

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

Academic Honesty

Academic integrity is a responsibility of all members of the academic community. An honor statement is included on the application for admission and readmission. The applicant's signature acknowledges that adherence is confirmed. The honor statement declares that:

An essential tenet of The University of Tennessee, Knoxville is a commitment to maintaining an atmosphere of intellectual integrity and academic honesty. As a student of the University, I pledge that I will neither knowingly give nor receive any inappropriate assistance in academic work, thus affirming my own personal commitment to honor and integrity.

PLAGIARISM

Students shall not plagiarize. Plagiarism is using the intellectual property or product of someone else without giving proper credit. The undocumented use of someone else's words or ideas in any medium of communication (unless such information is recognized as common knowledge) is a serious offense, subject to disciplinary action that may include failure in a course and/or dismissal from the University. Some examples of plagiarism are:

Using without proper documentation (quotations marks and a citation) written or spoken words, phrases, or sentences from any source.

Summarizing without proper documentation (usually a citation) ideas from another source (unless such information is recognized as common knowledge).

Borrowing facts, statistics, graphs, pictorial representations, or phrases without acknowledging the source (unless such information is recognized as common knowledge).

Submitting work, either in whole or in part, created by a program for service and used without attribution (e.g., paper, speech, bibliography, or photograph).

Extreme caution should be exercised by students involved in collaborative research to avoid questions of plagiarism. If in doubt, students should check with the major professor and the Dean of The Graduate School about the project. Plagiarism will be investigated when suspected and prosecuted if established.

Appeals Procedure

The Graduate Council Appeal Procedure can be obtained at the Office of Graduate Admissions and Records. Normally, grievances should be handled at the departmental level through the student's academic advisor or the department or program head. Further appeal may be made to the dean of the respective college, the Dean of The Graduate School, the Graduate Council, and ultimately to the Chancellor.

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

Appeal procedures in regard to allegations of misconduct or academic dishonesty are presented in Hilltops under "Student Rights and Responsibilities." Students with grievances related to race, sex, color, religion, national origin, age, disability or veteran status should file a formal complaint with the Office of Diversity Resources and Educational Services (DRES).

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 Catalog each semester for specific deadlines. Department policies and procedures, which are specific to degree programs and exceed those in the Graduate Catalog, are provided in the Graduate Student Handbook available in each academic department.

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

Definition of Graduate Terms

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

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

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


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

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

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

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

Minors

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

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

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

Transfer Credits

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

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

1. be taken for graduate credit.
2. carry a grade of B or better.
3. be a part of a graduate program in which the student had a B average.
4. not have been used for a previous degree.
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...
thesis or dissertation requirements or 600-level coursework requirements. Credit for extension courses taken from other institutions is not transferable, nor is credit for any course taken at an unaccredited and/or foreign institution.

MASTER'S DEGREE

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

ED.S. DEGREE

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

DOCTORAL DEGREE

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

Theses and Dissertations

All theses and dissertations are submitted to The Graduate School Thesis/Dissertation Consultant for examination. The Consultant will review the material and assure that it is attractively presented, free of technical errors in form, 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 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 endorsement by the Department Head and Dean of the College, prior to Admission to Candidacy for the degree sought. The request should include a proposal and justification for the exception. In all cases, one thesis/dissertation abstract must be written in English.

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

Master's Degrees

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

Master's degree programs are available with thesis and non-thesis options. These programs require 30 or more graduate hours of coursework. In addition to the M.A. and M.S. degrees, other degrees are offered, including the MBA and the M.S.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 (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 at least 6 hours or more than 12, hours of graduate credit. At least two-thirds of the minimum required hours in a master's degree program must be taken in courses numbered at or above the 500 level. Only 6 thesis hours may be counted toward this requirement.

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

SECOND MASTER'S DEGREES

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

MASTER'S COMMITTEE

A committee composed of the major professor and at least two other faculty members, all at the rank of assistant professor or above, should be formed as early as possible in a student's program, and must be formed by the time a student submits an application 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 is a minor, one member of the committee must be from the minor department.

ADMISSION TO CANDIDACY

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

The application for the master's degree is made as soon as possible after the student has completed any prerequisite courses and nine hours of graduate work with a 3.0 average or higher in all graduate work. The Admission to Candidacy form must be signed by the student's committee and list all courses to be used for the degree, including transfer coursework. The student must submit this form to the Office of Graduate Admissions and Records no later than commencement day of the semester preceding the semester in which he/she plans to graduate.

THESIS REGISTRATION

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

THESIS

The thesis represents the culmination of an original research project completed by the student. It must be prepared according to the UT Knoxville Guide to the Preparation of Theses and Dissertations (8th ed.). Two copies of the thesis must be approved and accepted by The Graduate School on or before the deadline specified each semester in the Graduate School News. Each copy must include an approval sheet, signed by the members of the student's committee, certifying that they have examined the final copy of the thesis and have judged it to be satisfactory.
A candidate presenting a thesis or problems in lieu of thesis must pass a final comprehensive oral examination on all work offered for the degree. The examination, which is concerned with coursework and the thesis or problems, measures the candidate's ability to integrate material in the major and related fields, including the work presented in the thesis or problems. The final draft of the thesis must be distributed to all committee members at least two weeks prior to the date of the final examination. Except with prior approval from the Graduate School, the examination must be held at least two weeks before the final date for acceptance and approval of the thesis by the Graduate School.

The major professor must submit the results of the defense by the thesis deadline. In case of failure, the candidate may not apply for reexamination until the following semester. The result of the second examination is final.

FINAL EXAMINATION FOR NON-THESIS STUDENTS

Each non-thesis student must pass a final comprehensive written examination. A department may require an additional oral examination. The examination is not merely a test over coursework, but a measure of the student's ability to integrate material in the major and related fields. Except with prior approval from the Graduate School, the examination must be given in University-approved facilities. It must be scheduled through the Office of Graduate Admissions and Records at least one week prior to the examination. Final examinations not properly scheduled must be repeated. This examination must be held at least two weeks before the final date for acceptance and approval of the thesis by the Graduate School. The major professor must submit the results of the defense by the thesis deadline. In case of failure, the candidate may not apply for reexamination until the following semester. The result of the second examination is final.

TIME LIMIT

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

Specialist in Education Degree

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

COURSE REQUIREMENTS

The student's program involves a minimum of four semesters of course study totaling no fewer than 60 semester hours of graduate credit beyond the baccalaureate degree. A minimum of 8 hours is required outside the major academic unit or area.

A student admitted to the program with a master's degree, or with acceptable work beyond the master's degree, may have program requirements modified upon recommendation of the student's committee. However, no modifications will be permitted in examination and research requirements, nor in the minimum 6 graduate hours required outside the major. All prior coursework accepted toward the degree must be related to the student's program objectives. A maximum of 6 hours beyond the master's degree may be transferred from another institution to an Ed.S. program (refer to section on Transfer Credits). Courses numbered at the 400 level required for certification through UT Knoxville may not be 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 unit or major area. Its responsibilities include formulating the student's program of coursework, supervising progress, recommending admission to candidacy, directing research, and coordinating the qualifying and final examinations.

RESIDENCE REQUIREMENTS

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

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

ADMISSION TO CANDIDACY

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

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

RESEARCH REQUIREMENTS

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

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

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

FINAL EXAMINATION

A candidate presenting a thesis, or problems in lieu of thesis, must pass an oral examination covering the student's research and program of study. A non-thesis student must pass a final written, or written and oral examination, on all work offered for the degree. The examination is not merely a test over coursework, but a demonstration of the candidate's ability to integrate materials in the major and related fields. Each examination must be scheduled through the Office of Graduate Admissions and Records in accordance with the deadlines specified in the Graduate School News and will be conducted by the student'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 $150 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 entry into the last 30 hours of their degree programs to complete the Ed.S. degree.

Doctoral Degrees

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

The doctoral degree is evidence of exceptional scholarly attainment and demonstrated capacity in original investigation.
DOCTORAL EXAMINATIONS

Examinations are taken.
Registration is required the term in which a comprehensive examination and a defense of the program will be conducted.
Successful completion of a comprehensive examination is required 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 coursework. The examination must be passed at least twice before the degree is awarded.

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

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

Statement to be submitted by the student before the degree is awarded.

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

A student may be admitted to candidacy for the doctoral degree after passing the comprehensive examination, fulfilling any language requirements (for Ph.D.), and maintaining at least a B average in all graduate coursework. Each student is responsible for filing the application 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 may be applied for and approved by The Graduate School at least one full semester prior to the degree the degree is to be conferred.

CONTINUOUS REGISTRATION
The student must register continuously for course 600 (minimum of 3 hours) from the time the doctoral research proposal is approved, admission to candidacy is accepted, or registration for course 600 is begun, whichever comes first, including summer semester and the semester in which the dissertation is 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.
approved and accepted by The Graduate School. A minimum total of 24 hours of course 600 is required before the dissertation will be accepted.

A student who will not be using faculty services and/or university facilities for a period of time may request leaves of absence from dissertation research up to a maximum of six terms (including summer terms). The request, to be made in advance, will be considered by The Graduate School upon written recommendation of the department head.

**DISSERTATION**

The dissertation represents the culmination of an original major research project completed by the student. The organization, method of presentation, and subject matter of the dissertation are important in conveying to others the results of such research.

A student should be registered for the number of dissertation hours representing the fraction of effort devoted to this phase of the candidate’s program. Thus, a student working full time on the dissertation should register for 12 hours of course 600 per semester.

Two copies of the dissertation (prepared according to the regulations in the UT Knoxville Guide to the Preparation of Theses and Dissertations, 8th ed.) must be submitted to and accepted by The Graduate School. Each copy must include an approval sheet, signed by all members of the doctoral committee, which certifies to The Graduate School that they have examined the final copy and found that its form and content demonstrate scholarly excellence. Microfilm Agreement form, Survey of Earned Doctorates, and Abstract form are also submitted at this time. The student should check with the department head concerning additional required copies of the dissertation.

**TIME LIMIT**

Comprehensive examinations must be taken within five years, and all requirements must be completed within eight years, from the time of a student’s first enrollment in a doctoral degree program.
# Summary of Procedures for Master's Degrees and Specialist in Education Degree

## PROCEDURES

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<tbody>
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<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

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<tr>
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<tbody>
<tr>
<td>Submission of application for diploma</td>
<td>Office of Graduate Admissions and Records</td>
<td>At beginning of term of graduation*</td>
</tr>
<tr>
<td>Payment of graduation fee</td>
<td>Bursar's Office</td>
<td>At beginning of term of graduation*</td>
</tr>
<tr>
<td>Scheduling of Final Examination</td>
<td>Student, Committee 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>
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## GRADUATION REQUIREMENTS FOR THESIS/PROBLEMS OPTIONS

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<td>Bursar's Office</td>
<td>At beginning of term of graduation*</td>
</tr>
<tr>
<td>Submission of thesis/problems to master's/Ed.S. committee</td>
<td>Student</td>
<td>At least two weeks prior to Final Examination</td>
</tr>
<tr>
<td>Scheduling of Final Examination</td>
<td>Student, Committee and Office of Graduate 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</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>
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</table>

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

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<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>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>
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### GRADUATION REQUIREMENTS

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<td>Bursar's Office</td>
<td>At beginning of term of graduation***</td>
</tr>
<tr>
<td>Submission of dissertation to doctoral committee</td>
<td>Student</td>
<td>At least two weeks prior to Defense of Dissertation Examination</td>
</tr>
<tr>
<td>Scheduling of Defense of Dissertation Examination</td>
<td>Student, Committee and Office of Graduate Admissions and Records</td>
<td>Not later than one week prior to Defense of Dissertation Examination***</td>
</tr>
<tr>
<td>Defense of Dissertation Examination</td>
<td>Doctoral Committee</td>
<td>Not later than four weeks prior to Commencement***</td>
</tr>
<tr>
<td>Approval and acceptance of final copy of dissertation and doctoral forms</td>
<td>Doctoral Committee and The Graduate School</td>
<td>After Defense of Dissertation Examination and not later than two weeks prior to Commencement***</td>
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<tr>
<td>Removal of Incomplete(s)</td>
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*The order of these items varies with individual programs.
**Not required in some programs.
***Deadline dates are printed in the Graduate School News each semester, in addition to a separate publication of Deadline Dates for Graduation and available on the Graduate School Web Page (http://web.utk.edu/~gsinfo).
Residency Classification for Tuition Purposes

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

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

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

RULES OF RESIDENCY CLASSIFICATION

Intent

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

Definitions

(1) “Public higher educational institution” shall mean a university or community college supported by appropriations made by the Legislature of this State.
(2) “Residence” shall mean continuous physical presence and maintenance of a dwelling within this State, provided that absence from the State for short periods of time shall not affect the establishment of a residence.
(3) “Domicile” shall mean a person’s true, fixed, and permanent home and place of habitation. It is the place where he intends to remain, and to which he or she expects to return when he or she leaves without intending to establish a new domicile elsewhere.
(4) “Emancipated person” shall mean a person who is no longer in the care, custody and control of his or her parent.
(5) “Parent” shall mean a person’s father or mother. If there is a non-parental guardian or legal custodian of an emancipated person, then “parent” shall mean such guardian or legal custodian; provided, that there are not circumstances indicating that such guardian-
ship 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 in order that his or her enrollment be deemed “continuous.” Enrollment shall be deemed continuous notwithstanding lapses in enrollment occasioned solely by the scheduling of the commencement and/or termination of the academic years, or appropriate portion thereof, of the public higher educational institutions in which such person enrolls.

Rules for Determination of Status

(1) Every person having his or her domicile in this State shall be classified “in-state” for 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. Unemancipated students of divorced parents shall be classified “in-state” when one parent, regardless of custodial status, is domiciled in Tennessee.

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

(1) An unemancipated, currently enrolled student shall be reclassified out-of-state should his or her parent, having theretofore been domiciled in the State, remove from the State. However, such student shall not be required to pay out-of-state tuition nor be treated as an out-of-state student for admission purposes so long as his or her enrollment at a public higher educational institution or institutions shall be continuous.
(2) An unemancipated person whose parent is not domiciled in this State but is a member of the 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, shall not be required to pay out-of-state tuition if his or her parent thereafter is transferred on military orders.
(3) A person whose domicile is in a county of another state lying immediately adjacent to Montgomery County, or whose place of residence is within thirty (30) miles of Austin Peay State University shall be classified out-of-state but shall not be required to pay out-of-state tuition at Austin Peay State University. Provided, however, that there be no teacher college or normal school within the non-resident's own state, of equal distance to said non-resident's bona fide place of residence.
(4) Part-time students who are not domiciled in this State but who are employed full-time in the State, or who are stationed at Fort Campbell pursuant to military orders, shall be classified out-of-state but shall not be required to pay out-of-state tuition. This shall apply to part-time students who are employed in the State by more than one employer, resulting in the equivalent of full-time employment.
(5) Military personnel and their spouses stationed in the State of Tennessee who would be classified out-of-state in accordance with other provisions of these regulations will be classified out-of-state but shall not be required to pay out-of-state tuition.
(6) A person who is domiciled in the Kentucky counties of Fulton, Hickman, or Graves shall be classified out-of-state and shall not be required to pay out-of-state tuition at The University of Tennessee at Martin if qualified for admission. This exemption is on condition that Murray State University in Murray, Kentucky, continue to admit Tennessee residents from selected Tennessee counties to enroll at that institution without payment of out-of-state tuition.
(7) Any dependent child not domiciled in Tennessee but who qualifies and is selected to receive a scholarship under the Dependent Children Scholarship Act (T.C.A. 49-4-704) because his or her parent is a law enforcement officer, firefighter, or emergency medical service technician who was killed or totally and permanently disabled while performing duties within the scope of employment, shall be classified out-of-state but shall not be required to pay out-of-state tuition.
(8) The spouse of a student classified as “in-state” shall also be classified “in-state.”
(9) Students not domiciled in Tennessee but who are selected to participate in specified institutional undergraduate Honors Programs shall be classified out-of-state but shall not be required to pay out-of-state tuition.
(10) A person whose domicile is in Mississippi County, Arkansas, or either Dunlin County or Peninsacola County, Missouri, and who is admitted to Dyersburg State Community College, shall be classified out-of-state but shall not be required to pay out-of-state tuition.
(11) A person who is not domiciled in Tennessee, but has a bona fide place of residence in a county which is adjacent to the Tennessee state line and which is also within a 30 mile radius (as determined by the THEC) of a city containing a two-year TBR institution and who is admitted to a two-year TBR institution, shall be classified out-of-state but shall not be required to pay out-of-state tuition. The two-year institution may admit only up to three percent (3%) of the full-time equivalent attendance of the institution without out-of-state tuition. (THEC may adjust the number of the non-residents admitted pursuant to this section every three (3) years.

Presumption

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

Evidence to be Considered for Establishment of Domicile

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

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

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

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

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

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

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

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

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

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

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

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

VOLXPRESS

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

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

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

<table>
<thead>
<tr>
<th>IN-STATE FEES</th>
<th>Fall 1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAINTENANCE FEE</td>
<td>Full Time (9 hours or more) $1,437 Per Semester</td>
</tr>
<tr>
<td>Part Time (8 hours or less) $160 per credit (or audit) hour or fraction thereof; minimum charge $160.</td>
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<table>
<thead>
<tr>
<th>OUT-OF-STATE FEES</th>
<th>Fall 1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAINTENANCE FEE AND TUITION</td>
<td>Full Time (9 hours or more) $3,965 Per Semester</td>
</tr>
<tr>
<td>Part Time (8 hours or less) $441 per credit (or audit) hour or fraction thereof; minimum charge $441.</td>
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</tbody>
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All students both in- and out-of-state are required to pay the established maintenance fee. Tuition is required of all students who are classified as non-residents for fee assessment purposes.

UNIVERSITY PROGRAMS AND SERVICES FEE

| Full Time (9 hours or more) | $140 Per Semester |
| Part Time (8 hours or less) per credit (or audit hour) | $9 Per Semester |
| Note: The Programs and Services Fee is non-refundable. |

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

All students enrolled in excess of eight semester hours per term are assessed a Programs and Services fee of $140. Part-time students taking fewer than nine semester hours will be assessed at the rate of $5 per semester hour or fraction thereof.

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

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

Knoxville campus students taking 5-3 hours may elect to pay the student health fee ($42 for fall and spring, $33 for summer), plus the appropriate part-time programs and services fee.

TECHNOLOGY FEE

Full Time (9 hours or more) $100 Part Time (9 hours or less) per credit (or audit) hour $12

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

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

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

MUSIC FEE

One hour less lesson per week per semester $60 One hour lesson per week per semester $120

Payable by students receiving individual instruction in music.

MISCELLANEOUS FEES

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

GRADUATION FEE

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

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

**PROFICIENCY FEES**

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

**FEES FOR COURSES NOT TAKEN FOR CREDIT**

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

**DEFERRED PAYMENT PLAN SERVICE FEE** ............................................................ $20

(See Tuition Payment Plans)

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

**PRIORITY REGISTRATION**

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

**FINAL REGISTRATION LATE FEE**

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

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

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

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

**REINSTATMENT FEE** ............................................................ $45

VOLXpress accounts which have a balance one month prior to the end of a term will be assessed a reinstatement fee of $45. Grades will be withheld until all past due amounts are paid.

**RETURNED CHECK SERVICE FEE POLICY**

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

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

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

**TUITION PAYMENT PLANS**

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

**Deferred Payment Plan**

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

**Room and Board Plan**

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

**REFUNDS**

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

**Refund/Charge of Fees for Withdrawal**

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

The effective date of withdrawal is the date the Office of Graduate Admissions and Records is notified by completion of the official withdrawal request form. The appropriate percentage of fees (maintenance and tuition and technology fees only) will be charged unless this action is completed by the close of the day before the first official day of classes for the semester. Failure to notify the Graduate Admissions and Records Office promptly when withdrawing could result in a larger fee assessment. Withdrawal does not cancel fees and charges already incurred. All charges and refunds will be made to the nearest even dollar.

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

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

**Financial Aid Withdrawals/Repayments**

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

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

For first-time students who withdraw on or before the 60% point in time of the enrollment period for which they were charged, the school must calculate a statutory pro rata refund and compare this amount to the refund amount from the state and accrediting agency policies (if any) to determine the largest available refund to the student. If both the state and the accrediting agency policies do not exist or are not applicable, the student's refund is the pro rata refund amount.

For continuing students who withdraw on or before the 60% point of the enrollment period or first-time students who withdraw after the 80% point of the enrollment, the school must calculate the student's refund amounts using the applicable state and accrediting agency policies (if any), compare the resulting refunds, and use the calculation that provides the largest refund. If the state and accrediting
Refund/Charge of Fees for Dropped Courses (continue with a reduced course load)

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

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

SUMMER TERM FEES AND EXPENSES

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

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

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

WAIVER OF FEES

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

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

STUDENT HEALTH INSURANCE

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

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

IDENTIFICATION CARD

The VolCard is issued to a new student after admission to an appropriate University level or anytime during the year to all students. The VolCard is used in nearly all aspects of campus life to obtain services including meals, vending machines, computers, laundry machines, check-cashing, sporting events, cultural attractions, residence halls access, library, recreational facilities and equipment, University Bookstore, and much more. Many students have established debit or charge accounts which are accessed through the use of the VolCard ID.

These cards are non-transferable and may not be duplicated. The VolCard MUST BE CARRIED AT ALL TIMES FOR PURPOSES OF IDENTIFICATION. Students are responsible for the safekeeping of this card and must immediately report if lost or stolen if the card is not in their possession. Failure to notify the VolCard office will make the student liable for any unauthorized charges to the debit or charge accounts the student may have.

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

FEES FOR SPONSORED INTERNATIONAL STUDENTS

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

Financial Assistance

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

ASSISTANTSHIPS

Graduate assistantships, scholarships, traineeships, and some fellowships are offered through many departments and colleges. Information concerning these types of assistance can be obtained from the department in which the student plans to study. All assistantships are governed by the Policy for the Administration of Graduate Assistantships. See section on Federal, State and University Policies.

FELLOWSHIPS

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

ACADEMIC COMMON MARKET

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

Residents of member states who seek further information should contact the Admissions Specialist in the Office of Graduate Admissions and Records, 374-3251, or the Southern Regional Education Board, 502 Tenth Street, N.W., Atlanta, GA 30318-5790, tel. (404) 875-5211, FAX (404) 872-1477, e-mail ann.creech@sreb.org.
EMPLOYMENT

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

LOANS

Students must be admitted into a degree program to receive student loans.

Four types of loan programs are administered by the Financial Aid Office: 1) Federal Perkins Loan (Student Aid Report, SAP, must be on file); 2) subsidized Federal Stafford Loan (SAP must be on file); 3) unsubsidized Federal Stafford Loan (SAP must be on file); and 4) The University of Tennessee Loan. Processing time varies from one loan program to another. Interested students should contact the Financial Aid Office for more information.

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

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

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

VETERANS BENEFITS

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

Special Federal and State Laws and University Policies

Family Educational Rights and Privacy Act

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

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

Use of Social Security Number

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

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

EEO/Title IX/Section 504 Statement

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

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

Inquiries concerning Title VI, Title IX, Section 504, and the ADA should be directed to the Office of Diversity Resources and Educational Services (DRES), 2110 Terrace Avenue; The University of Tennessee, Knoxville, TN 37996-3650; or telephone (423) 974-2498 (V/TT). Charges of violation of the above policies should also be directed to DRES.

Security Information

In accordance with the Tennessee College and University Security Information Act of 1989 and the Student Right-To-Know and Campus Security Act, The University of Tennessee, 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 abuse/financial assistance program.

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

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

Employees and their families needing treatment information should call their local Personnel Office, Employee Assistance Program, or the State of Tennessee Employee Assistance Program (800-468-8369). Students needing treatment information should contact their campus Student Affairs Office, student health center or counseling center.
Policy for the Administration of Graduate Assistantships

PREAMBLE

Programs of graduate study are designed to transform the individual from student to knowledgeable practitioner or professional scholar. When a graduate assistantship is well conceived and executed, it serves as an ideal instrument to facilitate the desired transformation. The primary goal of an assistantship, then, is to facilitate progress toward the graduate degree. While the student assistant makes progress toward an advanced degree, he or she also gains 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 total responsibility may be greater than that required of other students or staff members, but the opportunities for professional development also are greater for the graduate assistant.

- Tennessee Conference of Graduate Schools

DEFINITION

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

Types of Assistantships

It is imperative that each department adhere to the UTK Faculty Handbook's four categories of assistantships. All departmental guidelines should reflect the descriptions provided in the Handbook (1996, p.35).

Graduate Teaching Assistant

Graduate Teaching Assistant work under the direct supervision of regular faculty members and may be assigned only to duties related directly to instruction. These include such activities as assisting in the preparation of lectures, leading discussion sections, conducting laboratory exercises, grading papers and keeping class records. Assistants may not be given primary teaching and evaluation responsibilities nor should they be given duties to support faculty research or those basically clerical in nature.

In consultation with the supervisor, the Teaching Assistant works to gain teaching skills and an increased understanding of the discipline.

Graduate Teaching Associate

Graduate Teaching Associates are advanced graduate students who have been given primary responsibility for teaching undergraduate courses, including the assignment of final grades. No other category of graduate assistant may be so charged. Associates may not be assigned primary responsibilities for teaching and student assessment in courses approved for graduate credit.

Associates must have met the Southern Association of Colleges and Schools (SACS) 18-hour requirement.

Graduate Assistant

Graduate Assistants are appointed to perform various types of duties other than those related directly to teaching or research. Most commonly, these duties relate to supervisory or administrative functions of the University.

Graduate Research Assistant

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

Work Assignments and Related Factors

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

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

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

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

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

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

ALCOHOL ABUSE HEALTH RISKS

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

DRUG USE HEALTH RISKS

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

Special Federal and State Laws and University Policies

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

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

SACS Requirement

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

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

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

Implementation of the SACS 18-hour Requirement at UT

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

COMPETENCY IN ENGLISH

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

Now international students who have been offered an appointment as Graduate Teaching Assistant or Graduate Teaching Associate will take the SPEAK test after their arrival at UT, and the results of the test will be used to determine the nature of their assignment. The student who has already taken the TSE and received acceptable scores may be excused from the requirement of taking the SPEAK test.

Validation of competence in communicating with students in English is required for all 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-P, 2), "A student employee is one whose primary function is that of enrollment in an academic program." Thus, first priority of all graduate assistants must be satisfactory progress in their scholarly program. At the same time, acceptance of an assistantship is predicated on the belief that satisfactory progress can be concurrently achieved in work assignments and scholarly programs. Collaborative efforts between graduate assistants and their supervisors should be focused on the goal of satisfactory performance in both areas.

2. In cases where graduate assistants feel that they have a legitimate complaint about any aspect of carrying out their assignments (work hours, duties assigned, pay, work conditions, etc.), they have a right to pursue all established channels to resolve the conflict. In the order that follows, the student should speak to his/her immediate supervisor, the appropriate Department Head, the appeals committees in the home unit or College, and the Dean of the College/School involved. If the student feels that a resolution should be sought beyond the Department/College level, the Graduate School will 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-P, 2-3).

4. Graduate student assistantship appointments (Graduate Assistants, Graduate Teaching Assistants, Graduate Teaching Associates and Graduate Research Assistants) are of two types: "academic year" and "twelve 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 equal payments for the January-July period or 6 equal payments for the February-July period. In both cases a fee waiver is provided for Spring and Summer terms.

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

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

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

**ORIENTATION/TRAINING OF GRADUATE TEACHING ASSISTANTS AND GRADUATE TEACHING ASSOCIATES**

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

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

**ORIENTATION/TRAINING OF GRADUATE ASSISTANTS AND GRADUATE RESEARCH ASSISTANTS**

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

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

**ACCEPTING/DENYING AN ASSISTANTSHIP**

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

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

**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. Nonprofit career fair involving representatives from numerous area nonprofit organizations; employer information which includes types of majors sought, job descriptions, career profiles, annual reports and other pertinent information for hundreds of companies that recruit at UT; a website including valuable links to dozens of other career-related web resources; a part-time employment service for students seeking such positions; and workshops providing instruction in skills and tactics for successful interviewing, resume preparation, business and dining etiquette, and other topics.

On-campus interviews are scheduled during the year, and require registration via a web-based resume system. Thousands of interviews are scheduled each year which includes approximately 400 companies, government agencies and school systems. Interviews are scheduled by registrants on the web. Many job listings are also available from the department's website. Career Services also administers a Credentialing Service for doctoral candidates. Setting up a credential file is a simple process involving the submission of a resume and academic transcript, along with letters of recommendation. An alumni placement service offers assistance in the job search after graduation. Also thousands of resumes are referred directly to employers every year to assist students and recent alumni in their job-seeking activity. A web-based resume book is made available to employers.

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

**Student Services**

**Black Cultural Center**

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

The Center is located at 812 Volunteer Boulevard. The University community is encouraged to visit the facility and take advantage of the opportunities provided for all students.
including the Rotary Foundation, St. Andrews, and German Academic Exchange Service (DAAD) grants. Within its library on study, work and travel abroad, CIE has information about student summer job programs in nine countries.

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

Orientation programs conducted at the beginning of each term facilitate adjustment to the campus and community, as does the international student orientation camp prior to the fall term.

The International House, 1623 Melrose Avenue, is CIE's on-campus social, 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 Association for the Education of Young Children.

**Dining Services**

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

**UNLIMITED ACCESS PLUS PLAN**

Unlimited Access means just that! Students may enter newly renovated Presidential Court, Sophie's Place, and Morrill dining facilities anytime during their hours of operation and eat as much as they want, full meals or snacks. They also receive $300 bonus bucks per semester.

**THE ANY TEN PLUS PLAN**

The Any Ten Plus Plan is great for those with hectic schedules or less structured eating habits. Students choose 10 meals weekly that may be eaten at newly renovated Presidential Court, Sophie's Place, and Morrill dining facilities. They also receive $500 bonus bucks per semester.

**THE ANY TEN PLAN**

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

- "Meal week begins on Monday and ends on Sunday."
- "Meals are also available at Varsity Inn dining facility. Some restrictions may apply at this location."
- "Bonus bucks may be used whenever students choose any Dining Services' facility on campus, including convenience stores. Unused bonus bucks do not carry over to the next semester."
- "Meal plan contract covers the entire academic year (i.e. fall and spring semesters). Meal plan is not valid between semesters and during Spring Break."
- "The All Star Account and The Diner's Club may also be used in Dining Services' facilities. Please call the VoICard office at 974-3430 for more information on these accounts."
- To initiate or amend a meal plan, call UT Dining Services at 974-4111.

**Disability Services**

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

Prospective students are encouraged to contact DS personnel so that they can be assured that the campus facilities and services are adequate to meet their needs. The staff can be of service to the students to the extent that their individual needs are made known. Contact the students prior to registration enables DS staff to better access the need for interpretors, readers, accessible facilities, and other support services. Van service is also provided to those individuals with mobility limitations, whether permanent or temporary. Documentation of disability from an attending physician or the Student Health Center is required.

Participation in the services program is on a voluntary basis; confidentiality is maintained. Faculty, staff and students desiring any services are encouraged to contact the Office of Disability Services so that necessary arrangements can be made. The office is located at 191 Hoskins Library. V/TTD (423) 974-6087.

**Graduate Student Association**

As one of the five branches of the Student Government Association, the Graduate Student Association represents the interests of graduate and professional students and provides opportunities for their participation in the organization of graduate study at UT Knoxville. Officers and representatives from each college or professional school are elected each spring term during general campus SGA elections. Offices of the GSA are located in room 542 University Center. For more information, stop by the office or call (423) 974-2377.

**Hearing and Speech Services**

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

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

**Housing**

**UNIVERSITY APARTMENTS**

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

**RESIDENCE HALLS**

The Department of Residence Halls provides housing on-campus for single graduate students. Graduate students are given the same priority for housing in residence halls as undergraduate students. All of the residence halls are conducive to academic achievement and personal development.

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

A list of off-campus housing available to students is provided by the Department of University Housing. The University does not inspect or approve these facilities. The terms and conditions for the rental of off-campus housing are between the student and the landlord. Students living in off-campus housing are expected to observe the same rules of conduct and standards applicable to all students.

Minority Student Affairs

The Office of Minority Student Affairs is housed in a four-story, freestanding structure - the Black Cultural Center. The office serves as a link between the University and its minority student population. The Office, located at 612 Volunteer Boulevard, provides academic, educational, social and cultural programs to assist with the academic performance and retention of African-American students. Programming through the Office includes mentorship programs for freshmen and upperclassmen, academic support, leadership opportunities, graduate networking, and worship for all students on a variety of academic, intellectual, and social topics. Through the Office, students learn to share ideas and embrace a sense of community.

Religious Resources

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

Student Counseling Services Center

The Student Counseling Services Center (SCSC) provides a variety of services for students with personal and academic concerns to promote academic performance, increase personal growth and contribute to the mental health of the entire community. Services include: crisis intervention, group therapy, individual therapy, academic courses, outreach programs and consultation. To access services, students may come in for an intake interview Monday-Friday from 10:00-11:30 a.m. and 1:00-3:30 p.m. The Center is located at 900 Volunteer Blvd. and can be reached at 974-2136 or see our web page at http://web.utk.edu/~counsel.

Student Health Service

Health services provided by the University are available to any student who has paid the health fee (either through paying the full University Programs and Services Fee or, if taking fewer than 9 hours, paying the optional health fee). These outpatient services are available continuously throughout every term. The Health Service has a regular staff of primary care physicians, nurses, laboratory and x-ray technicians of Tennessee licensure. Outpatient services in the fields of family practice, internal medicine, pediatrics and psychiatry are available on a full-time basis. Appointments may be made by calling 974-3648. Specialty consultants in dermatology, surgery, sports medicine, and gynecology are available on campus through referral by a staff physician. Care beyond that provided by the regular staff can be arranged. Those students requiring allergy injections may arrange to receive them at the Clinic.

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

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

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

4. Overnight parking is permitted in the Student Commuter Parking Areas for the specific event.

A University Traffic and Parking Authority determines parking policy, traffic regulations, and fees. This information is published each year in the "University Traffic and Parking Regulations," and is available at the Parking Services Office located in Room 24 of the University Center and at 2121 Stephenson Drive. Information is also available from the Campus Information Center at Circle Park.

Women's Center

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

John Riley, Dean
Gary Schneider, Associate Dean

Departments
Agricultural and Biosystems Engineering
Agricultural and Extension Education
Agricultural Economics and Rural Sociology
Animal Science
Entomology and Plant Pathology
Food Science and Technology
Forestry, Wildlife and Fisheries
Ornamental Horticulture and Landscape Design
Plant and Soils 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 also (with the Agricultural Experiment Station, the Agricultural Extension Service and the College of Veterinary Medicine) one of the four administrative units of The University of Tennessee's Institute of Agriculture.

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

The unique association the College has with the UT Knoxville campus and the other units of the Institute of Agriculture makes it possible for the College to offer comprehensive high quality graduate programs. Graduate programs of the College of Agricultural Sciences and Natural Resources are designed to prepare men and women for positions of leadership in industry, state and federal government, teaching, research, and extension.

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

MASTER OF SCIENCE PROGRAMS

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

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

DOCTORAL PROGRAMS

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

College of Architecture and Design

Marleen Davis, Dean
William J. Lauer, Associate Dean
Jon P. Coddington, Graduate Program Head, Architecture

Schools
Architecture

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

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

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

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

College of Arts and Sciences

Lorayne Lester, Dean
Anne Mayhew, Associate Dean
Stuart Rigsby, Associate Dean
Otis Stephens, Associate Dean

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

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

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

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

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

GENERAL INFORMATION

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

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

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

College of Business Administration

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

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

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

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

Viewing the business firm as operating in dynamic social, political, and economic environments that demand leaders capable of dealing with innovation and rapid change, the College places central importance on development of students' thought processes and leadership potential. Emphasis is focused on flexibility of mind, receptivity to new ideas, and capacity to adapt one's reasoning powers. Our objective is to encourage the student to develop the ability to reason analytically and logically, and to develop a commendable plan of action. Above all else, we strive to instill the irresistible 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, Economies, Industrial and Organizational Psychology, and Management Science; the Master of Arts with a major in Economics; the Master of Science with majors in Management Science and Statistics; the Master of Accountancy; and the Master of Business Administration.

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

FINANCIAL ASSISTANCE

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

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

College of Communications

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

Departments and Schools

Advertising
Broadcasting
Journalism
Speech Communication

Facility for Research and Service

Communications Research Center (CRC)

The College of Communications grew out of the School of Journalism, which was originally located in the College of Business Administration. The Department of Speech Communication became part of the College of Communications in 1997. The master's program began in 1968 under Journalism and was changed to Communications after the School gained College status in 1970. The doctoral program was initiated in 1974. A chair of excellence was established in 1987 to support a distinguished professorship in science, technology, and medical writing. Communications media and interpersonal communications are vital forces in today's complex society. Specialization, gaps among segments of society, and the nature of world conflict point to the need for more understanding of how people communicate. Educating men and women in the perspective understanding of the communications field is a necessity. The graduate programs in the College acquaint students with the nature of communications and prepare them for professional work in many fields.

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

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

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

College of Education

C. Glennon Rowell, Dean
Thomas W. George, Associate Dean for Academic Programs and Administration
Lynn C. Cagle, Director, Teacher Education

Units

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

Facilities for Research and Service

Bureau of Educational Research and Service
Center for Literacy Studies
Center for Physical Activity and Health Curriculum Lab
Exercise Physiology Lab/Biomechanics Lab
Institute for Assessment and Evaluation
Institute for Educational Innovation
Instructional Services Center
Reading Center
Tennessee Internship Consortium in Professional Psychology

Education programs were first offered at the graduate level in 1906 by the School of Education. Through the Summer School of the South, the programs thrived, and the School became a College in 1926. The Ed.D. program was established in 1950, and the college-wide Ph.D. program began in 1979.

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

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

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

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

MASTER OF SCIENCE PROGRAMS

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

Students in the College of Education's Track 2 master's programs (i.e., five-year teacher preparatory programs) must gain admission to The Graduate School before enrolling in internship.

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

SPECIALIST IN EDUCATION PROGRAM

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

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

DOCTORAL PROGRAMS

The College of Education offers programs of advanced study leading to the Doctor of Education and the Doctor of Philosophy, both with a major in Education.

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

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

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

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

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

The University of Tennessee was one of the first institutions of higher education in the South to offer home economics, with the first class being offered in 1897. Initially called a School of Home Economics, it was reorganized in 1947 to become the College of 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 governmental positions in government, business, and industry.

The Master of Science degree is offered with majors in Child and Family Studies, Health, Promotion and Health Education, Human Resource Development, Nutrition (including public health nutrition), Recreation, Tourism and Hospitality Management, Safety Education and Service, and Textiles, Retailing and Consumer Sciences; the Master of Public Health degree is offered with a major in Public Health; and the Doctor of Philosophy degree is offered with a major in Human Ecology and concentrations in child and family studies, community health, human resource development, nutrition science, retail and consumer sciences, and textile science. For additional information, contact the Associate Dean, College of Human Ecology, The University of Tennessee, Knoxville, TN 37996-1600, (423) 974-5224.

FACILITIES FOR RESEARCH AND SERVICE

The Small Animal Research Lab, housed in the Jessie Harris Building, has received certification by the American Association for Accreditation of Laboratory Animal Care (AAALAC). Renovated in 1988, it has strict environmental controls, an operating theater and diet preparation room.

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

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

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

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

Refer to the section on Facilities for Research and Service for additional information.
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.-M.B.A program with the College of Business Administration and the J.D.-M.P.A. program with the Department of Political Science. Refer to details under the respective field of instruction. Graduate students in other disciplines may also take law courses upon approval of the College of Law and the major professor. See Law under Fields of Instruction.

College of Nursing

Joan Creasia, Dean
Carol Seavor, Associate Dean
Maureen Groer, Associate Dean for Research and Evaluation
Martha Alligood, Director of Master's Program
Sandra P. Thomas, Director of Doctoral Program
Mary Anne Modrin-McCarthy, Director of Undergraduate Program

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

The College of Nursing was established in July 1971. The master's program was initiated in 1976 and approval for the doctoral program was granted in 1988. More specific information about the programs may be obtained under Nursing, Fields of Instruction, or by contacting the Director of M.S.N. or Ph.D. Program, The University of Tennessee, College of Nursing, 1200 Volunteer Blvd., Knoxville, 37996-4110, (423) 974-4151.

MASTER OF SCIENCE IN NURSING

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

THE DOCTORAL PROGRAM

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

College of Social Work

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

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

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

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

GRADUATE PROGRAMS

The two-year program (thesis or non-thesis option) leading to the Master of Science in Social Work is fully accredited by the Council on Social Work Education and is offered on all three campuses. The foundation curriculum of the Ph.D. program is available only in Knoxville.

A special bulletin describing facilities, admission, fees, and degree requirements is available from the College of Social Work, Henson Hall, Knoxville, TN 37996-3333, or at http://www.utk.edu.

College of Veterinary Medicine

Michael Shires, Dean
James J. Brace, Associate Dean

Departments

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

The College of Veterinary Medicine, established in 1974, offers a professional curriculum leading to the Doctor of Veterinary Medicine (D.V.M.) degree. The college offers graduate studies leading to the Master of Science and the Doctor of Philosophy degrees. Residency training programs in the various clinical specialties are also offered.

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

About two-thirds of the veterinarians in the United States are engaged exclusively in pet or companion animal practice. A growing number are concerned with the health problems of zoo animals, laboratory animals, wildlife, and aquatic species. A number of veterinarians are involved in the health care of food and fiber animals ensuring the supply of safe and healthy food. Veterinarians also find rewarding careers in the U.S. Public Health Service, the Armed Forces, and in state, county, or local health agencies. A number of veterinarians are employed by the U.S. Department of Agriculture and by state departments of agriculture for important work in livestock disease control, meat and poultry inspection, serum and vaccine production, and the protection of our country against the importation of foreign animal diseases. Excellent research opportunities exist for veterinarians-research directly benefiting animals and research conducted with animals which benefits humans. Such opportunities are available at colleges and universities and with governmental agencies, private research institutions and biological and pharmaceutical companies.

College of Veterinary Medicine

Michael Shires, Dean
James J. Brace, Associate Dean

Departments

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

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FIELDS OF INSTRUCTION
Fields of Instruction

Accounting and Business Law
(College of Business Administration)

MAJORS

DEGREES

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

Keith G. Stanga, Head

Professors:

Anderson, Kenneth E. (Distinguished Prof.), CPA, Ph.D ........................................ Indiana
Dittrich, Norman E. (Emeritus), CPA, Ph.D ............... Indiana
Fisher, Bruce D., LL.M. ....... George Washington
Herring, Hartwell C., III, CPA, Ph.D. ... Alabama
Kiger, Jack E. (Warren L. Slagle Prof. of Acc), CPA, Ph.D.................. Oklahoma State
Reeve, James M. (De loftte & Touche Prof.), CPA, Ph.D. ......... VPI
Roth, Harold P., CPA, Ph.D. ...................... Oklahoma State
Stanga, Keith G. (Arthur Andersen Prof.), CPA, Ph.D. ................. Missouri
Williams, Jan R. (Ernst & Young Prof.), CPA, Ph.D. .............. Arkansas

Associate Professors:

Carcello, Joseph V., CPA, Ph.D. Georgia State
Ray, Amy W., Ph.D. .................................. VPI
Murphy, Daniel, CPA, Ph.D. ....... North Carolina
Posey, Imogene A. (Emeritus), CPA, M.S. ......................... Tennessee
Townsend, Richard L., CPA, Ph.D. ............. Texas

Assistant Professors:

Ayers, Susan, CPA, Ph.D. ......... Arizona State
Beih, Bruce K., CPA, Ph.D. ....... Arizona State
Norris, Kathleen B., Ph.D. .................... Oklahoma

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

UTK's accounting undergraduate and graduate programs are accredited by the American Assembly of Collegiate Schools of Business and are among the initial programs in the nation to receive this accreditation.

Admission Requirements

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

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

Course Requirements

A student's program encompasses a minimum of 30 semester hours of graduate coursework. Specifically, the student must complete courses in accounting and other areas as indicated below. Each course is 3 semester hours of graduate credit.

A student with an undergraduate degree in accounting can usually complete the program in about eleven months. A student without an undergraduate accounting degree can usually complete the program in about fifteen months.

For students with an undergraduate accounting degree, the requirements are:

**Business Core (9 hours):** Business Administration 502-03; Business Law 511.

**Accounting Core (6 hours):** 506-07.

**Accounting Concentration (9 hours):** Three concentrations are available:

3. Taxation: 531, 532, 533, 534, 539.

Students must take at least three courses from the same concentration and one of the course numbers must end with 9.

**Accounting Electives (6 hours):** Elective courses to be taken from graduate accounting courses.

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

**Prerequisites:** 311, 341, 411, 414, and 431.

**Business Core (12 hours):** Business Administration 502-03; Business Law 511; and a non-accounting business elective to be approved by advisor.

**Accounting Core (9 hours):** 506-07.

**Accounting Concentration (9 hours):** Three concentrations are available:

3. Taxation: 531, 532, 533, 534, 539.

Students must take at least three courses from the same concentration and one of the course numbers must end with 9.

**Transfer Credits**

A maximum of six semester hours taken at other AACSB accredited institutions that otherwise conform to the transfer policy of The Graduate School may be credited toward M.Acc. degree requirements.
Other Requirements
To qualify for the degree, a student must maintain a 3.0 average (3.0) or above in the program. This average must satisfactorily demonstrate the student's ability to recognize, analyze, and solve accounting policy problems and integrate concepts from the various areas of accounting by passing a comprehensive written examination. This examination is included in the capstone courses in each concentration as follows: 519, Seminar in Accounting and Auditing Policy, 539, Tax Policy, and 549, Systems Issues and Policies.

BUSINESS ADMINISTRATION CONCENTRATION

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

Ph.D. Concentration: Accounting
This degree provides a research-oriented terminal qualification for those seeking entry-level faculty positions in accounting. Students take approximately three years of coursework beyond the bachelor's degree, including a doctoral sequence designed to expose students to diverse areas of accounting research. Courses in accounting and other areas are selected to supplement the student's individual background and to prepare the student in an area of accounting specialization (financial, managerial, auditing, tax or systems). The final year is normally spent completing the doctoral dissertation. Minimum course requirements are 12 hours including 611, 612, 619, and one other accounting course to be approved by Ph.D. accounting program advisor.

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

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

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

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

### THE MASTER’S PROGRAMS

#### Biosystems 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:

- Biosystems Engineering 504 (1) or 507 (1), 505 (1), and other major subject courses 12
- Coursework in computational methods (mathematics, computer science, statistics, or any course containing appropriate computational components that may be approved by the department) 6
- Program electives 6
- Thesis 500 6

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

#### Biosystems Engineering Technology

**Thesis Option**: Applicants 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:

- Biosystems Engineering Technology 504 (1) or 507 (1), 505 (1), and other major subject courses 12
- Coursework in computational methods (mathematics, computer science, statistics, or any course containing appropriate computational components that may be approved by the department) 6
- Program electives 6
- Seminar (504, 505 or equivalent courses) 21
- 900 Dissertation 24

### THE DOCTORAL PROGRAM

#### Departmental Requirements

Students applying for admission into the doctoral program must submit evidence of ability to perform and report independent research to the satisfaction of the faculty of the department. An approved master's thesis will usually be acceptable for this purpose. Scores on the GRE general and engineering subject examinations also are required for applicants who have not received a degree from an ABET-accredited engineering program.

To earn a degree, each doctoral student must complete at least 75 hours of approved graduate credit (beyond the baccalaureate degree) in Biosystems Engineering and supporting areas (engineering, computational methods, agriculture 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 9 hours of courses at UTK numbered greater than 600. Other specific requirements for the minimum 75 hours are:

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

**Biosystems Engineering**

**GRADUATE COURSES**

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

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

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

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

451 Electronic Systems (4) Basic electronics with biological applications. Analog and digital electronics; sensing and controlling physical systems; control theory; design and implementation of control systems. Prereq: Consent of instructor. 3 hrs. Prereq/coreq: Processing and Food Biotechnology. 1 hr and 2 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 student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E.

504 Professional Development Seminar (1) (Same as Biosystems Engineering Technology 504.) S/NC only. E.

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

506 Physical Phenomena (3) Properties of materials, fundamental principles of hydraulics, electricity, thermal phenomena, and the environment. Prereq: Consent of instructor. F.

507 Professional Development Seminar (1) (Same as Biosystems Engineering Technology 507, Animal Science 507, Biosystems Engineering 507, Food Science and Technology 507, Ornamental Horticulture and Landscape Design 507, Plant and Soil Sciences 507.) S/NC only. F.

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

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

522 Processing and Environmental Systems (3) Environmental systems in plant and animal production; application of electric power, mechanical equipment, structures, crop processing and materials handling. Prereq: 506, 2 hrs and 1 lab. Sp.

532 On-Site Domestic Water Supply and Wastewater Renovation (3) Basic groundwater hydrology, selection and design of pumps and delivery systems, and point-of-use wastewater processes; soil-based wastewater renovation principles, and design and operating criteria for on-site wastewater renovation systems. Prereq: 506, 2 hrs and 1 lab. F.

542 Simulation of Agricultural Systems (3) Synthesis and analysis of agricultural systems using computer simulation, philosophy of system simulation, and applications in discrete and continuous systems. Prereq: 506 and introduction to computer programming. 2 hrs and 1 lab. F.

546 Automation Devices and Applications (3) Basic electronics as applied to simple automation systems, programmable controllers, data acquisition, digital logic and transducers. Prereq: 506 or consent of instructor. 2 hrs and 1 lab. Sp.

562 Selected Topics in Biosystems Engineering Technology (1-3) Lecture, group discussion, on specialized topics. May be repeated. Maximum 6 hrs. E.

**Biosystem Engineering Technology**

**GRADUATE COURSES**

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

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

442 Agricultural Waste Management and Pollution Control (3) Waste raw materials, fundamentals, characteristics of animal manure, techniques for collection, transportation, storage, and utilizing livestock waste. Prereq: Basic Calculus or Finite Mathematics or equivalent. 2 hrs and 1 lab. Sp.

452 Small Internal Combustion Engines (3) Theory, concepts, and mechanics of small internal combustion engines; theoretical cycles; selection, operation, adjustment, troubleshooting and repair of single-cylinder on-
Agricultural Economics and Rural Sociology

(College of Agricultural Sciences and Natural Resources)

MAJOR DEGREES

Agricultural Economics M.S., Ph.D.

Dan McleMone, Head

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

Associate Professors:
Jaks, Paul M., Ph.D. NC State
Jensen, K. L., Ph.D. Oklahoma State
Larson, J. A., Ph.D. Oklahoma State
Pompei, G. K., Ph.D. California (Davis)

Assistant Professor:
Jaenicke, E. C., Ph.D. Maryland

The Department of Agricultural Economics and Rural Sociology offers programs of graduate study leading to the M.S. 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 or 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 advisory committee. Six hours of thesis may be counted toward this requirement. May not be used toward degree requirements. May be repeated. Six credits minimum. E

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. Six hours of thesis may be counted toward this requirement.
2. A minimum of 24 hours of graduate credit in courses numbered at or above the 500 level. In the agricultural economics concentration, 15
3. A minimum of 12 hours of graduate credit in courses numbered at or above the 500 level. In the agriculturaleconomics concentration, 15
4. A minimum of 3 hours of graduate credit in courses numbered at or above the 500 level. In the agriculturaleconomics concentration, 15
hours of agricultural economics, 6 hours of economic theory and 6 hours of quantitative methods are required. In the rural sociology concentration, 9 hours of 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 30 hours of graduate coursework is required. At least 27 hours must be in courses numbered at or above the 500 level. The agricultural economics concentration must include a minimum of 24 hours in agricultural economics and 6 hours of economic theory. In the agribusiness concentration, 15 hours in agricultural economics, 3 hours of economic theory and 6 hours of internship are required. Six hours of quantitative methods are required in both concentrations. 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 27 hours of coursework in agricultural economics, 15 hours of economic theory, and 9 hours of quantitative methods are required. The program must include a minimum of 9 hours in courses numbered at or above the 600 level (excluding dissertation credits). Qualifying exams are required in macroeconomic and microeconomic theory. Comprehensive exams include three written exams and one oral exam. The written exams are in general agricultural economics, quantitative methods, and the area of concentration.

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

MINOR IN ENVIRONMENTAL POLICY
The department participates in a program designed to give graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. See Economics for program description.
Animal Science

(Major in Animal Science and Veterinary Medicine)

MAJOR

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

Kelly Robbins, Head

Professors:
Barth, K. M. (Emeritus), Ph.D........... Rutgers
Bell, M. C. (Emeritus), Ph.D............. Oklahoma State
Bletner, J. K. (Emeritus), Ph.D.......... Ohio State
Chamberlain, C. C. (Emeritus), Ph.D.... Iowa State
Eier, H., D.V.M., Ph.D................. Illinois
Erickson, B. H. (Emeritus), Ph.D........ Kansas State
Godkin, J. D. (Emeritus), Ph.D.......... Massachusetts
Hall, O. G. (Emeritus), Ph.D............. Iowa State
Hansard, S. L. (Emeritus), Ph.D........ Florida
Henry, R. W. Jr., D.V.M., Ph.D......... Ohio
Lidwell, E. R. (Emeritus), M.S.......... Tennessee
Masingcamp, F. B., Ph.D............... Kansas State
McDonald, T. P. (Emeritus), Ph.D....... Tennessee
McLaren, J. B. (Emeritus), Ph.D......... Auburn
Miller, J. K., Ph.D..................... Georgia
Murphee, R. L. (Emeritus), Ph.D....... Wisconsin
Oliver, S. P., Ph.D..................... Ohio State
Richardsion, D. O., Ph.D................. Ohio State
Robins, K. R., Ph.D..................... Illinois
Saxon, A. Ph.D......................... NC State
Shirley, H. V. (Emeritus), Ph.D......... Illinois
Schultz, T. W., Ph.D..................... Tennessee
Sims, M. H., Ph.D..................... Auburn
Tugwell, R. L. (Emeritus), Ph.D......... Kansas State

Associate Professors:
Backus, W. R., Ph.D...................... Tennessee
Bell, R. F., Ph.D......................... NC State
Grizzle, J. M., Ph.D...................... Florida
Heitmann, R. N., Ph.D................... Maine
Kattesh, H. G., Ph.D..................... Virginia Polytechnic Institute
Mathew, A. G., Ph.D..................... Purdue
Mendis-Handagama, L. C., Ph.D........ Monash
Smith, M. O., Ph.D...................... Oklahoma State
Wallace, J. C., Ph.D..................... Nebraska

Assistant Professors:
Edwards, J. L., Ph.D..................... Florida
Enfors, B. C., D.V.M., Ph.D............. Texas A&M
Schrick, F. N., Ph.D..................... Clemson
Thiho, P. K., D.V.M., Ph.D.............. Michigan State

All-first year graduate students are required to enrol in 507 and 509. All first- and second-year students are required to enrol in 596 each fall and each spring term.

THE MASTER'S PROGRAM

For admission to the M.S. program, a student must have obtained a 3.0 grade-point average on a 4.0 scale (or a 3.0 each term during the junior and senior years) in a completed undergraduate degree program in one of the animal sciences or in a related area.

The student must submit evidence (letters of recommendation, personal interview, etc.) that indicates ability to complete requirements for the M.S. Prerequisite courses may be required if the student has insufficient undergraduate background. If the student has an unsatisfactory grade-point average, acceptance may be on a probationary (non-degree) basis and a minimum of 9 hours of graduate coursework must be completed the first term with a minimum grade-point average of 3.0 for admission to the M.S. program.

The program requires 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 professional electives. These statistics courses must be chosen from the 400, 500, or 600 level of courses approved for use in the Intercollegiate Graduate Student Program (ICGSP). The remainder of the coursework will be selected jointly by the student and the major professor depending on the student's area of concentration and professional objectives.

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

THE DOCTORAL PROGRAM

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

1. A minimum of 16 hours in related fields outside of animal science.
2. At least 24 hours must be 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 or 600 level in two non-management concentration courses 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 ICGSP.

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

GRADUATE COURSES

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

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

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

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

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 and consent of instructor. 2 hrs and 1 lab. Sp

490 Professional Development Seminar (1) (Same as Agriculture 507, Biosystems Engineering 507, Biosystems Engineering Technology 507, Food Science and Technology 507) Professional development seminar. Prereq: 483 or equivalent. 1 hr. 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 the student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. 5/NC only. F

507 Professional Development Seminar (1) (Game as Agriculture 507, Biosystems Engineering 507, Biosystems Engineering Technology 507, Food Science and Technology 507) Professional development seminar. Prereq: 483 or equivalent. 1 hr. F

Animal Science

53
nology 507, Ornamental Horticulture and Landscape Design 507, and Plant and Soil Sciences 507.) S/NC only, F.

509 Scientific Communication (1) (Same as Agriculture 509, Food Science and Technology 509, Ornamental Horticulture and Landscape Design 509, and Plant and Soil Sciences 509.) F.

511 Special Problems in Animal Science (1-4) Prereq: Consent of instructor and department head. May be repeated. Maximum 9 hrs. E.


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

532 Sp.

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

552 Disorders of the Endocrine System (2) Pathological and physiological aspects of diseases; endocrine glands of various animal species. Prereq: 501 or consent of instructor. (Same as Comparative and Experimental Medicine—Veterinary Medicine 552.) A.

553 Sp.

554 Comparative Hematology (3) Morphology, physiology and development of blood and blood forming organs: similarities and differences of major domestic and laboratory species. Prereq: Undergraduate, or consent of instructor. 2hrs and 1 lab. (Same as Comparative and Experimental Medicine—Veterinary Medicine 554.) Sp.


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

562 Disorders of the Endocrine System (2) Pathological and physiological aspects of diseases; endocrine glands of various animal species. Prereq: 501 or consent of instructor. (Same as Comparative and Experimental Medicine—Veterinary Medicine 562.) Sp.

563 Sp.

564 Seminar (1) Advanced topics in animal physiology. Required of all first- and second-year graduate students. May be repeated. Maximum 4 hrs. S/NC only, F, Sp.

565 Advanced Topics in Animal Anatomy (1-4) Current and future research methodology, laboratory situation, recent advances in quantitative techniques for gross and microscopic anatomy. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. (Same as Comparative and Experimental Medicine—Veterinary Medicine 565.) E.

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

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

568 Seminar (1) Advanced topics in animal science. Required of all first- and second-year graduate students. May be repeated. Maximum 4 hrs. S/NC only, F.

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

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

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

581 Advanced Livestock Management (3) Objective functions to evaluate alternative livestock production management policies. Systems approach to analysis and integration 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.

Animal Science—Veterinary Medicine

See College of Veterinary Medicine and Comparative and Experimental Medicine

Anthropology

(College of Arts and Sciences)

MAJOR

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

Jan F. Simk, Head

Professors:

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

Faulkner, Charles H., Ph.D. Indiana

Jantz, Richard L., Ph.D. Kansas

Klippehl, Walter E., Ph.D. Missouri

Logan, Michael H., Ph.D. Pennsylvania

Pamela, Paul W. (Emeritus), Ph.D. Virginia

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

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

Associate Professors:

Harrison, Ira E., Ph.D. Syracuse

Howell, Benita J., Ph.D. Kentucky

Kingsberg, Lyle, Ph.D. Northwestern

Kramer, Andrew (Liaison), Ph.D. Michigan

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

Assistant Professor:

Marks, Murray K., Ph.D. Tennessee

Research Associate Professor:

Chapman, J., Ph.D. North Carolina

Research Assistant Professors:

Elam, J. Michael, Ph.D. Missouri

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

The Department of Anthropology offers both the M.A. and Ph.D. degrees with concentrations in archaeological, 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 MASTER'S PROGRAM

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

All prospective M.A. students must make formal application to The University of Tennessee, Knoxville Graduate School. Copies of the application form, transcripts, and GRE scores that are sent to the Graduate School should also be sent directly to the Department of Anthropology at the same time. In addition, the department requires a letter of intent from the applicant indicating career goals and reasons for selecting the University of Tennessee. Three letters of recommendation, and one sample of the prospective student's written work (a class paper or research report); these materials should be sent directly to the Graduate Secretary, Department of Anthropology, SSH 250, University of Tennessee, Knoxville, TN 37996-0720.

Graduate applications are considered once a year by the Graduate Committee. All application materials must be received in the department by January 15 for admission the following fall. Because of the structure of first-year studies, M.A. students should plan to begin their studies in the Fall semester.

M.A. Requirements

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

1. Selection of an M.A. advisor. This should be done as soon as possible in the student's program but must be done no later than the end of the first semester in residence. The department graduate advisor must be informed in writing of each student's advisor.

2. A minimum of 30 credit hours in graduate courses. Twenty-four hours must be in anthropology courses (with at least 15 hours in courses that are not offered by the department).

Applicants with a major in a related field (biology, sociology, geology, classics or geography) will be considered only if they have a formal minor in anthropology or its equivalent (at least five upper division anthropology courses).

Additional coursework should be selected in consultation with the student's advisor and must include one additional course from two anthropology concentrations besides the student's primary concentration. At least 20
hours of coursework must be at the 500 level or higher.

3. During the first year, comprehensive Graduate Evaluation Examinations (GEEs) are required of all M.A. students and are based on the content of the core courses. These examinations are given as the final examination in each core class (during regularly-scheduled final periods) and are graded by all faculty within the appropriate subdiscipline for each course. At the end of the first year, all M.A. students will be evaluated by the entire faculty and will either be retained or dropped from the program based on their first year’s performance and GEE scores.

4. All M.A. students must attend the graduate section of the visiting lecturer program. To insure compliance with this requirement, each student is required to register for one credit hour of Anthropology 501 in the Fall semester of each year and fulfill all requirements for the course defined by the instructor. Materials covered by visiting lecturers may appear in the exam.

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

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

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

8. Two copies of the thesis are required by the Graduate School. In addition, bound copies of the thesis are to be provided to the department and to all members of the student’s M.A. committee.

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

THE.DoCTORAL.PROGRAM

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

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

THE. DOCTORAL. PROGRAM

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

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

Admission to the Ph.D. program is based upon the applicant’s academic record and credentials, but also on fit between an individual’s interest and faculty areas of research. Applicants will not be admitted to the Ph.D. program unless appropriate faculty members are available to chair and serve on the doctoral committee. Doctoral program applicants should communicate directly with the potential chairperson and two additional

members of the anthropology faculty who will be asked to serve on the committee.

Applicants to the Ph.D. degree program must present the same official transcripts as M.A. program applicants and furnish the same materials (see The Master’s Program). Admission to the program requires either:

1. Acceptance of a Master’s degree in anthropology.

2. Acceptance of a Master’s degree in another discipline, with the provision that the student will follow the first-year program with entering M.A. students, i.e., complete the core courses (510, 560, 590) and pass the Graduate Evaluation Examinations.

Doctoral Committee: A doctoral committee is appointed following admission to the program. In consultation with this committee, the student defines the future program of study. When the student and committee have agreed upon the specific fields of specialization, the student will be examined, a brief dissertation proposal prepared by the student, approved by the members of the committee, is presented to the department head and the student’s major professor. As early as possible, no later than a full semester after admission to the doctoral program, the student shall formally present a written dissertation proposal to the department head and advisor.

Residence and Coursework: Every potential Ph.D. candidate must complete two consecutive semesters of full-time residence prior to taking the doctoral comprehensive examination. The student must complete the minimum coursework requirements of the Graduate School, including at least nine hours of 500- to 600-level courses outside of anthropology, chosen in consultation with the doctoral committee, particularly the outside member who represents the cognate language area. Outside coursework may be taken in a single discipline or be distributed across two or more disciplines as appropriate to the individual’s program of study.

Statistics: Demonstration of competence in statistics by completing Statistics 537 and 538 with a grade of B or better is required.

Language: Students must demonstrate knowledge of one foreign language. This language should normally be French, German, Russian, or Spanish, but other languages may be substituted at the committee’s discretion.

This requirement may be met by either:

1. Successful performance on a language examination administered by the appropriate language department. A student selecting this alternative should consult with the advisor, or

2. Completion of the second semester of specialized reading courses for graduate students with a grade of B or better.

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

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

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

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

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

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

Defense of Dissertation Examination: When the dissertation has been tentatively accepted by the committee, a final oral examination will be held. The committee conducts the exam, which is ordinarily held as a colloquium in which the candidate will respond to the nature and significance of her/his contribution to anthropological knowledge as set forth in the dissertation.

ACADEMIC COMMON MARKET

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

GRADUATE COURSES

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

411 Linguistic Anthropology (3) Basic linguistic concepts applied to research in cultural anthropology. Prereq: 130 or 230. (Same as Linguistics 411.)

412 Folklore in Anthropology (3) Introduction to anthropological study of folklore and folktide materials from various tribal, peasant, and complex societies. Prereq: 130 or consent of instructor.

413 Dynamics of Culture (3) Major changes in culture, ranging from evolution and diffusion to religious revitalization and political revolt. Continuity and change in diverse cultural settings through use of archaeological, ethnographic, and contemporary cases. Prereq: 130.

414 Political Anthropology (3) Organization and dynamics of power and politics in both stateless and state-level societies. Role of symbols, rituals, and ideologies in producing and reproducing power relations. Relationship between actors (individuals) and structures. Encapsulation of traditional political forms and systems within modern states. Prereq: Cultural anthropology or consent of instructor.

431 Ethnographic Research (3) Conceptual and practical exploration of methods and techniques cultural anthropo
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, methods, and findings to community and national development programs. Analysis of anthropologists' roles, values, and ethical issues in selected case studies. Survey of anthropologists' work in non-academic settings.

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

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

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

521 Laboratory Studies in Zoology (3) Examination and comparison of skeletal remains of major mammalian groups, shell characters of species encountered in archaeological sites. Laboratory study of comparative collections. May be repeated. Maximum 8 hrs.

522 Seminar in Archaeology (3) Analytic and practical issues of prehistoric and historic archaeology. 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.

540 Theory in Archaeology (3) Detailed consideration of theory in contemporary archaeology: modes of scientific explanation, research design, chronological processes, and methods of analysis and interpretation.

560 Archaeological Resource Management (3) Federal legislation and regulations affecting identification, protection, and management of archaeological resources. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

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

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

567 Selected Topics in Paleoanthropology (3) Genetic and morphological variation among extant human groups; relationships of variation to geography, ecology, and subsistence. May be repeated. Maximum 6 hrs.

580 Advanced Human Variation (3) Genetic and morphological variation among extant human groups; relationships of variation to geography, ecology, and subsistence. May be repeated. Maximum 6 hrs.


583 Skeletal Biology (3) Primal and theoretical approaches to analysis of prehistoric human skeletal remains. Causation, vital statistics, pathology, nutrition, and measurement of biological relationships as related to population as adaptive unit. Prereq: Consent of instructor.

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

590 Method and Theory in Biological Anthropology (3) Current methodological and theoretical perspectives in biological anthropology. May be repeated. Maximum 6 hrs.

591 Forensic Study (1-15) May be repeated. Maximum 6 hrs.

600 Doctoral Research and Dissertation (2-15) P/NP only. E

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

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

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

621 Selected Topics in Paleoanthropology (3) May be repeated. Maximum 6 hrs.

695 Gross Human Anatomy (5) Skeletal, muscular, and cardiovascular systems. Dissection of cadavers. Prereq: 480 or Human Biology, 5 hrs and 5 labs.

Architecture

(College of Architecture and Design)

MAJOR

DEGREE

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

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

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

Ph.D........................... St. Andrews
Admission Requirements
In addition to meeting The Graduate School's minimum requirements, the following specific admission requirements to the Master of Architecture program must be met.

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

For Track 2 applicants, a Bachelor of Architecture degree from an NAAB accredited program, or foreign equivalent. Candidates with a GPA less than 3.0 may be considered for conditional admission when evidence of exceptional promise is identified. Submission of a portfolio with a separate application to Architecture is required for a student to include an essay and three letters of recommendation. A personal on-site interview is desirable but not mandatory.

The general portion of the Graduate Record Examination is required of all applicants.

Discipline must be taken at the 500 level or above.

Graduate Courses
403 Introduction to Preservation (3) History, theory, and legal aspects of architectural preservation and restoration.
411 Objects in Architecture (3) Historical and critical review of major ideas of architecture through the ages. Open to all students.
412 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 study. Historical change in urban form and design.
421 Non-Western Architecture (3) Building responsive to climate, material availability, and economic level, as defined by non-Western builders. Pre-historic times to present in various cultures. Eastern arts and international architecture.
431 Tennessee Architecture (3) History of settlement patterns and building in Tennessee. Reading assignments, lectures, discussion, and field trips. Historical research using primary material.
451 Medieval Architecture (3) History of architecture from decline of Rome to beginning of Renaissance.
477 The International Style (3) Survey of architecture of the early modern movement, primarily in Europe and America, 1890-1940.
490 American Architecture, 1840-1940 (3) Styles and periods from the Gothic Revival through twentieth century.
421 History of Landscape Architecture (3)Intellectual, societal, and geographical influences that provide the theoretical basis for design throughout history. Selected examples of landscape architecture analyzed in terms of design.

591 Off-Campus Study (1-9) Special Topics in Architecture (1-9) Student-instructor-initiated course. May be repeated. Maximum 9 hrs. S/U or letter grade.

592 Off-Campus Study (1-9) Directed Readings in Architecture (1-9) Readings on topics of interest: primary texts, history, theory, urban issues, technology and professional practice. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.


Norman Magden, Head

Professors:
Blair, Sandra J., M.F.A ........................................ Wisconsin
Brake, P. M., M.F.A ........................................... Yale
Clarke, R.A. (Emeritus), M.S ................................ Wisconsin
Cleaver, Dale (Emeritus), Ph.D. ......................... Chicago
Daehehn, R. H. (Emeritus), M.F.A. ....................... Wisconsin
Falletti, Joseph S. (Emeritus), M.S. Ohio State
Goldenstein, M. B., M.F.A .................................... Nebraska
Kennedy, William C., M.F.A. ................................ Wisconsin
Lee, B., M.F.A. ..................................................... Yale
Leland, W. E., M.F.A. .......................................... Tennessee
Livingston, P. R., M.F.A. ...................................... Wisconsin
Lyons, B. (Liaison), M.F.A. .................................. Arizona State
Magden, Norman, Ph.D. ...................................... Case Western Reserve
Martinson, Fred, Ph.D. ........................................ Chicago
Metros, Susan E., M.F.A. ..................................... Michigan State
Moffatt, F., Ph.D. ................................................. Chicago
Peacock, D., M.F.A. ............................................ Iowa
Riesing, T. J., M.F.A. ............................................ Nebraska
Stewart, F.C., M.F.A. .......................................... Claremont
Yates, S., M.F.A. .................................. North Carolina (Greensboro)

Associate Professors:
Habel, Dorothy, Ph.D. .......................................... Michigan
Hilles, Timothy, Ph.D. ........................................ Penn State
LeFevre, Richard (Emeritus), M.F.A. ...................... Rochester IT
Neff, A., Ph.D. ...................................................... Pennsylvania
Staples, Carolyn, M.F.A. ...................................... Michigan State
Wilson, D., M.F.A. ................................................. California (San Diego)

Assistant Professors:
Brogden, Sally B., M.F.A. .................................... NY State College of Ceramics (Alfred)
Evrard, Kevin, M.F.A. .......................................... Ohio
Smith, Peter, M.F.A. ............................................ RISD

The Master of Fine Arts is the terminal degree in studio art. It is offered in the concentration areas of ceramics, graphic design, drawing, media arts, painting, printmaking, sculpture, and watercolor. Interarea studies are available with consent of the faculty.

THE MASTER'S PROGRAM

To become a candidate, the applicant must be admitted by The Graduate School and approved by the Department of Art. In addition to the admission requirements of The Graduate School, the Department of Art specifically requires the following:
1. A detailed letter of intent including statement requesting assistantship, if desired.
2. Three letters of recommendation from former professors or professionals in the field.
3. An undergraduate major in art or evidence of equivalent proficiency.
4. A portfolio to be evaluated by the faculty.

Further information is available by writing to the Department of Art.

M.F.A. Requirements

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

The candidate's committee will consist of a minimum of 5 members and a maximum of 6 members and will be appointed prior to registration for 599. The committee must consist of one faculty member from the candidate's concentration area (designated as chairperson) and one faculty member from outside the concentration area. The inclusion of an Art History faculty member on each committee is encouraged.

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

Academic Standards

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

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.F.A. program in Art is available to residents of the states of Alabama (concentration in watercolor only), Arkansas or Kentucky (concentration in graphic design only). Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE MINOR IN THE HISTORY OF ART

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

GRADUATE COURSES

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

482 Museology II: Exhibition Planning and Installation (3) Exhibition concept and development. Preparation, production, technical and aesthetic aspects of a museum exhibition. Prereq: 481 or consent of instructor. (Same as Anthropology 482.)

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

489 Special Topics (3) Student- or instructor-initiated course offered at convenience of department. May be repeated. Maximum 12 hrs.

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

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

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

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

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

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

Art Design/Graphic

GRADUATE COURSES


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

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

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

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

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

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

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

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

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

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

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

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

Art History

GRADUATE COURSES

403 History of Photography (3) Survey of history of photography from introduction of daguerreotype and calotype to more recent trends. Aesthetics and use of photography as a medium for artistic expression.

411 Art of Indian Asia (3) History of Indian art: Central Asia and Southeast Asia. Writing-emphasis course.

415 Chinese Art (3) Survey from pre-Shang Dynasty to contemporary movements in China. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

419 Japanese Art (3) Survey from ancient Jomon to pre-Shibata painting style of today. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

425 Early Christian and Byzantine Art to 1530 (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

426 Art of Northern Europe, 1500-1675 (3) Concentrated study of Bruegel, Rubens, Rembrandt, Georges de la Tour, Vermeer, Poussin, and Hals. Writing-emphasis course.


452 Art of Italy, 1650-1750 (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

453 Art of Southern Europe, 1575-1700 (3) Concentrated study of Caravaggio, Bernini, and Baroque development in all media. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

471 History of North American Art (3) Landmarks in painting, architecture, sculpture, and design from prehistory to 1890.

472 History of 20th-Century American Art (3) Development of modern painting, sculpture, and design from prehistory to 1890.

473 19th-Century American Art (3) Development in architecture, painting, and design since 1800.


475 History of 20th-Century Sculpture (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

476 History of 20th-Century Painting and Sculpture in Europe (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

477 History of 20th-Century Painting and Sculpture in Europe (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

478 History of 20th-Century Painting and Sculpture in Europe (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

480 History of European Art (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

481 History of European Art (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.
Art Media Arts

GRADUATE COURSES


432 History of Film and Modern Art (3) Study of development and interaction between cinematic arts and visual arts within context of modern art history. Available for Art History credit. (Same as Cinema Studies 433.)

435 Cinematography as Art (3) Continued development of concepts and techniques for creation of film as art form: individual projects. Prereq: Introduction to Cinematography as Art and Media Arts Portfolio Review or consent of instructor. May be repeated. Maximum 9 hrs.

436 Video Art (3) Continued development of concepts and techniques for creation of video works as art form: individual projects. Prereq: Introduction to Cinematography as Art and Media Arts Portfolio Review or consent of instructor. May be repeated. Maximum 9 hrs.

438 Special Topics in Media Arts (3) Student- or instructor-initiated course offered at convenience of department. May be repeated. Maximum 6 hrs.

441 Digital Photography II (3-4) Continuation of exploration and implications of use of computer in photography. Prereq: Digital Photography I and consent of instructor. 

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

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

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

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

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

577 Studies in Media as Art (3) Selected topics in theory and history of media as art form. May be repeated. Maximum 9 hrs.

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

595 Visiting Artist Seminar (2) Contemporary art issues by different visiting artists. May not be used toward art history requirement. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

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

Art Painting

GRADUATE COURSES

413 Painting IV (6) Advanced painting, individual concepts and personal expression with varied media. Prereq: Painting III. 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: Consent of instructor. May be repeated. Maximum 12 hrs.

513 Graduate Painting (1-6) May be repeated. Maximum 10 hrs.

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

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

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

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

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

Art Printmaking

GRADUATE COURSES

462 Intaglio III (3-6) Exploration of individual projects through advanced color printing methods and combinations with other print media. Prereq: Intermediate Intaglio or consent of instructor. May be repeated. Maximum 12 hrs.

463 Lithography III (3-6) Exploration of individual projects through advanced lithographic methods in combination with other print media. Prereq: Intermediate Lithography or consent of instructor. May be repeated. Maximum 12 hrs.

464 Screen Printing III (3-6) Individual development of techniques of screen printing, prints and techniques: development of images and personal concepts. Prereq: Intermediate Screen Printing or consent of instructor. May be repeated. Maximum 12 hrs.

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

561 Printmaking I (2-6) Directed exploration of any or all matrix-based imaging: intaglio, relief, lithography, screen printing, photo-print methods and monoprint. May be repeated. Maximum 10 hrs.

562 Printmaking II (2-6) Directed exploration of any or all matrix-based imaging: intaglio, relief, lithography, screen printing, photo-print methods and monoprint. Prereq: 561.

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

599 Visiting Artist Seminar (2) Contemporary art issues by different visiting artists. May not be used toward art history requirement. May be repeated. Maximum 12 hrs.

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

Arrowmont

GRADUATE COURSES

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

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

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

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

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

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

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

470 Fabric (2-4) Intermediate to advanced. May be repeated.
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 Sciences seeks to develop individuals for professional careers in a variety of positions including research and college teaching in the concentration areas of speech and language pathology, audiology, speech-language science or hearing science. The degree program is research oriented with primary emphasis on processes involved in normal, deviant, or disordered speech, language, and hearing. Students will be expected to demonstrate their knowledge in areas related to the concentrated field of study. These areas include:
1. Basic speech, hearing, or language processes;
2. Basic speech, hearing, or language disorders or differences;
3. Related disciplines providing insight into human communication processes;
4. Technical skills in instrumentation and experimental design which enable the student to investigate problems pertaining to speech and hearing processes.

The program 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. 3 semester hours in 611; and
   d. 3 semester hours in supervised teaching experience.
5. A comprehensive examination to demonstrate knowledge in the concentration area and an examination of research competence.
6. A final oral examination.

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

GRADUATE COURSES

431 Stuttering (3) Nature, appraisal and treatment. Prereq: 304 or consent of instructor.
433 Observation of Clinical Practice (1) Prereq: Speech and Language Development, Articulation Disorders, or consent of instructor.
434 Clinical Practice in Speech-Language Pathology I and II (1-4) Prereq: 433 and consent of instructor. Enrollment for fewer than 2 hrs must have prior departmental approval.
455 Problems in Speech Pathology (1-3) Prereq: Consent of instructor.
494 Aural Habilitation/Rehabilitation of the Hearing Impaired (3) Psychosocial aspects, amplification components, characteristics, assistive devices, speech acoustics, speech perception, speech reading, parent-child, preschool-school years of children, communication measurements/handicape/remediation of adults, effects of aging/ remediation on the elderly, and case studies. Prereq: Phonetics and Acoustics of Speech and 473, or equivalent or consent of instructor.
500 Thesis (1-15) P/NP only. E
502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/N only: E
504 Appraisal of Speech and Language Disorders (3) Diagnostic procedures for children and adults with speech and language problems including observation and practice with diagnostic tests. Prereq: Consent of instructor.
505 Problems in Speech Pathology (1-3) Prereq: Consent of instructor.
506 Neural Bases of Speech and Language (3) Structure and function of central and peripheral nervous systems, role in speech and language. Prereq: 305.
507 Anatomy and Physiology of Hearing (3) Structure and function of the peripheral and central auditory systems, and their roles in mediating auditory functions. Prereq: 473 or equivalent or consent of instructor.
511 Introduction to Research in Speech and Hearing (3) Analysis of research design, use of statistics, application of statistics, and completion of a research project.
512 Clinical Practice in Audiology I and II (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, 595, or consent of instructor. May be repeated. Maximum 8 hrs.
515 Practicum in Aural Rehabilitation (1-4) Prereq: 473 and 494. May be repeated. Maximum 8 hrs.
517 Instrumentation in Audiology and Speech Pathology (3) Principles of instrumentation in audiology and speech pathology: laboratory assignments for familiarization of students with instruments for measuring speech and hearing processes.
520 Aphasia (3) Historical review of aphasia literature, theories of brain functioning, aphasic classification and terminology, and current testing, etiology, therapy considerations and prognosis for recovery. Prereq: 506 or consent of instructor.

522 Seminar in Articulation and Phonological Processing Disorders (3) Current research in diagnosis and management of articulation and phonological processing disorders. Prereq: Articulation Disorders or equivalent or consent of instructor.

523 Seminar in Voice Disorders (3) Current research in diagnosis and management of voice disorders. Multicultural, gender, and age-related issues. Prereq: 441 or consent of instructor.

524 Traumatic Brain Injury (3) Advanced neuropsychological-cognitive-linguistic emphasis. Medical and speech-language pathology rehabilitation issues associated with traumatic brain injury (TBI) related to adult TBI population. Prereq: 506 and 520, or consent of instructor.

526 Dysphagia (3) Clinical diagnosis, evaluation, and treatment of adult swallowing disorders and critical interpretation of research literature on dysphagia. Prereq: 506 or consent of instructor.

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

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

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

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

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


561 Pediatric Oromotor Disorders (3) Evaluation, diagnosis, and treatment of pediatric oromotor disorders that affect normal growth and development of speech and feeding skills. Prereq: 506 or consent of instructor.

562 Hearing Disorders (3) Effects of hearing loss on physical, psychological, and social functioning. Prereq: 473 or equivalent or consent of instructor.

563 Amplification Technology (3) Description of hearing aid circuits, components and performance characteristics. Electroacoustical and real-ear analysis of hearing aids. Prereq: 473 and 507 or equivalent or consent of instructor.

564 Amplification for the Hearing-Impaired (3) Speech acoustics/psychosocial issues. Influence of noise, reverberation and auditory perception on speech perception. Strategies for amplification, counseling, and therapy. Prereq: 506 or consent of instructor.

565 Measurement Techniques and Hearing Conservation (3) Techniques of measurement and analysis of sound: hearing conservation in schools and industry. Prereq: Consent of instructor.

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

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

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

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

550 Seminar in Audiological Assessment (1-3) Significant research in various areas of audiology. Prereq: Consent of instructor. May be repeated. Maximum of 4 hrs.

552 Seminar in Speech Pathology (3) Current significant research in speech pathology. Topics vary. Prereq: 9 hrs of speech pathology. May be repeated with consent of instructor. Maximum of 6 hrs.

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

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

582 Clinical Language Disorders (3) Assessment and treatment strategies for specific-language-impaired children (ages 3-5). Techniques for special populations. Prereq: 461 or equivalent or consent of instructor.

563 Practical Applications of Language Habilitation Techniques (3) Identification and treatment of communication disorders in infants and toddlers: family-centered services and family systems. Prereq: 506 or equivalent or consent of instructor.

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

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

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

577 Vestibular Disorders (3) Anatomy, physiology, and pathology of vestibular system and other systems that contribute to balance. Prereq: 546 or consent of instructor.

579 Psychoacoustic Concepts in Speech Pathology (3) Main psychoacoustic concepts and information theory in the study of the normal hearing and speech of children. Prereq: Consent of instructor.

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

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

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

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

594 Advanced Aural Habilitation/Rehabilitation of Hearing-Impaired (3) Study of griefing process, counseling, group and individual: amputation systems, classroom adaptations, counseling, educational, therapy methods for rehabilitation and habilitation, 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 equivalent or consent of instructor.


596 Advanced Reading in Audiology (3) Special reading, consultation, and research activities in field of audiology. May be repeated. Maximum of 6 hrs.

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

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

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

603 Language Science (3) Seminar of theories and paradigms of research on acquisition and use of language, including syntactic, semantic, and pragmatic considerations. Prereq: Consent of instructor.


608 Seminar in Speech Science (3) Experimental areas: speech physiology, acoustical analysis, recognition, perception and intelligibility of speech, communication theory, and psychoacoustical measurement of speech and language. Topics vary. Prereq: 507 or Consent of instructor. May be repeated. Maximum of 6 hrs.

609 Seminar in Hearing Science (3) Advanced study of perception of non-speech auditory signal, dexterity, pitch, loudness, differential threshold, adaptation, and fatigue. Prereq: 507 or consent of instructor. May be repeated. Maximum of 6 hrs.

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

625 Advanced Seminar in Neurologically-Based Communication Disorders (3) Topics vary. Prereq: 507, 524, and 526. Prereq: Consent of instructor. May be repeated. Maximum of 8 hrs.

565 Practicum in College Teaching (1-3) Supervised experience in college teaching. Prereq: Consent of instructor. May be repeated. Maximum of 8 hrs. S/N only.

566 Directed Research (1-4) Participation in ongoing or non-dissertational research. Prereq: Consent of instructor. May be repeated. Maximum of 10 hrs.

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

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

569 Directed Study in Speech Science (1-3) Prereq: Consent of instructor. May be repeated. Maximum of 8 hrs.

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

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

Aviation Systems

(UT Space Institute)

MAJOR
Aviation Systems

DEGREE
M.S.

Frank G. Collins, Co-Chair
Dale B. Kimberlin, Co-Chair

Professors:
Collins, F. G., Ph.D. ........................................ California
Kimberlin, R. D. (Liaison), Ph.D. ......................... RTH (Germany)
Mason, A. A. (Emeritus), 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 applicant must possess a Bachelor's degree in engineering or science from an accredited institution, show evidence of ability to pursue and benefit from the program, and fulfill the University of Tennessee Graduate School admission procedures and grade-point standards. It is expected that the student will have a basic knowledge of computer utilization and statistics; an understanding of aero-engineering administration procedures and grade-point standards. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. program in Aviation Systems is available to residents of the states of Arkansas, Florida, Mississippi, Virginia, or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES


Biochemistry and Cellular and Molecular Biology

(College of Arts and Sciences)

MAJOR

Biochemistry and Cellular and Molecular Biology

DEGREES

M.S., Ph.D.

John W. Koontz, Head

Professors:

Bagby, R. M., Ph.D. ............... Illinois
Carlson, J. G. (Emeritus) (Distinguished Prof.), Ph.D. ............... Pennsylvania
Chen, T. T., Ph.D. ............... Ohio State
Churchich, Jorge E., Ph.D. ............... Illinois

Associate Professors:

Ganguly, R., Ph.D. .................... Nebraska
Hall, J. C., Ph.D. ............... Illinois
Howell, Elizabeth E., Ph.D. ............... Lehigh
Koontz, John W. (Liaison), Ph.D. ............... Kentucky
Peterson, Cynthia B., Ph.D. ............... LSU
Roberts, Daniel M., Ph.D. ............... California (Davis)
Serpepski, Engin H., Ph.D. ............... Harvard

Associate Professors:

Bagby, R. M., Ph.D. ............... Illinois
Carlson, J. G. (Emeritus) (Distinguished Prof.), Ph.D. ............... Pennsylvania
Chen, T. T., Ph.D. ............... Ohio State
Churchich, Jorge E., Ph.D. ............... Illinois

Serperski, Engin H., Ph.D. ............... Harvard

500 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, team work and decision-making processes.

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


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

1. Biochemistry and Cellular and Molecular Biology 511-12, 515-16, and 517.
2. Completion of course requirements as determined by the candidate's faculty committee.
3. Achievement of a 3.0 or better GPA in all courses taken for graduate credit.
4. Participation in 601 and 603 during the entire period of residence. Participation in at least one journal club chosen from among 605-608 for three semesters.
5. Six hours of master's research and a thesis.
6. A final examination that covers both the thesis endeavor and the subject matter of the 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 M.S. program in Biochemistry and Cellular and Molecular Biology is available to residents of Delaware and Kentucky. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

403 Advanced Genetics Laboratory (2) Experiments illustrating methods in modern genetics: techniques in classical, cytoplasmic, molecular, and developmental genetics. Model organisms, Drosophila and mouse. Prereq: General Genetics and Organic Chemistry.
410 Cellular and Comparative Biochemistry (4) Electron microscope, chemistry and structure of proteins; enzyme behavior and biological function; catabolism and energy capture; synthesis and function; nucleic acid function; protein synthesis, and biochemical genetics; regulation of biological processes. Prereq: Organic Chemistry and General Biology. 3 hrs and 1 discussion.
421 Cell and Tissue Structure and Function (4) Study of animal cells and tissues at light and electron microscope levels. Prereq: Cell Biology. 2 hrs and 2 labs.
449 Laboratory in Physiology (2) Prereq or coreq: 440 or 445.
465 Human Genetics (3) Genetics and genomics; principles and problems of human inheritance. Prereq: General Genetics.
471-81 Physical Chemistry (3, 3) Physical chemical principles with emphasis on biological systems. 471-Thermodynamics; chemical equilibrium; solution chemistry; transport; electrochemistry; kinetics; enzyme catalysis; radiation; 471-244-Elementary quantum chemistry. Interactions of light with biological molecules; optical and magnetic spectroscopy; light scattering; case studies of selected macromolecules. Prereq: Calculus, Organic Chemistry, General Biology or consent of instructor. (Same as Chemistry 471-81.) F, Sp.
480 Physiology of Exercise (3) (Same as Exercise Science 480.)
500 Thesis (1-15) P/NP only. E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
511 Advanced Protein Chemistry and Cellular Biology (9) Molecular structure and function at the molecular and supramolecular level in proteins and their function; membrane structure and function; bioenergetics and membrane proteins. Prereq: Prior knowledge of cell biology and biochemistry. Coreq: Consent of instructor.
515 Experimental Techniques (4) Modern experimental methodology and instrumentation lab. cell growth; spectrophotometry; microscopy; nucleic acid purification and analysis; protein assays; enzyme purification; electrophoresis; computer analysis of nucleic acid and protein sequences. Lectures on theory of laboratory to accompany two lab periods per week. Primarily for departmental graduate students. Prereq: Consent of instructor. F, S.
517 Physical Biochemistry (3) Physics and chemistry of biological systems and molecules. Thermodynamics; diffusion and transport; physical chemistry of macromolecules; enzyme kinetics; binding reactions; spectroscopy; electrophysiology. Prereq: 511 or consent of instructor. Sp.
520 Special Topics (1-3) Selected directed readings or special course in topics of current interest. Consult departmental listing for offerings. May be repeated with consent of instructor. Maximum 6 hrs. S/NC only.
525 Graduate Research Participation (3-12) Tutorial laboratory experience. May be repeated. Maximum 12 hrs. E
550 Advanced Concepts in Neurobiology/Physiology (3) Concepts related to neurobiology/physiology with information taken from current literature. Predominantly lecture format with student participation. Specific subject area to be announced. Prereq: Consent of instructor. May be repeated.
552 Physiology of Hormones (3) Cellular and organ-specific actions of hormones in vertebrate and invertebrate animals. Prereq: 490 or consent of instructor. Recommended prerequisite: 410. 2 hrs and 1 lab.
560 Advanced Concepts in Structural Biology/Biochemistry (3) Concepts related to structural biology/biochemistry with information taken from current literature. Predominantly lecture format with student participation. Specific subject area to be announced. Prereq: Consent of instructor. May be repeated.
561 Environmental Toxicology (3) (Same as Ecology and Evolutionary Biology 561.)
562 Introduction to Electron Microscopy (Practical application techniques for preparation of biological samples for viewing in transmission electron microscopy). Use of microscope and microscopy, 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
564 Introduction to Electron Microscopy (Practical application of electron microscopy techniques for preparation of biological samples for viewing in transmission electron microscopy). Use of microscope and microscopy, 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
566 Advanced Concepts in Neurobiology/Physiology (3) Concepts related to neurobiology/physiology with information taken from current literature. Predominantly lecture format with student participation. Specific subject area to be announced. Prereq: Consent of instructor. May be repeated.
567 Environmental Toxicology (3) (Same as Ecology and Evolutionary Biology 561.)
562 Introduction to Electron Microscopy (Practical application techniques for preparation of biological samples for viewing in transmission electron microscopy). Use of microscope and microscopy, 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
564 Introduction to Electron Microscopy (Practical application of electron microscopy techniques for preparation of biological samples for viewing in transmission electron microscopy). Use of microscope and microscopy, 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

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.

570 Advanced Concepts in Cellular/Molecular Biology (3) Concepts related to cellular/molecular biology with information taken from current literature. Predominantly lecture format with student participation. Specific subject area to be announced. Prereq: Consent of instructor. May be repeated.


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

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

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

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

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

603 Graduate Research Colloquium (1) Seminars and lectures dealing with current advances in fields of bio-chemical and biophysical methods, mechanisms of en-zyme catalysis, gene expression, membrane structure and function, metabolic regulation, physical biochemistry, molecular genetics, cell biology, neurobiology, and related topics. Required every semester in residence. S/NC only. F, Sp.

604 Current Topics in Environmental Toxicology (1) (Same as Ecology and Evolutionary Biology 504) S/NC only. F, Sp

605 Journal Club in Neurophysiology/Physiology (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs. S/NC only.

606 Journal Club in Structural Biology/Biochemistry (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs. S/NC only.

607 Journal Club in Cellular/Molecular Biology (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs. S/NC only.


610 Current Topics in Biochemistry, Cellular, and Molecular Biology (1-15) Critical reviews of research problems and methods in biochemistry, cell biology and/or molecular biology. Oral presentations, written reports, computer simulations by faculty and students. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs.

615 Special Topics in Biochemistry, Cellular, and Molecular Biology (3) Biochemical and biophysical methods, mechanisms of enzyme catalysis, gene expression, membrane structure and function, metabolic regulation, physical biochemistry, molecular genetics, cell ultrastructure and physiology, neurobiology, and related topics. Prereq: 511-1 or consent of instructor. May be repeated. Maximum 9 hrs.

Biomedical Sciences

Major Degree

Biomedical Sciences.........................Ph.D.

Jeffrey Becker, Acting Director

Professor:
Olins, Donald A., Ph.D. .......................Rockefeller
Popp, Raymond A., Ph.D. ....................Michigan

Research Professor:
Olins, Ada L., Ph.D. .........................New York

Assistant Research Professor:
Hauser, Loren, Ph.D. .........................California (Irvine)

Shared faculty are drawn from the Oak Ridge National Laboratory.

The University of Tennessee-Oak Ridge Graduate School of Biomedical Sciences, located within the Oak Ridge National Laboratory, offers a program leading to 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 full-time graduate study in the life sciences the talents and experiences of that staff, as well as the most advanced research methods and technology.

The program of study, which incorporates a high faculty-to-student ratio, is based on intensive graduate courses supplemented by tutorial instruction, participation in a wide variety of seminars, and a heavy emphasis on communication skills, research training, and independent study. The program encourages students to pursue graduate studies to the limits of their abilities.

Each student's curriculum is planned to meet individual needs, with the aim of giving: (1) strength in the basic sciences; (2) perception of the biomedical sciences as a whole; and (3) experience and training in a chosen speciality.

The concentration areas available for Ph.D. dissertation work are biochemistry, biophysics, genetics, cellular, developmental and mammalian genetics, and radiation biology. Included are such subjects as immunology, protein and enzyme chemistry, nucleic acid chemistry, radiation and environmental biology, developmental biology, experimental pathology, microbial and mammalian genetics, mutation, structural biology, and genomic analysis.

Admission Requirements

A bachelor's degree or its equivalent is required. Students with M.S., D.V.M., or M.D. degrees are also encouraged to apply. Completed applications, Graduate Record Examination scores and letters of reference should be sent to the address below. The student will need preparation in biology, calculus, physics, and organic chemistry. It is recommended that deficiencies in preparation, as identified in the admission process, be eliminated prior to entrance. Requests for application forms, information on admission, financial support, and housing should be sent to Director, University of Tennessee-Oak Ridge Graduate School of Biomedical Sciences, ORNL, 1060 Commerce Park, Oak Ridge, Tennessee 37831.

The Doctoral Program

1. Satisfactory (B grade or better) completion of the following core courses or their equivalent: Biochemistry (511); Biophysical Biochemistry (514); Genetics (515); Computing for the Life Sciences (525); and Survey of Statistical Methods (530).

2. Three semesters of Biomedical Sciences Laboratory (531-533).

3. Participation in at least one of the seminars during each term of residence after the first year is strongly recommended.

4. Satisfactory completion of formal advanced courses in the areas of the student's interests. The number and nature of the required advanced courses will vary depending upon the student's background and area of specialization.

5. Passing both written and oral comprehensive examinations.

6. A dissertation reporting the results of original and significant scientific research. A minimum of 24 semester hours of course 600 is required.

7. A final oral examination on the dissertation.

A formal seminar presentation of the dissertation research.

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. Prereq: Consent of instructor. E

511 Biochemistry (3) Chemistry of carbohydrates, lipids, proteins, and coenzymes; enzyme kinetics; metabolism and photosynthesis; biosynthesis of amino acids and coenzymes. S/NC only.

514 Biochemical Biochemistry (3) Chemistry of biosynthesis, synthesis, and metabolism of purines, pyrimidines, and nucleic acids; biosynthesis of RNA, DNA, and proteins. E

515 Genetics (3) Mendelian genetics, mitosis and meiosis, transmission genetics, linkage and recombination, genetics of phage, bacteria and eucaryotes, cell structure, growth, and cell division. S/NC only.

516 Biochemistry (4) Chemistry of biological systems and biochemical reactions; metabolic pathways; molecular structure and function. S/NC only.

525 Computing for the Life Sciences (3) Interactive computing, minicomputing and microcomputer environments; Basic, Fortran, and Pascal languages; application of statistics, graphics, text manipulation, and computer communications.

530 Survey of Statistical Methods I (3) (Same as Statistics 531)

531-32-33 Biomedical Sciences Laboratory (3,3,3) Approaches to problems in various areas of modern biology. Students spend a semester in each of three laboratories conducting research in different areas of biomedical science. Required of all first-year students.

534-46-49 Graduate Research Participation (3,6,9) Special advanced research project not related to dissertation research. Topics chosen with consent of instructor. E

551-553 Special Topics in Biomedical Sciences (3,3,3) Either tutorials or formal lectures. Potential topics: X-ray diffraction and crystallography; excited-state biophysics; physical chemistry of macromolecules; pathology; mammalian genetics; developmental biology; immunology.

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

651-52 Advanced Topics in Biomedical Sciences (3,3) Current and future research developments: protein synthesis, protein chemistry and enzymes; viruses, and special topics. Either as a tutorial or a seminar. S/NC only.

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 animals. Prereq: 515.
Botany

(College of Arts and Sciences)

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

Edward E. Schilling, Head

Professors:
- Caponetti, J. D., Ph.D. .......... Harvard
- Clebsch, E. E. C. (Emeritus), Ph.D. .... Duke
- DeSein, H. R. (Emeritus), Ph.D. .. Ohio State
- Evans, A. M. (Emeritus), Ph.D. .... Michigan
- Heilman, A. S. (Emeritus), Ph.D. .. Ohio State
- Herndon, W. R. (Emeritus), Ph.D. .. Vanderbilt
- Hickok, L. G., Ph.D. ................. Massachusetts
- Holton, R. W. (Emeritus), Ph.D. .... Michigan
- Hughes, K. W., Ph.D. ............... Utah
- Mullin, B. C., Ph.D. ................. North Carolina State
- Petersen, R. H. (Distinguished Professor), Ph.D. ... Columbia
- Schilling, G. E. (Liaison), Ph.D. .... Indiana
- Schwarz, O. J., Ph.D. ............... North Carolina State
- Walne, P. L. (Benwood Distinguished Professor), Ph.D. .... Texas

Associate Professors:
- Amundson, C. C., Ph.D. .......... Colorado
- Pignucco, M., Ph.D. .............. Connecticutt
- Smith, D. K., Ph.D. ............... Tennessee
- Wofford, B. E. (Curator), Ph.D. .... Tennessee

Assistant Professors:
- Cruzan, M. B. C., Ph.D. ....... SUNY (Stony Brook)
- von Aminn, A. G., Ph.D. ........... East Anglia (UK)

Lecturer:
- McFarland, K. D., Ph.D. .......... Tennessee

The Department of Botany offers the Master of Science and Doctor of Philosophy degrees with concentrations in anatomy, biology, cytology, cytogenetics, ecology, genetics, lichenology, morphology, mycology, photobiology, physiology, phytology, and taxonomy.

Educational service is required of each graduate degree candidate and such service will include teaching and/or ancillary services performed in the department related to the instruction of courses. For further information, contact the Department Head or the Graduate Coordinator.

ADMISSION REQUIREMENTS

The Botany Department requires scores from the general portion of the Graduate Record Examination, at least three letters of recommendation or standard recommendation forms from academic or professional persons, a short statement describing reasons for interest in graduate education in botany, and the following academic requirements:
1. Bachelor's degree: a B.A. or B.S. from an accredited college or university and a cumulative grade-point average of 2.5 or better (on a 4.0 scale), with evidence of ability to do work of graduate quality.
2. General botany or general biology: 8 semester hours.
3. Advanced botany or closely allied biological sciences: 12 semester hours.

4. Physical sciences: general inorganic chemistry: 3 semester hours; organic chemistry: 8 semester hours. Physics highly recommended.
5. College mathematics: 6 semester hours including 1 term of calculus.

Evidence of a broad undergraduate background, an ability to do work of graduate quality, and an interest in the study of plant science are considered to be much more important than the particular courses taken as an undergraduate. Accordingly, students lacking specific prerequisite courses but otherwise qualified may be admitted to graduate study 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 graduate committee during the first meeting with the student.

THE MASTER'S PROGRAM

The program for the Master of Science is patterned to fit the needs of students who desire a less extensive course of study than the Ph.D. program. Therefore, 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 examination and an oral defense to the student's committee of a research proposal suitable for a thesis. This must be completed before enrollment in Botany 500.
2. Successful completion of 30 hours of graduate credit, at least two-thirds of which must be at the 500 level or higher.
3. Satisfactory completion of two hours at the 600 level.
5. Presentation of a 30 minute departmental seminar.
6. Educational service in the form of teaching and/or ancillary services; consult major professor and department head.

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

THE DOCTORAL PROGRAM

The Doctor of Philosophy program is patterned to provide training that involves extensive independent research within the student's area of concentration. Although there is no formal program of coursework, the student's committee may require specific courses for the completion of the degree. Most students spend from three to five years working on their Ph.D.

Requirements for successful completion of the Ph.D. are as follows:
1. Satisfactory presentation of a research problem by means of a written proposal and an oral defense to the student's committee. This must be completed before enrollment in Botany 600.
2. Satisfactory performance on a written comprehensive examination.
3. Presentation of one or more cognate areas outside of the department totaling 6 hours of graduate credit with at least a B average.
4. Satisfactory performance on an examination in one modern foreign language (see Graduate Coordinator) or an A or B in French 302 or German 332.
5. Satisfactory completion of 6 hours at the 600 level (excluding dissertation).
7. Presentation of a departmental seminar near the end of the doctoral program.

Note: The listed requirements for the M.S. and Ph.D. degrees should be interpreted as minimal requirements. Specific stipulations or requirements such as additional foreign languages or an additional oral comprehensive examination may be required by the student's faculty committee.

MINOR IN ENVIRONMENTAL POLICY

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

GRADUATE COURSES

401 Field Studies in Botany (1-3) Field experience and taxonomy of special plant groups. Topics vary: bryology, lichenology, plant morphology, mycology, aquatic vascular plants, synantherology, woody plants, and botanical photography. Prereq: Field Botany or equivalent. (Same as Ecology and Evolutionary Biology 401.)

402 Plant Evolution (3) Evolutionary biology from plant perspective. Speciation, hybridization, evolution of mating systems, phenotypic plasticity; comparison of characteristics of animal and plant systems. Lectures, paper discussions on primary literature, current research in evolutionary ecology and genetics. Prereq: General Botany or Biodiversity; Organization and Function of the Cell. (Same as Ecology and Evolutionary Biology 402.)

404 Plant Molecular Biology (4) Current research in plant molecular biology techniques and procedures. Genome structure, gene expression and regulation, transformation, transposable elements, plant development. Labs: isolation of DNA and RNA, molecular hybridization, isolation and purification of plasmids, PCR amplification of specific sequences, DNA sequencing and transformation. Prereq: Biodiversity; Organization and Function of the Cell and Genetics with grade of B or better and consent of instructor. 2 hrs and 4 labs.

412 Plant Anatomy (3) Cells, tissues and organs; development in vegetative and reproductive structures of vascular plants—seed plants. Prereq: General Botany or Biodiversity; Organization and Function of the Cell or equivalent.

431 Plant Ecology (4) Interactions between individuals, species, communities and their environments. Circulation of energy and matter in ecosystems. Weekly field trips or laboratory periods, and at least two week-long field trips. Prereq: Field Botany or equivalent. (Same as Ecology and Evolutionary Biology 431.)
Broadcasting
(College of Communications)

MAJOR

COMMUNICATIONS

Barbara Moore, Head

Professors:
- Holt, Darrel W. (Emeritus), Ph.D.
- Northwestern Howard, Herbert H., Ph.D.
- Ohio Moore, Barbara A., Ph.D.
- Missouri Swain, Norman R., Ph.D.
- Associate Professors:
- Bates, Benjamin J., Ph.D.
- Michigan Wilkinson, Jeffrey, Ph.D.
- Georgia

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

440 Corporate Video (3) Special requirements of business, industrial, educational, and medical uses of video. Management, budgeting, planning, producing, and evaluating projects. Prereq: 430 or consent of instructor.


460 Broadcast News Operations (3) Production of news programs for broadcast on television stations. Electronic news gathering, editing and writing news packages and studio production. Prereq: 410 or consent of instructor.

470 Cable Television and Emerging Technologies (3) History and structure of cable television industry. Cable regulations and programming. Entry of telephone companies in distribution video. Analysis of all relevant technologies: direct broadcast satellite, fiberoptic cable, high definition television, and others. Prereq: Introduction to Radio and Television or consent of instructor.


490 International Broadcasting (3) Broadcasting systems in other countries. Analysis of international broadcasting organizations. International communication and international broadcasting. Development communication and international broadcasting. Prereq: Consent of instructor.

500 Radio and Television Law and Regulations (3) Legal problems faced by broadcast managers. Philosophy of regulatory policy formation. Efforts at self-regulation. Sociological aspects of laws and regulations, and public pressure on stations, networks, cable, and new technologies. Unique situation of broadcasting among media in terms of regulations. Prereq: Consent of instructor or admission to program. F

510 Radio and Television Research (3) Various techniques used by stations and consultants in broadcast research. Applied audience research: Deciding which methods to use, interpreting results, and applying research to management decision making. Prereq: Communications 512 or 612, or consent of instructor. Sp

520 Seminar in Radio and Television (3) Salient issues in broadcasting. Topics vary. International broadcasting, cable television, network television, educational and public broadcasting, broadcasting and society. Prereq: Consent of instructor or admission to program. May be repeated. Maximum 6 hrs. (Same as Information Sciences 581.) F

530 Advanced Radio & Television Management (3) Financial management of broadcast operations: budgeting, financial planning, accounting, and related techniques. Theoretical perspectives in broadcast management, organization and management of commercial and non-commercial operations, from a perspective of general manager. Prereq: 490. Sp

570 Independent Study (3) Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. E

590 Internship (3) Full-time (30-40 hrs per week) work experience in news, production, or sales and management with non-university professional organization. Educational experience beyond that available at university. Final term paper. No retroactive credit for previous work experience. Prereq: Senior or graduate standing, completion of at least half the credit hours. GPA 3.0 or better, and consent of department head.

Business Administration
(College of Business Administration)

MAJOR

DEGREES

Business Administration .......... MBA, J.D.-MBA, M.S.-MBA, Ph.D.

The College of Business Administration offers two college-wide programs, the MBA and the Ph.D. with a major in Business Administration. Two tracks are available for the MBA: the regular, full-time program and the executive program. A dual degree program is also available in conjunction with the College of Law leading to the J.D.-MBA and with the College of Engineering leading to the M.S.-MBA.

To obtain application materials, write or call:
Office of Graduate Business Programs, Suite 527, Stokely Management Center, College of Business Administration, The University of Tennessee, Knoxville, TN 37996-0552, Telephone: (423) 974-5033. For the executive program, telephone (423) 974-1660.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state basis. The Ph.D. in Business Administration is available to residents of Alabama, Florida, Georgia, Louisiana, or Texas (concentration in logistics and transportation only), or West Virginia; the MBA is available to residents of Alabama, Florida, Georgia, Louisiana, Texas (concentration in logistics and transportation only), Kentucky (concentration in new ventures analysis and entrepreneurship or environmental management), Virginia (concentration in environmental management or logistics and transportation), or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

ACADEMIC STANDARDS

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

The MBA program is designed for students with undergraduate degrees in the social and natural sciences, the humanities, and professional fields such as engineering, business, agriculture, and architecture. The MBA program is a two-year program with students beginning in the fall of each year and graduating in the spring, two years hence. During the summer between the first and second year, students must complete an internship with a company using those skills acquired during the first year of the MBA program.

The MBA program consists of a common first-year core and a wide selection of second year concentration/elective courses. The first-year core develops a general management foundation upon which specialization is developed in the second year electives. The objective of the program is to develop leaders able to enhance the success of their organizations.

The program consists of two 15-credit-hour MBA core courses in the first year and 24 credit hours of concentration/elective courses in the second.

Admission Requirements
Applications are accepted for fall semester only. The application deadline for fall semester is March 1. Applications by U.S. citizens and permanent residents received after March 1 will be considered as space allows.

To be considered for admission, the applicant’s file must be complete. A complete 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 application; therefore, there is no automatic cut-off for either grade point averages or GMAT scores. However, admission preference will be given to applicants with full-time work experience after obtaining the undergraduate degree.

Prerequisites
College-level mathematics through at least one course in college-level calculus, taken within the past 5 years, with a grade of B or better, is the only prerequisite requirement for entry into the program. Students whose undergraduate training does not include calculus should arrange to take it at UT Knoxville or at another accredited institution prior to the fall semester of entry into the program. Those electing the management science or statistics concentration must have completed two years of college-level calculus.

MBA Core
The MBA core consists of two 15-hour courses, one taken each semester. The courses are taught by the MBA core faculty in an integrated fashion and through a year-long simulation requiring students to learn the functional fundamentals (accounting, finance, management, marketing) when they need to apply them to solving a specific business problem. The topics introduced in 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/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 teamwork-based environment. Many core requirements are experiential exercises in which self discovery within a team setting is an important element of the learning process. Individualized support is provided for developing both written and oral communication skills.

Concentration and Electives
A concentration area may be indicated on the MBA Program Application or this declaration may be deferred until after matriculation. In any event, selection must be made after completion of the first year. Requests for changes in concentration area must be submitted for approval to the Office of Graduate Business Programs.

Among the 24 credit hours in the concentration/electives block, at least 9 but not more than 12 must be in one of the following concentration areas. For specific courses required in concentration areas, see the appropriate field of instruction.

- Economics
- Environmental Management
- Finance
- Forest Industries Management
- Global Business
- Logistics and Transportation
- Management
- Manufacturing Management
- Marketing
- New Venture Analysis and Entrepreneurship
- Statistics
- New Venture Analysis and Entrepreneurship

Statistics
The remaining elective courses must be in fields outside the concentration area, normally selected from MBA courses offered in other departments of the college. Courses outside the College of Business Administration as well as courses listed in the Graduate Catalog numbered below 500 may be included in this block only with written prior permission via formal petition to the Office of Graduate Business Programs.

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

Concentration Area: 3 hours (provided at least 6 hours of work at this institution are included in the concentration area).

Elective Area: 3 hours

Because of the fully integrated nature of the first-year curriculum, no credit hours are transferred into this core curriculum. The maximum number of hours that may be transferred to elective and concentration areas is 6 semester hours.

Transfer credit will be considered upon formal petition to the Director of Graduate Business Programs.

Other Requirements
The Application for Admission to Candidacy must be approved by faculty members and the department head in the student's area of concentration and the Associate Dean in the College of Business Administration. It should be submitted to the Graduate Office at least one full semester prior to the date the degree is conferred. (Admission to candidacy in the fall semester permits graduation in the following spring semester.)

To qualify for the degree, the student must achieve a B average (3.0) or above in MBA core courses required in his/her program; a B average or higher in courses comprising the concentration area; and a B average or higher in the overall program. Each student must write a satisfactory analysis of a comprehensive case administered at the end of the first year.

BUSINESS ADMINISTRATION CONCENTRATIONS

For complete listing of MBA program requirements, see above.

MBA Concentration Areas:
- Global Business
- New Venture Analysis and Entrepreneurship
- Forest Industries Management
- Logistics and Transportation
- Manufacturing Management
- Marketing
- Statistics

The remaining elective courses must be in fields outside the concentration area, normally selected from MBA courses offered in other departments of the college. Courses outside the College of Business Administration as well as courses listed in the Graduate Catalog numbered below 500 may be included in this block only with written prior permission via formal petition to the Office of Graduate Business Programs. Students pursuing a concentration in global business are strongly encouraged to pursue it as a second concentration in addition to one of the traditional departmental concentrations. Students pursuing this concentration are also strongly encouraged to pursue an international or internationally related internship for the summer between their first and second years in the MBA program. Students are expected to participate in a foreign exchange or field experience if at all possible, especially for those with no previous foreign experience. Language training is advised but not required, and beginning language courses are not typically available for graduate credit.

The concentration in new venture analysis and entrepreneurship is comprised of three specifically designed courses which are interdisciplinary in nature. This concentration strives to build a strong academic foundation for both entrepreneurial and intrapreneurial activities. The new venture analysis and entrepreneurship concentration is offered in recognition of the growing trend in American business today towards new product/venture
development. The new venture analysis/entrepreneurship concentration courses may be combined with two elective courses in another area (management or marketing) to achieve a dual concentration.

Minimum course requirements are Finance 551, Management 551, and Marketing 550. These course descriptions are listed under their fields of instruction.

PRE-MBA PROGRAM

The College offers a joint BA/MBA program with the College of Arts and Sciences. Students in this program take their first three years of coursework in Arts and Sciences, and their last two years in the College of Business Administration. Within their first three years, students fulfill all general education requirements for the BA degree, both upper and lower division along with a minor offered by one of the Arts and Sciences departments. They may use one Economics course only to fulfill distribution requirements, and they are required to take a year of calculus as the only prerequisite to the MBA.

Admission requirements are higher than those normally expected of MBA applicants. Desired qualifications include a minimum 3.4 GPA and a GMAT score of 600 or higher. Students interested in the program are counseled initially in the Arts and Sciences Advising Center regarding admission standards and Arts and Sciences requirements. At the end of their second year, they have a conference with the Director of Graduate Business Programs and are advised of their prospects for formal admission. Students who are likely candidates are advised to take the Graduate Management Admission Test in October of the third year, and to submit an application to the MBA program. The admission decision is made by January of the third year.

Upon admission, students begin MBA coursework in the fourth year and are awarded a BA degree at the end of that year. Upon successful completion of the fifth year (minimum of 30 semester hours of graduate credit), the student receives the MBA degree.

DUAL J.D.-MBA PROGRAM

The College of Business Administration and the College of Law offer a coordinated dual program leading to the conferral of the Master of Business Administration degree (concentration in manufacturing management) and the Master of Science degree with a major in Industrial Engineering (concentration in manufacturing systems engineering). The dual program saves the student one or two semesters over the time that would be required to earn both degrees independently.

The establishment of the dual program addresses the critical need for graduates trained in both engineering and management who can integrate this increasingly complex body of knowledge in achieving the efficient operation of manufacturing and production firms. The program is designed to accommodate the interests of students who desire a career leading to a leadership position in a manufacturing organization.

Admission Requirements

Applications are accepted for fall semester only. Applicants for the M.S.-MBA program must make separate application to, and be competitively and independently accepted by, The Graduate School for the M.S. degree program and by the Dual Program Committee.

Students will initially apply for the MBA program, indicating on that application the intent to pursue the dual M.S.-MBA program in manufacturing (refer to the MBA program for separate instructions). During the second semester of the first year, students will review the Graduate School registration form and the M.S. degree program, and, if both programs are selected, the applications for the M.S.-MBA program may be submitted.

Applications by U.S. citizens and permanent residents received after the MBA application deadline (March 1) will be considered as space allows. Additional information is required, and different application dates are established by The Graduate School for international students.

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.

DUAL M.S.-MBA PROGRAM

The College of Business Administration and the College of Engineering offer a coordinated program leading to the conferral of the Master of Science degree (concentration in manufacturing management) and the Master of Business Administration degree program and the Master of Science degree program with a major in Industrial Engineering, and by the Dual Program Committee.

Students will initially apply for the MBA program, indicating on that application the intent to pursue the dual M.S.-MBA program in manufacturing. 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.

Admission Requirements

Applications are accepted for fall semester only. Applicants for the M.S.-MBA program must make separate application to, and be competitively and independently accepted by, The Graduate School for the M.S. degree program and by the Dual Program Committee.

Students will initially apply for the MBA program, indicating on that application the intent to pursue the dual M.S.-MBA program in manufacturing (refer to the MBA program for separate instructions). During the second semester of the first year, students will review the Graduate School registration form and the M.S. degree program, and, if both programs are selected, the applications for the M.S.-MBA program may be submitted.

Applications by U.S. citizens and permanent residents received after the MBA application deadline (March 1) will be considered as space allows. Additional information is required, and different application dates are established by The Graduate School for international students.

Awarding of Grades

Grades for graduate business courses accepted by the College of Law and 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.

DUAL M.S.-MBA PROGRAM

The College of Business Administration and the College of Engineering offer a coordinated program leading to the conferral of the Master of Science degree (concentration in manufacturing management) and the Master of Business Administration degree program and the Master of Science degree program with a major in Industrial Engineering, and by the Dual Program Committee.

Students will initially apply for the MBA program, indicating on that application the intent to pursue the dual M.S.-MBA program in manufacturing. 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.

Admission Requirements

Applications are accepted for fall semester only. Applicants for the M.S.-MBA program must make separate application to, and be competitively and independently accepted by, The Graduate School for the M.S. degree program and by the Dual Program Committee.

Students will initially apply for the MBA program, indicating on that application the intent to pursue the dual M.S.-MBA program in manufacturing (refer to the MBA program for separate instructions). During the second semester of the first year, students will review the Graduate School registration form and the M.S. degree program, and, if both programs are selected, the applications for the M.S.-MBA program may be submitted.

Applications by U.S. citizens and permanent residents received after the MBA application deadline (March 1) will be considered as space allows. Additional information is required, and different application dates are established by The Graduate School for international students.

Awarding of Grades

Grades for graduate business courses accepted by the College of Law and 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.
Curriculum
The curriculum in the first academic year of the dual M.S.-MBA program is the two-semester core of the MBA program (two 15-hour courses, one per semester). A 1-hour seminar course each semester in manufacturing will also be taken concurrently during the first two semesters (not for graduate credit). A 3-hour design or industrial problem project will be accomplished in the summer term of the first year. This will be part of a summer internship in industry, and the project will be academically supervised by a faculty member associated with the dual program.

During the second year, 27 hours of coursework will be completed in the manufacturing systems engineering concentration in Industrial Engineering plus an additional 9 hours of graduate courses in the College of Business Administration acceptable in meeting the requirements of the MBA program. Fifteen hours will be taken during each of the first two semesters of the second academic year. A culminating 6-hour integrated case study requiring use of most previous material, and a final examination as required by the Dual Program Committee, will be taken during the first session of summer term of the second year.

The dual degree candidate must satisfy the curriculum and graduation requirements of the Department of Industrial Engineering and the College of Business Administration. Dual degree students withdrawing from the dual program before completion of both degree programs will not receive credit toward graduation in either degree program for courses in the other degree program, except as such courses qualify for credit without regard to the dual degree program. The M.S. and the MBA degrees will be awarded upon successful completion of the requirements of the dual program.

Approved Dual Credit
A maximum of 6 semester hours of approved graduate-level courses completed in the College of Business Administration may be counted toward the M.S. degree program with a major in Industrial Engineering. A maximum of 15 semester hours of approved graduate-level courses completed in the Department of Industrial Engineering may be counted toward the MBA degree program. The approval of courses is the responsibility of the Dual Program Committee and the student's assigned advisor.

PROFESSIONAL MBA PROGRAM

The professional MBA is provided for fully employed individuals. The weekend track of the MBA results in the same Master of Business Administration degree as the full-time MBA and executive MBA.

The professional MBA program is three consecutive semesters completed in 16 months. Classes meet all day on Saturdays and occasionally on Friday evening and/or Sunday afternoon. It offers an integrated core curriculum with an applied project in each semester. The program begins in the fall semester with an intensive week of classes, then continues with weekend classes throughout the following calendar year. The final fall semester also includes an intensive week of courses in addition to weekend classes.

Admission Requirements
Applications are accepted for fall semester only. The application deadline is April 15. For admission to the program, consideration is given to (1) an 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 supervisors. The admission decision is based on all factors which make up the total application; therefore, there is no automatic cut-off for either grade-point averages or GMAT scores.

Prerequisites
There are no specific course prerequisites for admission. However, undergraduate courses and work experience should demonstrate ability with both qualitative and quantitative work.

Transfer Credits
Because of the fully integrated nature of the professional MBA core curriculum, no credit hours may be transferred as substitutes for core curriculum.

Other Requirements
Other requirements are the same as those for the full-time MBA program.

EXECUTIVE MBA PROGRAM

The executive MBA is designed for professionals holding middle and upper level positions in organizations that wish to support their attainment of an MBA degree. The objective of the program is to provide advanced management skills to individuals who play key roles in leading their organizations.

The executive track of the MBA is three consecutive terms completed in one year. Each term requires two residence periods on campus alternating with a continuous program of reading, study, and on-the-job applications off campus. The off-campus work requires substantial and regular contact with program faculty and other participants and includes scheduled assignments to be carried out.

The program consists of three 12-hour core courses and a 9-hour sequence which is a project of diagnosis and analysis of a significant strategic issue in the sponsoring organization.

Admission Requirements
All participants begin and complete the program together in one twelve-month period. Sessions begin in January of each year. Final deadline for applications is October 10 of the preceding calendar year. For applicants who wish to make plans early in the preceding year, there is an advance reservation deadline of August 1. International students and students whose native language is not English must meet special requirements for admission to The Graduate School of UT Knoxville, and they are advised to make inquiries well in advance of the program application deadline.

To be considered for admission, the applicant must have a bachelor's degree and 10 or more years of work experience. Applicants must submit a complete application file including the Graduate School Application, official transcripts of prior college work, the executive MBA program application with evaluations from his/her company, and the Graduate Management Admissions Test (GMAT) score report. Transcripts from other institutions only take four to six weeks to arrive, so applicants should request these far in advance of the deadline.

For admission to this program, primary consideration is given to the applicant's work history and the recommendation from the sponsoring organization and the GMAT. There is no cut-off for either grade-point averages or GMAT scores, however, admission to the program is competitive, and applicants will be evaluated on their ability to operate on a par with other high achieving participants.

Curriculum
The program is taught by a core faculty of 10 professors assisted by other faculty on an ancillary basis. The core faculty develop the entire curriculum and teach it in an integrated, interdisciplinary manner.

The MBA program for executives is completed in three terms and requires registration for 15 hours in each term. The first term is comprised of Executive Core I and Management Project I; it includes two residence sessions. The second term is comprised of Executive Core II and Management Project II; it includes two residence sessions. The third term is comprised of Executive Core III and Management Project III. It includes two residence sessions.

The core courses are a full-term curriculum with reading and study, case work and problem solving, as well as 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 (taught within a cross-functional framework); continuous improvement from a systems-thinking perspective; the role of the firm in the global environment; organizational culture and change management; and personal and team development.

The management project is carried out as an independent project with faculty advisor. It involves the diagnosis and analysis of some significant aspect in the sponsoring organization and is based on applying major themes in the core courses.

The written project and presentation to senior management and faculty serves as the comprehensive examination. The off-campus work requires substantial and regular contact with faculty.

Transfer Credits
Because of the integrated nature of the curriculum, no credit hours for courses already taken may be substituted for those in the executive program of the MBA.

Executive MBA in Taiwan

The executive MBA taught in Taipei, Taiwan is designed for professionals residing in Taiwan and other nearby countries. Its target audience and objectives are the same as those on the Knoxville campus, except that the sequence of material has been changed to accommodate the schedules of faculty teams traveling to Taiwan. The executive track of the MBA in Taiwan results in the same Master of Business Administration degree as the full-time MBA and executive MBA on the Knoxville campus.
The Taiwan executive MBA is a three-semester program of 15 credit hours each, including the same core and project courses described for the Knoxville program. Between each semester, there is a term when students are not enrolled. The program begins in the summer term, continues in the Spring semester of the following calendar year and is completed in the Fall semester of that same year. All participants begin and complete the program together.

Each semester is comprised of two periods of concentrated class work with a continuous program of reading, study and on-the-job applications between class periods. The class will meet once a week during the semesters in which they are not enrolled for purposes of discussing the readings and assignments and for assisting one another. The first five periods will be taught in Taiwan. The sixth class period is a three-week residency on the Knoxville campus.

Admissions Requirements for the Executive MBA in Taiwan
To be considered for admission, the applicant must have the equivalent of a U.S. Bachelor's degree and 10 or more years of work experience. Applicants must submit a complete application file including the Graduate School Application, official transcripts of prior college work, and the executive MBA program application with a recommendation from their company. Admission to the program is competitive. Primary consideration is given to the applicant's work history and the recommendation from the applicant's manager. Applicants will be evaluated on their ability to operate on a par with other high achieving participants.

Each international participant who has not taken the test of English as a foreign language (TOEFL) within the previous two years must take it with a score of 550 or higher. This test may be taken after enrolling in the program but must be successfully completed prior to the international study period in the U.S. To allow for the registration of scores and receipt of the I-20, participants should arrange to take the TOEFL at least 5 months before the international study period.

Executive MBA for Physicians
The physician track of the executive MBA is custom designed for physicians. Its objectives are the same as the generalized executive track of the MBA on the Knoxville campus. The curriculum content is like that of the Knoxville executive MBA, except that it is focused on executive education within the health care industry. The physician track of the executive MBA program results in the same Master of Business Administration degree as the full-time MBA and executive MBA programs on the Knoxville campus.

The physician program is a three-semester program of 15 credit hours each, including the same core and project courses described for the Knoxville program. The program begins in the Spring semester, continues into the Summer term and is completed in the Fall semester of that same year. All participants begin and complete the program together. Each term begins with an intensive residential period of concentrated class work with subsequent interactive sessions between faculty and students using distance learning technologies. In addition, a fourth and final residence period at the end of the Fall term will conclude the educational experience.

Admission Requirements for the Executive MBA for Physicians
To be considered for admission, the applicant must have an M.D. degree and 5 or more years of work experience. Applicants must submit a complete application file including the Graduate School Application, official transcripts of prior college work, and the executive MBA program application. Admission to the program is competitive. Applicants will be evaluated on their ability to operate on a par with other high achieving participants and on their future management potential.

THE DOCTORAL PROGRAM
The primary objective of the Ph.D. in Business Administration is to prepare a select number of qualified students for careers in university-level teaching and research and for responsibilities in business and government.

Admission Requirements
Students seeking a Ph.D. degree must be recommended for acceptance by the College of Business Administration to The Graduate School. Actual admission is based on the applicant's overall standing compared with other applicants and with the number of vacancies in each department. The Graduate School requires the Graduate School Application, transcripts from all previous college work, and additional information from international students. The college requires the Ph.D. application, scores from the GMAT, and four written recommendations. All materials should be received by the College of Business Administration 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 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.

The program focuses on the development of competent scholars, heavy emphasis is placed on both teaching and research skills. As part of the doctoral program, each student is required to serve as a teaching assistant to an undergraduate business class or as a research assistant to a senior faculty member. Typically, the College of Business Administration offers financial support for doctoral students during their tenure in the program.

The Ph.D. program is highly flexible, offering a wide array of concentrations and cognates. Moreover, heavy emphasis is placed on individualized instruction and close student-faculty interaction. Instruction takes the form of regular classes, doctoral seminars, and independent study and research. Students are also encouraged to attend lectures and discussions by visiting scholars throughout the year.

There are six concentrations offered in the Ph.D. program:
- Accounting
- Finance
- Logistics and Transportation Management (Operations Management and Strategic Management)
- Marketing
- Statistics

More detailed information concerning these specific areas is available by writing directly to each department chairman and referring to the appropriate fields of instruction.

Degree Requirements
Doctoral students must file a program of study that has been approved by the doctoral committee within one year of completing their first year of doctoral study. This committee is nominated by the department chairman in a student's intended area of concentration, subject to the Graduate Council's policies and procedures. Following are specific degree requirements:

1. Students must complete at least three years of full-time coursework beyond the baccalaureate degree, with two years of residence on the Knoxville campus.
2. Students are required to have a sound and broad base on which to build their Ph.D. coursework. The departmental doctoral advisor will work with the student to determine what, if any, courses need to be completed. All such work is subject to approval by the temporary doctoral advisory committee and the Director of Graduate Business Programs. Specific concentrations may have prerequisites.
3. Research Tools: A minimum of 9 semester hours of graduate research methods must be completed. At least 6 semester hours in statistics courses beyond Statistics 531 are required. The remaining 3 semester hours may be completed in additional statistics courses (not to include Statistics 531) or in other areas such as research methodology, management science, computer science, econometrics, and psychometrics.
4. Concentrations: The concentration is the focal point of the Ph.D. program. Students are 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, logistics/transportation, management (operations management and strategic management), marketing, and statistics. See the appropriate fields of instruction for specific course requirements.
5. 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 six concentration business areas listed above, economics, or a related area in another school or college of the University.

Comprehensive Examinations
Comprehensive written examinations over the concentration area must be taken within five years of matriculation. Students qualify in the concentration area by completing a one-session, four-hour examination or an equivalent jointly approved by the student's major professor and the student's advisor in the cognate area. Comprehensive examinations are generally offered during the fall and spring term. Comprehensive examinations must be taken within five years of matriculation.

When either the concentration or cognate area examination is passed, the remaining examination must be passed within the next 12 months.

Doctoral Committee
A doctoral student is advised to give serious attention early in the program to the composition of his/her doctoral committee. In accordance with Graduate School policy, the student and the major professor identify a doctoral committee composed of at least four faculty members, three of whom, including the chair, must be approved by the Graduate Council to direct doctoral research. When the doctoral committee has been formed, the temporary doctoral advisory committee ceases to exist.

Admission to Candidacy
Students may apply for admission to candidacy for the Ph.D. after maintaining at least a "B" average in coursework, successful completion of comprehensive examinations, and acceptance of a research proposal for the dissertation by the student's doctoral committee.

Admission to candidacy must be approved at least one full semester prior to the date the degree is conferred. (Admission in the fall permits graduation in the following spring semester.)

Application for admission to candidacy must include a listing of all courses taken in each of the fields required for the degree (business functional areas, basic disciplines, concentration and cognate area). Graduate courses accepted from other institutions must be included. Under "Other Requirements," the date of acceptance of the research proposal by the doctoral committee should be indicated. The application must be approved by the student's doctoral committee and the Associate Dean before submission to The Graduate School.

Dissertation
Minimum of 24 semester hours: The student must complete 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

502-03 Business Core for Master of Accountancy I, II
(3.3) Development of role and responsibility of accountant in business environment and delivery of customer value, continuous system improvement, strategic process control, human resource management, role of quality in competitive organizations, performance measurement, financial implication of corporate strategy.


506 Information Infrastructure Strategy and Design
(3) Information strategy involving structured and unstructured systems, using Internet and intranets. Design of structured system using upper CASE tools and unstructured system using groupware which is Internet accessible with access control.

510 Customer Responsive Management
(3) Management methods that provide flexibility required to respond to diverse customer needs and to adapt to competitive, technological, and environmental change. Customer relationship management, interactive marketing, capacity management economics, and relationship management for industries: health care, consulting, temporary services, professional services, repair services, truck load transportation, emergency response organizations, customer service centers, and other response organizations. Coreq: Admission to executive program of MBA program or consent of Director of Graduate Business Programs.

551 Executive Core I (12) Integrated course with substantial reading, study and analyses during off-site periods. Integration of major business functions through strategic and business process perspective. Application of functional knowledge to case study material and current issues. Development of purpose of firm as delivering value to customers and other stakeholders. Ethical issues. Financial and accounting principles. Economic and regulatory environment of business. Human resource and organizational behavior topics in context of business systems and objectives. Personal development for leadership; individual personal skills of communication, negotiation, leadership and motivation. Coreq: Admission to executive program of MBA. Prereq: Admission to executive program of MBA.


593 Directed Independent Study
(3) Cross-disciplinary project of mutual interest to student and faculty. Available only by arrangement with sponsoring faculty member. May require approval of Director of Graduate Business Programs. May be repeated. Maximum 6 hrs. S/NC or letter grade.

599 Executive-In-Residence (3) Interaction with corporate executives from wide spectrum of business disciplines and discussion of domestic and international strategic planning as applied in major corporations. Prereq: MBA core and consent of instructor.

Chemical Engineering

Graduate 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 committees.

Admission to candidacy must be approved at least one full semester prior to the date the degree is conferred. (Admission in the fall permits graduation in the following spring semester.)

Application for admission to candidacy must include a listing of all courses taken in each of the fields required for the degree (business functional areas, basic disciplines, concentration and cognate area). Graduate courses accepted from other institutions must be included. Under "Other Requirements," the date of acceptance of the research proposal by the doctoral committee should be indicated. The application must be approved by the student's doctoral committee and the Associate Dean before submission to the Graduate School.

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

GRADUATE COURSES

502-03 Business Core for Master of Accountancy I, II
(3.3) Development of role and responsibility of accountant in business environment and delivery of customer value, continuous system improvement, strategic process control, human resource management, role of quality in competitive organizations, performance measurement, financial implication of corporate strategy.


506 Information Infrastructure Strategy and Design
(3) Information strategy involving structured and unstructured systems, using Internet and intranets. Design of structured system using upper CASE tools and unstructured system using groupware which is Internet accessible with access control.

510 Customer Responsive Management
(3) Management methods that provide flexibility required to respond to diverse customer needs and to adapt to competitive, technological, and organizational change. Customer relationship management, interactive marketing, capacity management economics, and relationship management for industries: health care, consulting, temporary services, professional services, repair services, truck load transportation, emergency response organizations, customer service centers, and other response organizations. Coreq: Admission to executive program of MBA program or consent of Director of Graduate Business Programs.

551 Executive Core I (12) Integrated course with substantial reading, study and analyses during off-site periods. Integration of major business functions through strategic and business process perspective. Application of functional knowledge to case study material and current issues. Development of purpose of firm as delivering value to customers and other stakeholders. Ethical issues. Financial and accounting principles. Economic and regulatory environment of business. Human resource and organizational behavior topics in context of business systems and objectives. Personal development for leadership; individual personal skills of communication, negotiation, leadership and motivation. Coreq: Admission to executive program of MBA. Prereq: Admission to executive program of MBA.


593 Directed Independent Study
(3) Cross-disciplinary project of mutual interest to student and faculty. Available only by arrangement with sponsoring faculty member. May require approval of Director of Graduate Business Programs. May be repeated. Maximum 6 hrs. S/NC or letter grade.

599 Executive-In-Residence (3) Interaction with corporate executives from wide spectrum of business disciplines and discussion of domestic and international strategic planning as applied in major corporations. Prereq: MBA core and consent of instructor.

Chemical Engineering

Graduate courses

MAJOR

DEGREES

Chemical Engineering............ M.S., Ph.D.
John R. Collier, Head

Professors:
Bienkowski, Paul R., Ph.D., Purdue Collier, John R. (Liaison), Ph.D., Case Western Counce, Robert M., Ph.D., Tennessee Culberson, Oran L. (Emeritus), Ph.D., Texas Cummings, Peter T., (Distinguished Scientist), Ph.D., Melbourne Frazier, George C., Jr. (Condra Prof.), D.Eng., Johns Hopkins Holmes, John M. (Emeritus), Ph.D., Tennessee Hu, Hsien-Wen (Emeritus), Ph.D., Wisconsin Moore, Charles F. (Alumni Prof.), Ph.D., Louisiana State Perez, Joseph J. (Emeritus), PE, Ph.D., Northwestern Prados, John W. (University Prof.), PE, Ph.D., Tennessee Sheth, Atul C. (UTSI), Ph.D., Tennessee Thomas, Carl O. (Emeritus), Ph.D., Tennessee

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

Assistant Professors:
Frymier, Paul D., Ph.D.,........... Virginia Koffler, David J., Ph.D.,........... Minnesota

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

Thesis Option: The standard master’s program includes a thesis and leads to the Master of Science. Minimum departmental requirements are as follows:
1. A total of at least 21 hours in graduate coursework in chemical engineering and related areas excluding thesis. The minimum requirements are 15 hours in chemical engineering; 3 hours in other engineering, scientific, or business areas (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. Supportive 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 written comprehensive examination, consisting of a written part and an oral part. The written part covers thermodynamics, reactor analysis, and transport phenomena and separations.
4. Active participation in graduate seminars conducted by the department. Resident students must register for CHE 501 every semester offered.

GRADUATE COURSES

403 Introduction to Optimization (3) Principles and applications of optimization techniques to chemical engineering process design; unconstrained and equality constrained optimizations, linear programming, dynamic programming, and geqmetrical programming. Prereq: Mathematics 241.
467 Honors: Engineering Internship in Process Control (4) Selected students work in small groups on industrial problems in process dynamics and control. Directed by faculty and engineers from host company. Prereq: Process Dynamics and Control and consent of instructor.
477 Honors: Applied Process Automation Laboratory (3) Interfacing flexible batch continuous processes to automation systems. Top down analysis with bottom up implementation, hierarchical structures and designed for controlled processes. Prereq: upper division standing in engineering. Prereq: Process Dynamics and Control and consent of instructor.
485 Hydrocarbon Processing (3) Chemical and physical properties of selected petroleum and those processes utilized in conversion of raw materials into various fuels and selected chemical feedstocks. Prereq: Process 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 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 Engineering Analysis (3) Formulation and solution of problems in chemical engineering and materials areas, ordinary and partial differential equations; types of ODE, PDE Existence and uniqueness of solutions, method of characteristics, integral transforms, numerical methods; introduction to numerical methods. (Same as Mathematics Science and Engineering 505.)
507 Application of Linear Algebra in Engineering Systems (3) Fundamental concepts of linear algebra to problems in engineering systems: steady state and dynamic systems. Geometric and physical interpretations of relevant concepts: least square problems, LU, QR, and SVD decompositions of system matrix, eigenvalue problems and similarity transformations in solving difference and differential equations, computational stability aspects of various algorithms; application of linear algebra concepts in control and optimization studies; Introduction to linear programming. Computer projects. Prereq: Graduate standing or consent of instructor. (Same as Electrical Engineering 507 and Mechanical Engineering 507)
531 Advanced Chemical Engineering Thermodynamics (3) Phase equilibrium in ideal and nonideal solution; composition-relationship between phases, solution behavior and application to macromolecules; introduction to microscopic approach to thermodynamics. F
541 Fluid Mechanics and Polymer Processing (3) (Same as Materials Science and Engineering 541.)
542 Diffusive and Stage-Wise Mass Transfer Operations (3) Analysis of mass transfer phenomena, coupled mass transfer and reaction, mass transfer operations in packed towers and agitated vessels, membrane separations. Equilibrium stage can be added to mass transfer operation, emphasizing non-thermal and multi-component systems.
547 Introduction to Transport Phenomena (3) Unified treatment of mass, momentum, and heat transfer. Differential and macroscopic balances in deriving governing equations. Analogies between processes. Use of dimensional analysis in scaling up systems or down. Applications involving transfer, and simultaneous chemical reactions. F
551 Chemical Reactor Analysis (3) Rate models for heterogeneous reactions, properties of porous catalysts, catalyst deactivation, fluid-fluid and fluid-solid reactors.
561 Process Modelling and Simulation (3) Theories and methodologies of deterministic and stochastic simulation based on the stochastic approach, model development from basic principles, model development from plant test, use of models in operation, optimization and control. Prereq: Consent of instructor.
575 Applied Microbiology and Bioengineering (3) Combination of the study of microorganisms, cell structure and function, and their relationship to environmental and chemical engineering systems. Commercial processes using microorganisms in wastewater treatment, analysis of basic bioreactor processes, biosystems, and immobilization. Prereq: Graduate standing in engineering or consent of instructor. (Same as Environmental Engineering 581 and Engineering Science and Mechanics 585.)
585 Process System Reliability and Safety (3) (Same as Nuclear Engineering 585.)
590 Special Topics In Chemical Engineering (3) May be repeated. Maximum 6 hrs.
600 Doctoral Research and Dissertation (3-15) P/NP only. E
631 Advanced Topics in Statistical Thermodynamics and Molecular Dynamics (3) Statistical thermodynamics, molecular simulation and computer simulations. Monte Carlo and molecular dynamics calculations, Monte Carlo, and computer simulations of supercritical fluids, macromolecules and biological systems. Prereq: 532.
642 Advance Topics in Polymer Processing (3) (Same as Materials Science and Engineering 542.)
647 Advanced Transport Phenomena (3) Theory of mass, momentum, and energy transport in reactive and non-reactive systems. Formulation of transport models useful for application to analysis and design of separation processes, and chemical and biochemical reactors. Prereq: 505, 547.
661 Advanced Topics in Process Dynamics and Control (3) May be repeated. Maximum 6 hrs.
675 Microbial Systems Analysis (3) Identification and analysis of complex microbial systems using perturbation-response methods. Structuring of important mechanistic models of intracellular processes, and regulation at several system levels (reactor or macro, ecological, cellular, physiological and molecular). Experimental studies for data gathering, signal resolution and processing, statistical signal analysis, model development (deterministic, sta...
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, and theoretical chemistry.

The requirements for the Ph.D. in Chemistry (except for the chemical physics concentration) consist of the satisfactory completion of:

1. Research and a dissertation to give at least 24 hours of graduate credit in Chemistry 600. Registration must be continuous from the beginning of research.
2. Participation in seminar (Chemistry 501) during the entire period of graduate study, including the presentation of at least one seminar. (No more than 2 hours may be applied to the course requirements.)
3. Prescribed remedial courses based on performance on entrance examinations.
4. Sufficient graduate coursework in chemistry (at the 400 level or above) and/or a related field to make an overall total of 30 hours, including one of the following sequences: 530-31-32, 550-51-52, 570-72-73, 550-94-95, or three courses from 510-11-12, 20. At least 14 hours of coursework must be graduate level or above. 5. A final oral examination.

THE DOCTORAL PROGRAM

1. Research and a dissertation to give at least 24 hours of graduate credit in Chemistry 600. Registration must be continuous from the beginning of research.
2. Participation in seminar (Chemistry 501) during the entire period of graduate study, including the presentation of at least one seminar. (No more than 2 hours may be applied to the course requirements.)
3. Prescribed remedial courses based on performance on entrance examinations.
4. Sufficient graduate coursework in chemistry (at the 400 level or above) and/or a related field to make an overall total of 30 hours, including one of the following sequences: 530-31-32, 550-51-52, 570-72-73, 550-94-95, or three courses from 510-11-12, 20. At least 14 hours of coursework must be graduate level or above. 5. A final oral examination.

THE DEGREES

6. Eighteen additional hours in courses at the 500 level or above including at least one course above 601 and one of the following courses: 510-11-12, 530-31-32, 550-51-52, 53-54, 570-71-72, 73, and 550-94-95. 7. 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 department 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


470-81 Biophysical Chemistry (3,3) (Same as Biochemistry and Cellular and Molecular Biology 470-81) 470-83 Physical Chemistry (3,3) Students may not receive credit for both 470 and 473 nor for both 481 and 483. 470-83 471-81 Properties of gases; first, second, and third laws of thermodynamics; chemical equilibria, simple phase equilibria; properties of solutions; introduction to statistical thermodynamics. 473-81 Kinetics of chemical reaction; introduction to quantum mechanics and applications to electronic structure of atoms and molecules: molecular spectroscopy. Prereq: General Chemistry. Elements of Physics or Fundamentals of Physics: Electricity and Magnetism, and Calculus III.

476-89 Physical Chemistry Laboratory (2,2) Experiments on topics discussed in 471-81 or 473-83. Prereq or coreq: Corresponding course 471 or 473 to 479 and 481 or 483 for 476. Lab 479-489. Prereq: 481 or 483. 481 or 483.

481-89 Advanced Physical Chemistry (3) Chemical dynamics, statistical thermodynamics, quantum mechanics of atomic and molecular systems; crystal structure and solid state. Prereq: 481 or 483. 481 or 483.

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/N only. F,Sp

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when the student uses University facilities and for faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/N only. E

505 Special Problems (1) Specialized assigned theoretical or experimental work on problems not covered in other courses. Prereq: Consent of department. May be repeated. Maximum 6 hrs. S/N only.

510 Analytical Spectrometry (3) Principles and practices of optical and mass spectrometers, and mass spectrometry in qualitative chemical analysis. Prereq: 1 yr of physical chemistry.

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

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

520 Chemical Instrumentation (3) Principles of analog and digital systems in chemical instrumentation; practice in design and construction of chemical instruments. Prereq: Consent of instructor.

530 Chemical Bonding (3) Wave mechanical atom, group theory, quantum approach to molecular orbital theory, valence, ionic, and metallic bonding, ligand field theories. Prereq: 1 yr of physical chemistry. F

531 Characteristics of Inorganic Compounds (3) Descriptive chemistry of elements, structures, reactions, kinetics, mechanisms, equilibria, and spectra of coordination, organoaluminic, bioinorganic compounds. Prereq: 530.

532 Experimental Methods of Inorganic Chemistry (3) Producing, infrared, Raman, NMR, ESR, nuclear quadrupole, Mossbauer, magnetic, and electron spectroscopies for characterization of inorganic compounds. Prereq: 530.
Child and Family Studies

(College of Human Ecology)

MAJORS

Child and Family Studies ................................ M.S.
Human Ecology ........................................ Ph.D.

Ernest W. Brewer, Interim Head

Professors:

Blanton, Pricilla, Ed.D. .................. Tennessee
Buender, Cheryl, Ph.D. .................... Minnesota
Cunningham, Jo Lynn, Ph.D. ......... Michigan State
Fox, Greer Liton, Ph.D. ................. Michigan
Moran, James D., Ph.D. ............... Oklahoma State
Nordquist, V. Mick, Ph.D. ............. Tennessee
Steele, Connie (Emeritus), Ed.D. ... Texas Tech
Twardosz, Sandra, Ph.D. ............. Kansas

Associate Professors:

Allen, Jan, Ph.D. ....................... Purdue
Malia, Julie, Ph.D. ...................... Iowa State
Smith, Delores, Ph.D. ................. Oklahoma State
Tegano, Deborah, Ph.D. ............. Virginia Tech

Assistant Professors:

Grovos, Melissa, Ph.D. .............. Virginia Tech
Morrise, Lane, Ph.D. ................. Tennessee

The Department of Child and Family Studies provides coursework in human development and family studies. Integration of these areas creates a unique perspective for the study of individuals and families. Each graduate student's program of study is carefully planned in conjunction with a faculty committee to establish a program consistent with program requirements and a student's individual goals. All programs are characterized by a broad array of coursework, varied research experiences, and opportunities for experiences in applied settings.

ADMISSION REQUIREMENTS

A completed file for review includes a departmental application, Graduate Record Examination (GRE) scores for the general section, and completion of three Graduate School Rating Forms by individuals who can attest to the applicant's 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, work experience, and the match between student's goals and department's focus. Prerequisites for admission to the master's program are 9 semester hours of upper division undergraduate social science. Prerequisites to the doctoral program are a master's degree from a regionally accredited institution or equivalent coursework. A non-thesis option only is available. All students in the early childhood education licensure program must enroll in Human Ecology 574, 574, 575, and Holistic Teaching/Learning 505 (or equivalent Child and Family Studies courses). Students select 3 hours from 510, 511, 512, 575, 591, and Holistic Teaching/Learning 505 (or equivalent Child and Family Studies courses). Specific coursework within each specialization is on file in the Department of Child and Family Studies. Interested students should contact the Graduate Coordinator in Child and Family Studies.

The early childhood education concentration is designed for students seeking initial teacher licensure in early childhood education (Pre-K through Grade 3). This program is based on an undergraduate degree in child development or equivalent coursework. A non-thesis option only is available. All students in the early childhood education licensure program must enroll in Human Ecology 574, 575, 576, and Holistic Teaching/Learning 505 (or equivalent Child and Family Studies courses). Students select 3 hours from 510, 511, 512, 575, 591, and Holistic Teaching/Learning 505 (or equivalent Child and Family Studies courses). Specific coursework within each specialization is on file in the Department of Child and Family Studies.

THE M.S. CONCENTRATION

The department participates in the doctoral program with a major in Human Ecology, concentration in child and family studies. Two themes are highlighted: the integration of human development and family studies within the context of human ecology and related areas, and concentration in a selected area of study. A doctoral program that is concurrently specialized and integrative in nature reflects the complexity of the disciplinary subject matter, provides a broader context to formulate theoretical questions, and broadens the empirical literature for addressing those questions.

DEGREES

The Master of Science degree with a major in Child and Family Studies provides a broad foundation in the understanding of how children develop and how families function in today's society. Two concentrations are available in child and family studies or in early childhood education.

Child and family studies requires a minimum of 36 credits of coursework and 18 credits in core coursework and 18 credits in specialization.

Core requirements are: 510, 511, 540, 550, 562, and 565. Students choose either the thesis option (research) or the non-thesis option (practice; internship and comprehensive exam required). Students who plan to pursue a doctoral degree are best served by selecting the thesis option. The following are required in the thesis option: 570, Statistics 531 or 537, and 6 credits of Thesis 500. Students who plan to work with children and families in the community are best served by selecting the non-thesis option. Specializations within the practice option include: child and family life practice, family mediation, gerontology, child and family policy, families of children with disabilities, and child and family program administration. Each of these specializations includes 6 credits of specified relevant coursework and a supervised internship (564 and 565). Specific coursework within each specialization is on file in the Department of Child and Family Studies. Interested students should contact the Graduate Coordinator in Child and Family Studies.

Students seeking the M.S. with a major in Child and Family Studies must file a plan of study with the department head after 15 hours of graduate credit.

THE PH.D. CONCENTRATION

The department participates in the doctoral program with a major in Human Ecology, concentration in child and family studies. Two themes are highlighted: the integration of human development and family studies within the context of human ecology and related areas, and concentration in a selected area of study. A doctoral program that is concurrently specialized and integrative in nature reflects the complexity of the disciplinary subject matter, provides a broader context to formulate theoretical questions, and broadens the empirical literature for addressing those questions.
early childhood education: description, analysis and evaluation of curriculum models, teaching methods, administrative style, and supervision of personnel. Experience in designing and evaluating early childhood programs for young children; special needs; infancy-age 8. Prereq. or coreq.: 510 or 512.

521 Organizational Management in Early Childhood Education (3) Designing, implementing, and evaluating physical and psychological environments in educational environments. Development of skills in environmental organization, interpersonal leadership, and supervision of staff. Prereq. or coreq.: 510 or 512 or equivalent or consent of instructor.

522 Naturalistic Interventions for Parents and Teachers of Young Children (3) Common problems faced by parents and teachers; methods to modify problem behavior. Prereq. or consent of instructor.

525 Seminar on Play (3) Comparison and contrast of theoretical frameworks and research methodologies on play. Developmental perspective on play.

530 Families of Handicapped Children (3) Developmental nature of families' experiences in caring for handicapped children, especially during infancy and early childhood. Prereq. and 511 or consent of instructor or equivalent.


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, impact of child abuse and divorce on children. Prereq. and consent of instructor.

550 Research and Theory in Marriage and Family (3) Use of family concepts and frameworks and application of theoretical models to understanding research literature on marital relations.

552 Diversity in Children and Families (3) Diversity in family configurations in contemporary U.S. society. Variations of family patterns by race, ethnicity, religion, and social class; social dynamics of family formation, composition, and patterns. Prereq.: 550, F.A.

555 Children, Divorce and Remarriage (3) Children's and adolescents' adjustment to transitions involving parental divorce, single-parenthood, and remarriage. Prereq. or consent of instructor.

556 Human Sexuality (3) Theory, research, and family life education practices related to study of human sexuality: individual, relational, cognitive, emotional, biological, and developmental issues of human sexuality.

562 Families and Children Coping with Stress (3) Processes involved in children and families during times of stress. Theoretical context and study of impact of developmental stressors and catastrophes on children and families. Prereq. 550 or consent of instructor.

563 Family Life Education Programs (3) Planning, implementing and evaluating programs in marital, parent-child, and family relationships, and parenthood education. Prereq. Consent of instructor. (Same as Human Ecology 663.)

564 Practicum in Human Development or Family Studies I (3) School and community programs. Education for human development and family living. Prereq. Consent of instructor. S/N only.

565 Practicum in Human Development or Family Studies II (3) School and community programs concerned with education for human development and family living. Committee approved and supervised as written project. Prereq. 564 and consent of instructor. S/N only.

566 Approaches to Family Intervention and Counseling (3) Various theoretical approaches to family intervention and counseling. Structural, experiential, and social learning schools of practice. Effectiveness of intervention from perspective of their impact on family functioning and client behavior. Prereq. or consent of instructor. S/N only.

567 Family Violence (3) Theory and research on intimate, maintenance and cessation of violent behaviors in intimate family contexts, and assessment of responses to violent family behaviors, perpetrators, victims, and family systems. Prereq.: 550, F.A.


571 Research Seminar I (Presentation and critique of research projects. Prereq.: Departmental major or consent of instructor. May be repeated. S/N only.)

580 Special Topics in Human Development or Family Studies (1-3) Research, theory and current issues in child development or family studies; topics, handicap, children, symbolic interaction, work and family, Piagetian meanings, children, theory and research in human sexuality, cognition. Prereq. or consent of instructor. May be repeated with different topics. Maximum 9 hrs.

581 Directed Study in Human Development or Family Studies (1-3) Individual learning experiences in specific topics in child development or family studies. Prereq.: 6 graduate hrs. or consent of instructor. May be repeated with different topics. Maximum 6 hrs.

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.

600 Doctoral Research and Dissertation (1-15) S/N only.

610 Advanced Special Topics in Human Development or Family Studies (1-3) Study of research and theory related to current issues. Prereq. 12 graduate hrs in major or consent of instructor. May be repeated with different topics. Maximum 6 hrs.

620 Advanced Directed Study in Human Development or Family Studies (1-3) Advanced, in-depth individualized learning experiences in specific topics in child development, early childhood education, or family studies. Prereq. May be repeated with different topics. Maximum 6 hrs.

630 Advanced Developmental Processes (3) Sociocultural, cognitive/developmental processes development during infancy and childhood. Normative and non-normative development. Prereq. or consent of instructor. May be repeated with different topics. Maximum 9 hrs.

631 Adolescent Development in Families (3) Normative and nonnormative adolescent development: physical, cognitive, moral, social, familial, sexual, and personality. Prereq. or consent of instructor.

633 Survey Design and Analysis (3) (Same as Sociology 633.)

634 Advanced Survey of Family Theory and Research (3) Conceptualization, analysis, and critical assessment of pertinent conceptual and empirical literatures at advanced level for variety of contemporary family issues. Prereq. 550, 570 or equivalent research methods course. S, A.

640 Advanced Theory in Human Development (3) Original conceptualizations and current theoretical perspectives influencing field of human development and empirical evaluation of these perspectives. Prereq. 550, 510, 511, or consent of instructor.

650 Advanced Qualitative Research Methods (3) Techniques and data analysis in qualitative research in human development and family studies. Use of methods: in-depth interviewing, participant observation, and case studies. Prereq. Communications 642 or Psychology 613.

652 Men and Families (3) Contemporary American men: primary psychological processes in sociocultural context. Historical influence of society and culture. Men's and women's families in marriage and parenting. Prereq. 5 hrs of graduate family studies coursework. F, A.

653 Women and Families (3) Contemporary American women: primary psychological processes in sociocultural context. Historical influence of society and culture. Women's and men's families in marriage and parenting. Prereq. 5 hrs of graduate family studies coursework. F, A.

691 Analytic Reasoning (3) Analysis of quantitative methods and measures used in human development and family research: validity, reliability, causality, and generalizability. Prereq: 550, 510, 511, 570, 3 hrs graduate statistics, or consent of instructor.
Civil and Environmental Engineering
(College of Engineering)

MAJORS

Civil Engineering ............................................. M.S., Ph.D.
Environmental Engineering ............................... M.S.
(Ph.D. through Civil Engineering)

Gregory D. Reed, Head

Professors:
Bennett, R. M., PE, Ph.D. ............................... Illinois
Burdette, E. G. (Fred N. Peebles Prof.), PE, Ph.D. ............................... Illinois
Chatterjee, A., PE, Ph.D. ................................. NC State
Davis, W. T., Ph.D. ................................. Tennessee
Deatherage, J. J., Ph.D. ................................. Tennessee
Drumm, E. C., PE, Ph.D. ................................. Arizona
Goodpasture, D. W., PE, Ph.D. ............................... Illinois
Greco, W. L. (Emeritus), Ph.D. ............................... Michigan State
Heathington, K. W. (Emeritus), Ph.D. ............................... Northwestern
Humphreys, J. B. (Emeritus), Ph.D. ............................... Texas A&M
Johnson, H. L. (Emeritus), M.S., Ph.D. ............................... Tennessee
Miller, W. A. (Granger Prof.), PE, Ph.D. ............................... Georgia Tech
Reed, G. D. (LaJolla), PE, Ph.D. ............................... Arkansas
Robinson, R. B. (Fisher Prof.), PE, Ph.D. ............................... Iowa State
Smoot, J. L., PE, Ph.D. ................................. VPI
Tschantz, B. A. (Condra Prof.), PE, Ph.D. ............................... New Mexico State
Walker, C. R. (Emeritus), M.S. ............................... MIT
Wegmann, F. J., Ph.D. ................................. Northwestern

Associate Professors:
Chou, K. G., Ph.D. ................................. Northwestern
Cox, C. D., Ph.D. ................................. Penn State
Han, L. D., Ph.D. ................................. California
Mauldon, M. P., Ph.D. ................................. California
Miller, T. L., PE, Ph.D. ............................... Tennessee
Richards, S. H., PE, Ph.D. ............................... Tennessee
Robinson, K. G., Ph.D. ............................... VPI

Assistant Professor:
Jackson, N. M., PE, Ph.D. ............................... Oregon State

The Department of Civil & Environmental Engineering offers degrees leading to the Master of Science and Doctor of Philosophy with a major in Civil Engineering concentrating in construction engineering, environmental engineering, geotechnical/materials engineering, public works engineering, structural engineering, and transportation engineering; to the Master of Science in Environmental Engineering with concentrations in water quality, water resources, air quality, mixed waste management, waste management, and environmental risk assessment.

THE MASTER’S PROGRAM

The Master of Science programs in Civil Engineering and Environmental Engineering are offered to graduates of recognized undergraduate curricula.

Departmental requirements provide that for a major in Civil Engineering, the Bachelor's degree must be in civil engineering, or certain undergraduate prerequisite courses must be taken before admission to candidacy for the Master of Science in Civil Engineering.

Civil Engineering

The Department of Civil and Environmental Engineering offers two options for the Master of Science with a major in Civil Engineering.

Thesis Option:
A minimum of 30 semester hours, including 6 hours of thesis, is required.

Non-Thesis Option:
A minimum of 33 semester hours, including a 3-hour special problems is required. The special problem will culminate in a written report which must be approved by the student's major professor.

Environmental Engineering

For a Master of Science with a major in Environmental Engineering, normally a Bachelor's degree in a field of engineering is required. For a student who does not have an engineering background, the following minimum prerequisite courses will be required: Environmental Fundamentals, Nuclear Engineering, Basic Engineering, and Mathematics.

The student must present a minimum of 30 semester hours of approved graduate courses. The major shall include 6 semester hours of thesis and a minimum of 12 semester hours of approved environmental engineering coursework. A minor may be selected but is not necessarily required.

Thesis Option:
The student must present a minimum of 33 semester hours of approved graduate courses. The major shall include 6 semester hours of thesis and a minimum of 12 semester hours of approved environmental engineering coursework. A minor may be selected but is not necessarily required.

Non-Thesis Option:
The student must present a minimum of 33 semester hours of approved graduate courses. The major shall include 6 semester hours of approved environmental engineering coursework. A minor may be selected but is not necessarily required.

Either option must be approved by the student's major professor. A student's program must include a minimum of 9 semester hours of advanced environmental engineering design courses selected from a list provided by the student's committee.

Normally, the graduate program of study will 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 level Doctoral Research and Dissertation will be required.
2. A minimum of 24 semester hours of graduate courses in civil engineering, exclusive of thesis or dissertation credit, at least 6 hours of which must be 600-level courses.

3. Supporting courses in related scientific and engineering fields, amounting to approximately 24 semester hours, subject to approval by the student's faculty committee. These related fields will normally include such disciplines as mechanics, chemistry, mathematics, microbiology, physics, and other engineering fields. A minimum of 9 semester hours of mathematics will be required beyond the civil engineering undergraduate requirements.

4. One foreign language if the student's faculty committee feels that a reading knowledge of a foreign language is crucial to the student's research efforts.

5. Upon completion of at least one-half of all coursework, each student must pass a comprehensive examination.

6. After completion of the dissertation, prior to graduation, each student must pass a comprehensive examination administered by a faculty committee.

MINOR IN ENVIRONMENTAL POLICY

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

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at U.T. Knoxville on an in-state tuition basis. The M.S. program in Environmental Engineering (concentration in air quality or waste management) is available to residents of the state of Alabama. Additional information may be obtained from the Admissions Specialist in the office of Graduate Admissions and Records.

Civil Engineering

GRADUATE COURSES

421 Portland Cement Concrete Mix Design and Analysis (3) Aggregate properties and tests, tests of portland cement and concrete, mix design methods, admixtures, and non-destructive testing. Prereq: 421. 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, roadway and their interrelationships; traffic studies: basic considerations of traffic circulation and control, lighting and markings, traffic analysis, roadway safety analysis and design. Prereq: 210, 251, 352.

453 Airport/Railroad Planning and Design (3) Airport master planning and railroad engineering. Runaway configuration, airport capacity, geometry and terminal layout and design.Railroad capacity, geometry and system layout and design. Prereq: 210, 251, 352.

461 Analysis of Framed Structures (3) Determination of dead, live, and earthquake loads for buildings; vertical and lateral load resisting systems; analysis of building frames. Prereq: Structural Analysis II.

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

474 Reinforced Concrete Design (3) Design of continuous beams, floor slabs, and columns with combined axial loads.
538 Finite Element Applications in Geotechnical Engineering (3) Applications of finite element method to typical problems in geotechnical engineering. Confinement and unconstrained flow through porous media; stresses and strains in Elastic half spaces; representation of nonlinear soil behavior with elastic and elasto-plastic models; soil structure interaction effects. Prereq: Introduction to Soil Behavior and 561.

539 Geotechnology Seminar (1) Seminar topics in geotechnical and geotechnological research. Research contributions and case studies by graduate students and engineers and scientists from industry, consulting, and government. Prereq: Graduate standing and consent of advisor. May not apply toward degree. May be repeated. S/N/C 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) Driver-vehicle-roadway system; traffic flow modeling; elements of transportation/highway safety. Prereq: Graduate standing.

552 Traffic Engineering - Operations (3) Signs, signals and marking; short-term operations; controls; signal timing and phasing; one-way reversible flow; system operations; design and correction of high-accident locations and system deficiencies. Prereq: 551 or 452.

553 Geometric Design and Layout of Roadway and Community Facilities (3) Functional and geometric design and rural and urban roads of all classes; subdivision layout and layout of roads of all classes; techniques for access control; friction, weather changes and street intersections; and parking. Prereq: 451 or consent of instructor.

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

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

558 Transportation Planning and Operations with Micro-Computer Applications (3) Transportation system management techniques and application of micro-computers to transportation applications. Prereq: 551 and 556.

559 Planning and Transportation (3) Preparation of transportation as elements of comprehensive development plans. Analysis of transportation systems and modes; models of travel and transportation decision making; other community features. Use of planning techniques to establish existing travel behavior modeling of demand, traffic estimation and evaluation. Prereq: Graduate standing. (Same as Planning 537.)

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

562 Structural Systems (3) Structural system design and analysis; design, dead, live, and earthquake loads on buildings and bridges. Prereq: Structural Analysis.

563 Statically Indeterminate Structures (3) Elastic analysis of indeterminate elements and rigid frames with non-prismatic members using energy, slope deflection, moment and moment distribution methods; plastic analysis of rigid frame structures; and stability analysis of compression members and portal frames. Prereq: Structural Analysis.

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: Introduction to Structural Design.

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

572 Fracture Analysis (3) Same as Geology 572.

573 Prestressed Concrete (3) Properties of prestressing materials; methods of pretensioning and posttensioning; analysis of 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; residual stresses; and design specifications and design procedures. Prereq: 471.

576 Masonry Design (3) Clay and concrete masonry materials; reinforced masonry design; reinforced masonry design; seismic behavior of masonry structures. Prereq: Introduction to Structural Design.

580 Risk Analysis in Civil and Environmental Engineering (3) Applications of probability theory and statistics in civil engineering disciplines: structures, geotechnology, water resources, transportation, and environmental engineering. Prereq: Calculus II or consent of instructor.

590 Special Problems in Civil Engineering (1-6) Enrollment limited to civil engineering students in non-thesis programs. May be repeated. Maximum 6 hrs. S/N/C only.

595 Special Topics (1-4) Topics and problems related to current developments in field. May be repeated. Prereq: Consent of instructor.

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

611 Analysis Techniques for Transportation Systems (3) Analysis of trip generation, trip distribution, modal split and traffic assignment, employing mathematical, statistical, and computer science techniques. State of the art and new modeling techniques. Prereq: 554 or 556.

612 Analysis Techniques for Transportation Systems (3) Advanced topics of application of mathematical, statistical and computer science techniques in modeling and analysis of transportation systems. Prereq: 651.

666 Reliability of Constructed Systems (3) Development of safety factors and probability based design codes; Monte Carlo methods; constructed system reliability; evaluation of existing infrastructures. Prereq: 580. Introduction to Structural Design or consent of instructor.

671 Behavior of Steel Bridges and Buildings (3) Behavior, analysis and design of plate girders, columns, and composite members subjected to static and dynamic loading. Prereq: 571.

674 Behavior of Reinforced Concrete Beams and Slabs (3) Strength and behavior of statically and statically determinate reinforced concrete beams and frames; limit analysis; behavior, analysis, and design of reinforced concrete elastic-plastic design 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/N/P 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.

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

510 Environmental Protection (3) Managing of water resources, wastewaters, 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, computations, and classifications; uniform and gradually varied flow theory and applications; open channel design; unsteady flow theory and analysis; dynamic
soil vapor extraction, soil washing, chemical destruction, thermal destruction, bioremediation. Prereq: 556 or consent of instructor.

570 Air Quality Management/Pollution Control (3) Introductory course on concepts of air pollution, analysis of relationships among sources, meteorology, effects; stack sampling, emission control systems. Prereq: Consent of instructor.

571 Design of Air Pollution Control Systems (3) Design and evaluation of systems used to control emission of gaseous and particulate air pollutants. Comprehensive design of specific devices and systems. Prereq: 570.

572 Air Quality Dispersion Modeling (3) Diffusion in atmosphere; application of atmospheric dispersion models and evaluation of meteorological and air quality data. Prereq: 570.

573 Sampling of Air Pollutants (3) Standard sampling methods for particulate and gaseous air pollutant emissions from industrial processes; ambient air monitoring instrumentation techniques. Prereq: 570.

574 Applied Microbiology and Biotechnology (3) (Same as Chemical Engineering 575, Microbiology 575, and Agricultural Engineering 575.)

581 Industrial Pollution Prevention (3) (Same as Chemical Engineering 581 and Engineering Sciences and Mechanics 585.)

590 Special Problems in Environmental Engineering (1-9) Enrollment limited to environmental engineering students in non-thesis program. 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.

620 Advanced Surface Water Hydraulics (3) Advanced topics in surface water hydraulics; solutions in St. Venant equations for complex channel structures; dam breach modeling. Prereq: 520.

651 Industrial Waste Unit Operations and Processes (3) Theoretical design and laboratory modeling of industrial waste treatment processes and operations. Prereq: 551, 555. Prereq or coreq: 552. 2 hrs and 1 lab.


653 Pollutant Fate Modeling and Risk Assessment (3) Application of scientific principles concerning movement and fate of chemicals at interfaces of air, water, and earth solids in environmental systems. Assessing risk posed by presence of those chemicals. Prereq: 551.

691 Special Topics in Environmental Engineering (3) Selected advanced problems of current interest. Prereq: Consent of instructor may be repeated.

556 Hazardous Waste Management (3) Analysis and design of operations and processes used for hazardous waste disposal and processing; regulations involving industrial operations. Prereq: Graduate standing or consent of instructor.

557 Hazardous Waste Site Remediation (3) Advanced study of processes for hazardous waste site remediation.

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: 401A-402B or consent of instructor. May be repeated. Maximum 9 hrs.

414 Cicero and Techniques of Latin Prose Composition (3) For advanced students in Latin, practice in prose composition, writings of Cicero. Prereq: 491-592 or consent of instructor.

431-32 Selected Readings from Latin Literature (3,3) For advanced students in Latin, oratory, historical writings, poetry of ancient Rome in original Latin. Prereq: 491-592 or consent of instructor. May be repeated. Maximum 9 hrs.

435 Medieval Latin (3) Selected readings from Latin prose and poetry of medieval Europe. Prereq: Consent of instructor.

441 Special Topics in Classical Civilization (1-3) Art, literature, religion, and society of Greece and Rome. May be repeated with consent of department. Maximum 9 hrs.

461 Studies in Classical Archaeology (3) Variable content course offering subject matter not taught in an existing course, or concentrating on one aspect of existing survey. Prereq: According to topic. May be repeated. Maximum 9 hrs.

561 Special Topics in Classical Civilization (1-3) Advanced study of one of the great genres of classical literature. Includes the wider reading of Greek and Latin authors in a selected field, a more detailed study of one of the great genres of classical literature, and the development of background for the appreciation of Greek or Roman life and literature.

COMMUNICATIONS

MAJOR DEGREES

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

The College of Communications offers the Master of Science and the Doctor of Philosophy degrees with a major in Communications. In addition to the full-time program, the M.S. degree program is offered on an evening basis at the University of Tennessee at Martin, and via distance education, at Chattanooga on the University of Tennessee at Chattanooga campus and at Martin on the University of Tennessee at Martin campus. For application forms and other information about the M.S. and Ph.D. programs in Communications, write to: Associate Dean for Graduate Studies, College of Communications, 426 Communications Building, The University of Tennessee, Knoxville, TN 37996-0347.

ADMISSION REQUIREMENTS

Applicants must meet admission requirements of The Graduate School. In addition,
they must complete the Graduate Record Examination, rating forms, and application forms as required by the College of Communications. Minimum requirements for admission to full potential candidate status normally include a 3.0 (4.0 system) grade-point average in undergraduate studies and scores at or above the fifteenth percentile in verbal, quantitative and analytical aptitude on the Graduate Record Examination. All application materials are screened by an admissions committee authorized by the faculty of the College of Communications.

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

A baccalaureate degree in communications or a related field is recommended. Admission is possible with other baccalaureate degrees. However, all applicants without the appropriate background are required to take up to 16 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.

THE MASTER'S PROGRAM

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

The prospective student who is interested only in courses in one area of concentration is advised to enroll for a second baccalaureate rather than an advanced degree.

Students planning to pursue a doctoral degree with a major in Communications may be accommodated in the M.S. program through special academic advising.

Degree Requirements

The M.S. program emphasizes communication 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, and 550 or 560, the first three of which must be taken within the first two semesters of the student's program, except with written approval of the Associate Dean for Graduate Studies for the College.

2. Twelve hours within one department of the college, at least 6 hours at the 500 level or above. An internship, if needed, is included.

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 590), including a thesis seminar, or a 3-hour project (Communications 591).

Additional hours may be required for those who do not have academic prerequisites, and an internship may be required for those who do not have professional experience in the field they wish to study. A course in communications law is a prerequisite.

A student's internship experience requires approval by his/her advisor. Credit will be given through Advertising 598, Broadcasting 598, Journalism 598, or Public Relations 598 on the basis of 3 hours of credit for the equivalent of 15 weeks of full-time professional experience. This credit is to be included in the hour requirements for the M.S. program. Previous professional experience will be evaluated by the student's committee.

Students interested in subsequent entry into a doctoral program are advised to pursue the thesis option and to take additional courses in communication theory and research, subject to advisor's approval.

After completion of the formal program of coursework and research for the thesis option, the student must pass an oral examination conducted by his/her graduate committee. The non-thesis option requires a written comprehensive examination and an oral defense of the project.

THE DOCTORAL PROGRAM

The Ph.D. with a major in Communications is intended to prepare scholars for teaching, research, administration, and service in the field of mass communications. The program is interdisciplinary, consisting of a required core curriculum and recommended courses outside the College in the related social and behavioral sciences. The program is flexible and will accommodate a wide variety of career goals in communications. New students may be admitted to the program at any time; however, core courses begin only in the fall semester.

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

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

1. A 3.0 (4.0 system) grade-point average in undergraduate studies, and 3.5 for graduate work in a master's degree;

2. At or above the fifteenth percentile in verbal, quantitative and analytical aptitude on the Graduate Record Examination;

3. Endorsement by at least three former teachers or professional colleagues;

4. A statement of the applicant's goals and reasons for pursuing the doctorate. Personal interviews with members of the Ph.D. Admissions Committee are recommended and may be required.

Professional experience in some field of communication 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, and 652.

2. Fifteen hours in a primary concentration (advertising, broadcasting, information sciences, journalism, public relations, or speech communication) supplementing the core. Courses may be taken in one or more of the Departments of Advertising, Broadcasting, Speech Communication, and/or the Schools of Information Sciences and Journalism.

3. Twelve hours in a secondary concentration (outside the College of Communications).

4. Four hours of electives.

5. Twenty-four hours of dissertation. All courses require the approval of the student's advising committee.

Admission to candidacy must be attained at least two semesters prior to graduation and requires successful completion of a written comprehensive examination.

Each doctoral student's progress will be reviewed annually by the Doctoral Committee of the College of Communications. Results will be reported to the student by his/her program advisor, who will convey the committee's recommendations concerning the student's standing in the program (probationary) and suggestions for improvement in performance. Candidates without prior teaching experience must register for Communications 521, Tutorial in Communications Teaching.

Planned course offerings in the College of Communications for a full calendar year are available the preceding November. This information is available from the Graduate Studies Office, 426 Communications Building, 974-6661. See also courses listed under Advertising, Broadcasting, Information Sciences, Journalism, and Speech Communication.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. program in Communications is available to residents of Arkansas, or Kentucky (concentration in advertising). The Ph.D. program is available to residents of the states of Alabama, Arkansas, Louisiana, Maryland, Virginia, or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

ACADEMIC STANDARDS

A student in the College of Communications whose graduate grade-point average, not including incomplete grades, is below 3.0 at any time after the end of 12 hours of graduate credit will be placed on probation. A student on probation will be dropped from the program unless his or her cumulative graduate grade-point average is 3.0 or higher at the end of the probationary period. The probationary period is defined as the next 12 semester hours of graduate coursework attempted that is specified in the student's degree program.

Exceptions to this policy may be made only with the approval of the Associate Dean for Graduate Studies of the College of Communi-
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:

Karlstad, M.D., Ph.D., Anesthesiology
Lawler, J. E., Ph.D., Psychology
Loizzo, C. M., Medical Biologist
Potgieter, L. N. D. (Liaison), B.V.Sc., Ph.D., Veterinary Teaching Hospital
Slauson, D. O., D.V.M., Ph.D., Veterinary Teaching Hospital

The Comparative and Experimental Medicine degree program (M.S. and Ph.D.) is a jointly-administered graduate program intended to prepare students for teaching and/or research careers in the health sciences. This program emphasizes the comparative approach to the study of experimental pathobiology, infectious diseases, pharmacology, epidemiology, clinical medicine, immunopathology, histology, 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 interdisciplinary program, 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, U.T. Medical Center at Knoxville, the Oak Ridge National Laboratory, Knoxville Zoological Park, Hemophilia Clinic, Developmental and Genetic Center, Hematology and Oncology services, and departments of life sciences.

For additional information, write to the Office of Research and Graduate Programs, or access the Website at http://cem.vet.utk.edu.

ADMISSION REQUIREMENTS

Admission requirements of The Graduate School of UT Knoxville apply. In addition, all applicants must furnish three letters of recommendation from individuals who are familiar with their scholastic or professional records.

Master of Science Degree Program

Applicants must have a baccalaureate degree with coursework in chemistry through organic, mathematics through calculus, physics, and basic biology. For the advanced study in biology such as biochemistry, mammalian anatomy, histology, cell biology, or other appropriate biomedical courses from an accredited university is recommended.

Applicants for admission to the Master of Science degree program must present evidence of exemplary performance on the Graduate Record Examination. For additional information, write to the Office of Research and Graduate Programs, or access the Website at http://cem.vet.utk.edu.

Doctor of Philosophy Degree Program

Applicants generally will be expected to have a master's degree in one of the biological sciences and a Graduate Record Examination score of at least 1000 for the quantitative and verbal portions of the Graduate Record Examination.

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 admitted to the Comparative and Experimental Medicine graduate program but will be enrolled officially as veterinary students. During summers such students may take advantage of registering for graduate
Admissions Specialist in the Office of Graduate Admissions and Records.

**Comparative and Experimental Medicine--Graduate School of Medicine**

**GRADUATE COURSES**

Participating departments include: Anesthesia, Medicine, Medical Biology, Obstetrics and Gynecology, Pathology, Pediatrics, Radiology, and Surgery.

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

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

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

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

541 Molecular Basis for Metabolic Disease (4) Disease at molecular level. Changes in metabolic events in cells that lead to disease and occur as result of disease. Correlation with clinical and pathological states. Prereq: Biochemistry and Cellular and Molecular Biology 410-419 or equivalent. F

545 Clinical Genetics (3) Human genetic disorders: new developments in cytogenetics, molecular genetics, clinical diagnosis and prevention. Prereq: Biology and genetic background or consent of instructor.

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

601 Medical Biology Seminar (1-3) Invitation speakers. Topics posted in advance. May be repeated. S/NC only. E

608 Descriptive and Applied Epidemiology (2) Principles of epidemiology and their application to real-world problems of medical importance. Prereq: Consent of Instructor. May be repeated. F

609 Special Topics in Pathology (1-3) Specialized experience in comparative and experimental medicine. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

610 Advanced Topics in Medical Science (1-3) New developments in medical 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

653 Comparative Pathology of Domestic Animals (3) Clinical and pathological aspects of diseases of domestic animals. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

656 Veterinary Pathology Seminar (1) Topics of current interest in medical science. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. E

662 Clinical Epidemiology (3) Theory and principles of disease identification and analysis of clinical research. Lab: application of biostatistical methods and analysis. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. E

665 Clinical and Experimental Medicine (1-6) Specialized experience in comparative and experimental medicine. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

670 Diagnosis and Pathogenesis of Viral Diseases of Domestic Animals (3) Advanced study of viral diseases in domestic animals. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

689 Descriptive and Applied Epidemiology (2) Principles of epidemiology and their application to real-world problems of medical importance. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

692 Special Topics in Pathology (1-3) Specialized experience in comparative and experimental medicine. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

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

**Comparative and Experimental Medicine--Veterinary Medicine**

**GRADUATE COURSES**

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

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

**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 is available to residents of Georgia. The Ph.D. program is available to residents of the state of Florida. Additional information may be obtained from the...
Comparative Medicine

See College of Veterinary Medicine and Comparative and Experimental Medicine

Computer Science

(MAJOR DEGREES)

Computer Science............................. M.S., Ph.D.

Robert C. Ward, Head

Professors:

Dongarra, Jack, Ph.D............................. New Mexico
Langston, Michael A., Ph.D..................... Texas A&M
Poore, J. H., Ph.D............................... Georgia Tech
Sherman, Gordon R., Emeritus, Ph.D., Purdue
Thomson, Michael G., Ph.D..................... Duke
Ward, Robert C., Ph.D............................. Virginia

Associate Professors:

Berry, Michael W., Ph.D........................... Illinois
Gregor, Jens, Ph.D............................... Aalborg (Denmark)
MacLennan, Bruce J., Ph.D..................... Purdue
Vander Zanden, Bradley, Ph.D.................... Cornell
Vose, Michael D., Ph.D........................... Texas

Assistant Professors:

Plank, James S., Ph.D............................. Princeton
Raghavan, Padma, Ph.D......................... Penn State
Straight, David W., Ph.D......................... Texas
Wolski, Richard, Ph.D............................ UC Davis

Instructor:

Meyo, J. Wallace (Liaison), M.S. .......... Tennessee

THE MASTER'S PROGRAM

Two semesters of calculus plus two additional semesters of college mathematics (e.g., linear algebra, differential equations, probability) and a course in discrete structures and in systems programming are required for admission. For the master's degree, 30 semester hours of graduate credit are required, 24 of which must be 500 level or above. Computer Science 530, 560, and 580 are required for the degree. Graduate courses taken outside the department are sometimes allowed but must be approved by the Graduate Committee before enrollment.

Thesis Option

The student must reach agreement on a thesis topic with a faculty advisor and must take 6 hours of 500 Thesis. Six hours of 500 Thesis may count in the 24-hour requirement at the 500 level or above.

Non-Thesis Option

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

Problems in Lieu of Thesis Option

The student must reach agreement on the problem topic with a faculty advisor and pass an oral exam on the problems before a committee of three or more faculty members.

Master's Minor in Computer Science

The graduate minor consists of any two of the three core courses (530, 560, 580) plus an additional 3 hours of graded computer science graduate-level courses at or above the 400 level.

THE DOCTORAL PROGRAM

A student seeking admission to the Ph.D. program is expected to meet the following requirements:

1. The student should have three letters of recommendation sent directly to the department head from individuals capable of assessing the student's potential for advanced work in computer science (for example, college teachers or employers for whom the student has worked after earning a Bachelor's degree). The department reserves the right to contact these individuals or other knowledgeable people if additional information is deemed necessary or desirable.

2. The student is expected to have taken the GRE verbal and quantitative general test within the past three years and to have theses 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 computer science must be taken in computer science at UTK. The student's advisor and committee will establish the specific course requirements. The comprehensive examination consists of a departmental written examination and a subsequent oral examination conducted by the student's committee.

GRADUATE COURSES

420 Advanced Topics in Machine Intelligence (3) Search: learning, expert systems, neural networks, pattern recognition and natural language processing. Faculty research. Prereq: Consent of instructor or consent of instructor. May be repeated. Maximum 9 hrs.

430 Advanced Topics in Hardware Systems (3) Architecture, parallel processors, microprogramming, networks and communications, faculty research. Prereq: Completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hrs.

440 Advanced Topics in Software Systems (3) Operating systems, compilers, parallel computation, software engineering, databases, programming languages. Faculty research. Prereq: Completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hrs.

450 Advanced Topics in Scientific Computation (3) Numerical methods, supercomputers and computer modeling and simulation of physical systems. Faculty research. Prereq: Completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hrs.

470 Advanced Topics in Theoretical Computer Science (3) Theory of computation, complexity theory, formal languages and graph theory and its applications. Faculty research. Prereq: Completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hrs.

480 Advanced Topics in Discrete Structures and Problem Solving (3) Heuristic search, automatic theorem proving, symbolic methods, semantic information processing, representation theory. Prereq: Discrete Structures.

522 Artificial Intelligence (3) Various applications in computer science and artificial intelligence. Prereq: Discrete Structures.

525 Software Engineering (3) Survey of software engineering: formal methods, tools, testing, reliability, structured design and development, metrics, management and history of the field.

530 Computer Systems Organization (3) Architectures and system organization for parallel and distributed systems. Prereq: Discrete Structures and System Programming.

532 Boolean Algebra, Logic Design and Microprocessors (3) Boolean algebra, combinational and sequential logic design, Microprocessors, Hardware lab. Prereq: One year of college mathematics beyond algebra and trigonometry.


551 Pattern Analysis (3) Decision-theoretic and structural pattern analysis. Deterministic and statistical decision rules, feature extraction and representation; syntactic and semantic methods, relational models. Prereq: Discrete Structures and probability or statistics.

552 Image Analysis (3) Enhancement and restoration of digital images, 2D transforms and segmentation and description. Computational procedures for image reconstruction. Prereq: One year calculus and discrete structures.


571-72 Numerical Mathematics (3) See College of Arts and Sciences Mathematics Department.
Consumer and Industry Services Management

(Majors of Human Ecology)

MAJORS DEGREES

Human Ecology.......................... Ph.D.
Recreation, Tourism and Hospitality Management.............. M.S.
Textiles, Retailing and Consumer Sciences.................. M.S.

Nancy B. Fair, Head

Professors:
Bresee, Randall R. (Liaison), Ph.D. .................. Florida State
Duckett, Kermit E., Ph.D. .............. Tennessee

Dyer, C. L., Ph.D. ..................... North Carolina
Hayes, Gene A. (Liaison), Ph.D. .............. North Texas State
Wardsworth, Larry C., Ph.D. .............. NC State

Associate Professors:
Bhat, Gajanan, Ph.D. .............. Georgia Tech
Blanton, Mary Dale, Ph.D. ....... Indiana
Costello, Carol, Ph.D. .............. Tennessee
Fair, Nancy B., Ph.D. .............. NC State
Fairhurst, Ann E. (Liaison), Ph.D. ....... Oklahoma State
Krick, Ken L., Re.D. .............. Indiana

Assistant Professors:
Hendrick, Francis T., Ph.D. .......... Oregon
Lee, Jinkook, Ph.D. ................ Ohio State
McGrath, M., Ed.D. .............. Tennessee
Pfaffenberger, Carl, Ph.D. .............. Tennessee

The Department of Consumer and Industry Services Management offers the master's degree with majors in Textiles, Retailing and Consumer Sciences; concentrations in textile science and in retail and consumer sciences; and in Recreation, Tourism and Hospitality Management, concentrations in therapeutic recreation, recreation administration, tourism, and hospitality management. An interdepartmental/interdisciplinary minor in gerontology gives the graduate student an opportunity for combining the knowledge and experience about aging in American society with her/his own major concentration.

The programs in Consumer and Industry Services Management prepare students for careers in industry, business, public and private agencies, and educational institutions. Master's level work enables students to conduct research in retail management and merchandising and in the consumer areas related to retail decision making. Students in textile science are expected to have a solid foundation in mathematics, as well as a formal background in a physical science or engineering.

Interested students should contact the department head for more information.

ADMISSION REQUIREMENTS

A complete file for review includes the Graduate School application file, Department of Consumer and Industry Services Management application, Graduate Record Examination (GRE) scores for the general section, and three Graduate School Rating Forms completed by individuals who can attest to the potential for graduate education. Forms may be obtained from the Dean's Office, College of Human Ecology.

In addition to specified entrance requirements stipulated by the Graduate School, admission to the master's degree program with a major in Textiles, Retailing and Consumer Sciences is dependent on completion of undergraduate courses that give the necessary background for success in the graduate program. For the concentration in retail and consumer science, students should have an adequate background in retailing and/or consumer science supported by coursework in economics, marketing, mathematics, and statistics. For the concentration in textile science, students should have a basic technical background in textile science or materials science supported by mathematics through differential equations, organic chemistry, and general physics.

Superior students deficient in one or more of the above requirements, may be admitted at the discretion of the department's graduate faculty.

THE MASTER'S PROGRAM

The requirements for the major in Textiles, Retailing and Consumer Sciences are listed below.

Retail and Consumer Sciences (Thesis)
Major (Required RCS courses): 510, 511, 541, 550, 562, 590
Cognate Area......................... 15
Statistics................................ 6
Electives................................ 6
Total................................... 34

Retail and Consumer Sciences (Non-Thesis)
Major (Required RCS courses): 510, 511, 541, 550, 562
Cognate Area......................... 15
Statistics................................ 6
Electives................................ 6
Total................................... 34

Textile Science (Thesis Option)
RCS 552 Research Methods* .............. 3
TS 590 Textile Science courses ............. 12
Cognate Area......................... 6
Statistics................................ 3
Electives................................ 9
Total................................... 36

*Must include RCS 562 or equivalent; or 3 hours of laboratory techniques in materials analysis and characterization.

Textile Science (Non-Thesis Option)
Nonwoven Core
(Required TS courses: 510, 521, 526, 528, 595)........... 15
Related Courses....................... 9
Statistics................................ 3
Professional Project, TS 501 ......... 3-6
Total................................... 30-33

The major in Recreation, Tourism and Hospitality Management requires 33-36 hours for the thesis option and 36-39 hours for the non-thesis option depending upon the specific concentration. For all thesis concentrations, individuals not possessing an undergraduate degree in the discipline or having appropriate full-time work experience will be required to take 590 (graduate internship).

Requirements for each concentration are:

HOSPITALITY MANAGEMENT

All students (28 hours): Hotel and Restaurant Administration (532, 537, 542); Nutrition 541; Hotel and Restaurant Administration/Nutrition electives (12 hours); related area (6 hours); statistics (3 hours);

Thesis Option (6 hours): 590:
Non-Thesis Option (9 hours): 535; Hotel and Restaurant Administration/Nutrition elective (3 hours); elective (3 hours).

For a description of courses in the hospitality management concentration, see Nutrition.

RECREATION ADMINISTRATION

All students (27 hours): 415 or 440, 510, 515, 540, 541; Safety Education 443; Sport
Management 512; statistics (3 hours); research methods (3 hours); Thesis Option (6 hours); 500; Non-Thesis Option (9 hours): 590 (6 hours); elective (3 hours).

Therapeutic Recreation
All students (24 hours): 420 or 425, 510, 515, 520, 521, 522; statistics (3 hours); research methods (3 hours); Thesis Option (9 hours): 500; elective (3 hours); Non-Thesis Option (12 hours): electives (6 hours); 590 (3-6 hours).

Tourism
All students (30 hours): 470, 510, 515; Hotel and Restaurant Administration 532, 542; Marketing 510; Hotel and Restaurant Administration 555 or Planning 540; Planning 548 or 550; statistics (3 hours); research methods (3 hours);
Thesis Option (6 hours): RTM or HRA 500; Non-Thesis Option (9 hours): 590 (3-6 hours); elective (3-6 hours).

THE PH.D. CONCENTRATIONS

Retail and Consumer Sciences
Students enrolled in the Ph.D. program with a concentration in retail and consumer sciences are provided with a foundation in management and retail and consumer sciences to further theory and application in advanced study and research. Requirements are either 81 or 90 hours, depending upon whether students select a minor in statistics. Requirements include:

RCS Required Courses: 614, 615, 625, 641, 651 15
Research Methods: 590, 616 5
Statistics 12-15
Cognate Area 9
Human Ecology 630 3
Electives 21
Dissertation 24
Total 83-89

Note: (1) Statistics hours must include Statistics 537, 538, 579. (2) Cognate hours must include at least 3 hours at the 600 level. (3) Students choosing to take a minor in statistics will take a minimum of 15 hours of prescribed statistics courses and are not required to take a cognate area.

Textile Science
Students enrolled in the Ph.D. program in Human Ecology with a concentration in textile science take one common course which provides a foundation for the integration of textiles and apparel in the context of the near environment. A required departmental research seminar exposes students to research being conducted in all areas of study in the department. Requirements include:

Textile Science Courses 18
RCS 552 3
TS 550 2
Cognate Area 9
Statistics (500-600 level) 6
Research Methods* 6
Electives 14
Dissertation 24
Total 82

*must include 8 hours of laboratory techniques in materials analysis and characterization;
Note: Students must take a minimum of 9 hours at the 600-level in the College of Human Ecology, exclusive of dissertation. Transfer students with a master's degree from another institution are required to complete at least 42 hours (including dissertation hours) from 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 capabilities.

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 LIT Knoxville on an in-state tuition basis. The M.S. program in Textiles, Retailing and Consumer Sciences is available to residents of the state of Mississippi. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records. For the Ph.D., see Human Ecology.

Hotel and Restaurant Administration

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester in which they use University facilities and/or require use of facilities before their degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
530 Computer-Assisted Foodservice and Lodging Management (3) Application of computer technology to food and lodging industry inventory, cost accounting, production, revenue analysis, rooms management, and sales planning and analysis. Prerequisite: Food and Lodging Cost Control or consent of instructor. F, A
531 Advanced Financial Management (3) Financial planning, operations and evaluation techniques used in foodservice and lodging management, including budgeting, accounting systems, and financial reports. Prerequisite: Food and Lodging Cost Control or consent of instructor. F, A
532 Advanced Human Resource Management (3) Identifying labor needs; development and maintenance of work force. Prerequisite: Food and Lodging Personnel Development or consent of instructor. F, A
533 Advanced Food Production and Delivery System Management (3) Analysis of food production and delivery systems; application of quantitative methods and models to optimize decisions. Prerequisite: Quantity Food Procurement, Production and Service, Microcomputer Applications or consent of instructor. F, A
534 Special Topics in Foodservice and Lodging Administration (1-3) Lecture/discussion format. Contemporary developments and trends in industry. Prerequisite: Consent of instructor. May be repeated. E
535 Directed Study in Foodservice and Lodging Administration (1-3) Problems selected for study by student with guidance of faculty member. Prerequisite: Consent of instructor. May be repeated. Maximum 6 hrs. E
537 Seminar in Foodservice and Lodging Administration (1) May be repeated. S/NC only. F

542 Advanced Hotel Administration (3) Strategic management of hotel organizations. Theoretical and applied literature on formulation and implementation of strategy, external and internal factors relevant for business and corporate level decisions. Consideration of role of marketing in hotel firms. Analysis of industry and case studies. Prerequisite: 531, 532. Sp, A
544 Experimental Study of Quantity Food Production (3) Design and preparation of food products applicable to foodservice and lodging industry research, sensory evaluation, production techniques, and microbiological evaluation of food. Prerequisite: Quantity Food Procurement, Production and Service, Microcomputer Applications or consent of instructor. F, A
547 Field Experience (3-9) Experience for food- or lodging-related industry or agency under supervision of faculty. Prerequisite: Consent of instructor. S/NC only. E
555 Foodservice and Lodging Law (3) Management organization and policy as imposed or granted by law. Legal research to determine legal principles at state and federal levels which impact industry. Prerequisite: Hospitality Law or equivalent, or consent of instructor. Sp, A
600 Doctoral Research and Dissertation (3-18) P/NP only. E
620 Advanced Topics in Foodservice Administration (1-3) Individual study and group discussion of topics related to current problems. Prerequisite: 533 or consent of instructor. F, A

Recreation and Tourism Management

GRADUATE COURSES

415 Development and Maintenance of Leisure, Sport, Tourism Services (3) Principles of planning, designing, outfitting and operating leisure and sport-related facilities such as aquatic centers, tennis complexes, activity centers. Prerequisite: Leisure Program Development and Evaluation, or consent of Instructor. (Same as Sport Management 415). F
430 Organization and Administration of Leisure and Tourism Services (3) Principles of administration applied to provision of leisure services offered by public, private and/or commercial enterprises. Organizational structures, personnel management, evaluation, legal authority, introduction to budgeting and fiscal procedures. Prerequisite: 430 or consent of instructor. F
440 Dimensions of Commercial Recreation and Enterprises (3) Nature and function of recreation in private, commercial, and industrial settings. Survey of development and management of commercial goods and services offered in leisure market. Factors influencing participation, management considerations, and research in commercial recreation and tourism. Prerequisite: Recreation Foundations of Leadership, Leisure Program Development and Evaluation, junior standing or consent of instructor. Sp
450 Specialized Study in Leisure Education (1-6) Special interest leisure activities; developing positive attitudes toward leisure. Demonstrates how leisure contributes to one's mental and physical health. May be repeated. Maximum 6 hrs. E
470 Tourism and Leisure Industries (3) Symbiotic relationship between tourism and various sectors of leisure industry. Use of resources, both natural and developed, and economic impacts of ventures such as on venue as well as impacts on local population. Sp
500 Thesis (1-15) P/NP only. E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester in which they use University facilities and/or require use of facilities before their degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
510 Perspectives and Trends in Leisure Services (3) Basic role of leisure delivery systems in today's society. Scope of leisure services, determinants of leisure behavior, development of leisure, and recreation. Current trends, problems, laws, and issues affected by and/or affecting delivery of leisure services. Sp
Retail and Consumer Sciences

GRADUATE COURSES

411 Entrepreneurship and Small Business Management (3) Concepts of entrepreneurship within single ownership and other business organizations; risk taking and risk management; management of small businesses; current issues and problems. Prereq: Retail Buying, Principles of Marketing.

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

501 Professional Project (3-6) Application-oriented, capstone project to show competence in major academic area. Enrollment limited to retail and consumer sciences students in non-thesis program. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. S/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

510 Fiber Science (3) Physical properties, mathematical properties and microstructure of polymeric fibers; relation to end-use properties. Prereq: Organic Chemistry and Thermal Physics or equivalent.

520 Optical Microscopy (4) Basic compound and polarizing microscopy for imaging; optical property measurements, and structured illumination. Other methods of optical microscopy. Prereq: Fundamentals of Physics: Waves, Motion, Optics and Modern Physics or equivalent. 3 hrs and 2 labs.

521 Nonwovens Science and Technology (3) Nonwoven fabric technology; different web forming processes; and relationships among the chemical, morphological and mechanical properties of fibers and orientation in webs to final performance of bonded structures. Prereq: Organic chemistry or consent of instructor.

526 Nonwovens Science and Technology (4) Intergs between mechanics of production and mechanical properties of nonwoven fabrics; characterization of fiber morphology and web structure; chemistry of nonwoven binders and finishes; and engineering of specific fabric properties. Prereq: 521 or equivalent.

528 Laboratory Methods in Nonwovens Processing and Characterization (3) Laboratory experience in nonwovens fabrication processes and characterization techniques. Effect of processing conditions on structure development and properties of different types of webs. Prereqs: 510 and 521.

552 Economics of Textile Complex (3) Economics consideration of 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


590 Research Seminar (1) Research topics in textile science. May be repeated. S/NC only. F, S

593 Directed Study (1-3) Individual problems in textile science. Prereq: 9 hrs textile science graduate coursework. May be repeated. Maximum 9 hrs.

595 Advanced Topics in Textile Science (1-3) Lecture: group discussion on special topics. Prereq: 9 hrs. E

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

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

614 Theory in Retail Environment (3) Analyze and evaluate theory in real retail environment. Prereq: Retail Environment, Principles of Management.

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 for further study. Prereq: 521, 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 358. S-P-A


641 Retail Consumer Behavior (3) Theories and concepts from social science in relation to ultimate consumer's behavior. Prereq.: 510.

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 political attitudes. Prereq: 510 and 521. S-P-A

695 Advanced Topics in Retail and Consumer Sciences (3) Lecture, group discussion, individual research on advanced topics and research areas of current significance to retail and consumer sciences. Prereq: 3 graduate hours in consumer sciences. May be repeated. Maximum 9 hrs.

Textile Science

GRADUATE COURSES

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

501 Professional Project (3-6) Application-oriented, capstone project to show competence in major academic area. Enrollment limited to textile science students in non-
Counselor Education and Counseling Psychology

(Will be) Counselor Education and Counseling Psychology

MAJORS DEGREES

Counseling ........................................ M.S.
Education ........................................... Ed.S., Ph.D.

Robert F. Kronick, Leader

Professors:

Davis, Kathleen L., Ed.D. ................. Georgia
DeRidder, Lawrence M. (Emeritus), Ph.D. .......... North Carolina
Dietz, Siegfried C. (Emeritus), Ed.D. .......... Michigan
Hector, Mark A., Ph.D. ....................... Michigan State
Huck, Schuyler W., Ph.D. .................. Northwestern
Peterson, Marla P., Ph.D. ................. Ohio State
Poppen, William A. (Liaison), Ph.D. .......... Ohio State
Thompson, Charles L., Ph.D. .......... Ohio State

Associate Professor:

Hutchens, Teresa A., Ph.D. .......... Georgia

The Counselor Education and Counseling Psychology Psychology unit participates in graduate programs leading to degrees, majors, and concentrations in:

Master of Science Counseling Mental health counseling School counseling Educational Specialist Education School counseling Doctor of Psychology Education Counseling psychology

See Education under Fields of Instruction for full description of all degree requirements.

The M.S. and Ed.S. degree programs with their respective concentrations are accredited by the Council for Accreditation of Counseling and Related Educational Programs. In addition, the counseling psychology concentration under the college-wide Ph.D. program is accredited by the American Psychological Association, and the specialization in counselor education within the counseling psychology concentration is accredited by the Council for Accreditation of Counseling and Related Educational Programs. The Counselor Education and Counseling Psychology unit emphasizes research-based practices that address the growth and development of the whole person throughout the lifespan. In its counseling programs, the unit concentrates on maximizing development and adjustment of individuals through prevention and treatment models in schools, colleges, community agencies, businesses, and private practice settings.

The application deadline for admission to the doctoral and Ed.S. programs is February 1; and November 1 and February 1 for the master's program.

ADMISSION REQUIREMENTS

Admission requirements include up-to-date scores from the GRE, the unit admissions application form and letters of recommendation. For the doctoral program, a writing sample is also required.

GRADUATE COURSES

410 Gender Role Development: Implications for Education and Counseling (3) Theories and research on role development and gender roles and their relevance to identity and behavior in psycho-socio-cultural, educational, and counseling settings. *(Same as Women's Studies 410, F.Su)*

431 Personality and Mental Health (3) Various perspectives of mental health with application to education and other social institutions. E

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

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any academic quarter. Students using 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 Special Topics (1-3) Instructor-initiated course offered at convenience of academic unit on topics of current interest. May be repeated. Maximum 15 hrs. S/NC or letter grade. E

518 Educational Specialist Research and Thesis (3) May be repeated. P/NP only. E

520 Statistics and Research Design: Conceptual (3) Consumer-oriented, conceptual treatment of statistical, research design, and quantitative methods of testing. E

525 Formal Measurement in Education and Counseling (3) Principles of test construction and item analysis. Survey of standardized tests of intelligence, achievement, aptitude, vocational interest, attitudes and personality. Preors: 520 or equivalent. E

535 Ethical, Legal, and Professional Issues in Counseling (3) Professional practice issues in school and community counseling and related fields: education, research, standards of practice, licensure, internship, and policy. Preors: Admission to Counseling program or consent of instructor. E

550 Introduction to Personnel Preparation Programs (3) History, philosophy, professional standards, counselor role in relation to school staff and mental health professionals, and ethics of profession. E

551 Theory and Practice of Counseling (3) Philosophical bases of helping relationships: development of counselor and client self-awareness; counseling theory and techniques. F.Su

552 Career Development: Vocational Theory, Research and Practice (3) Relationship of vocational theory, career development research and societal factors to life career roles. F

553 Career and Educational Information Systems and Resources (3) Use of print and non-print materials: computer-based systems, for career and educational planning. Preors: 552 or consent of instructor and Internet access account. Sp

554 Group Dynamics and Methods (3) Theory and types of group counseling, 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. Preors: Admission to program. E

556 Seminar in Community Agency Counseling (1) Orientation to professional organizations, codes of ethics, certification requirements, and role identity of community agency counselors. May be repeated. Maximum 2 hrs. S/NC only. F.Sp

559 Internship in School Counseling (1-6) Supervised postpracticum employment at academic unit approved school site. Preors: 550 and consent of instructor. May be repeated. Maximum 12 hrs. S/NC only. E

561 Development and Operation of School Counseling Programs (3) Management of comprehensive school counseling programs to include needs assessment, program planning, setting identification, evaluations, and use of computer-based program management software. Preors: 550. Sp, Su

562 Seminar in Assessment (3) Technical and practical aspects of the assessment process, with an emphasis on the role played by the school counselor in assessment activities. E

565 Seminar in Clinical Practice (3) Clinical and practical aspects of the counseling process, with an emphasis on the role played by the school counselor in the counseling relationship. E

566 Seminar in Advanced Practice (3) Seminar designed to acquaint students with the role of counselor in the advanced practice setting. E

571 Individual Cognitive Assessment in Counseling (3) Basic concepts and applications in individual assessment of intelligence, proficiency in administrative interpretation for Wechsler, adults and children, Stanford-Binet, Preors: 525 and 520 and assignment to counseling program or consent of instructor. S/NC only. Sp, A

585 Seminar in Gerontology (1) (Same as Human Ecology 585, Exercise Science 585, Nursing 585, Public Health 585, Psychoeducational Studies 585, Social Work 585, and Sociology 585.)

593 Independent Study (1-3) May be repeated. S/NC or letter grade. E

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

602 Directed Research (1-3) Instructor- or student-initiated group investigation of empirical and theoretical problems in educational counseling psychology. May be repeated. Maximum 12 hrs. S/NC only. E

604 Special Topics (1-3) Instructor-initiated courses offered at convenience of academic unit on topics of interest. May be repeated. Maximum 15 hrs. S/NC or letter grade. E

625 Advanced Study in Personality (3) Theory, research and conceptual analysis of studies with application to education and counseling. Preors: 431 or equivalent. F

635 Ethical, Legal, and Professional Issues in Psychology (3) Same as Psychology 635 and Psychosocial Counseling Studies 935.) Sp

650 Seminar in Counseling Education (1) Professional issues related to role and function of counselor educator. Preors: Admission to doctoral program in counselor education. May be repeated. Maximum 2 hrs. S/NC only. F

657 Practicum in Counseling Education (3) Supervised practice and application of counseling skills with clients. Preors: 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 an academic or approved internship sites in counselor education. May be repeated. Maximum 12 hrs. S/NC only. E

661 Education Implications of Neuropyschology (3) Theory and assessment: Common syndromes and their behavioral and cognitive manifestations. Preors: 516; and 541 or equivalent individual assessment course, or consent of instructor. F.Sp

666 Seminar in Community Agency Counseling (1) Supervised field experience in community agency counseling settings. Preors: Admission to counseling psychology doctoral program. May be repeated. Maximum 6 hrs. F.Sp

671 Personality and Vocational Assessment (3) Use and interpretation of personality and vocational measures in
The unit derives its intellectual identity and orientation from disciplines such as anthropology, history, philosophy, psychology, and sociology, and from more specialized forms of inquiry such as ethnography, semiotics, literary theory, hermeneutics, linguistics, and feminist theory.

As a unit founded upon and devoted to interdisciplinary inquiry, Cultural Studies in Education seeks to bring its disciplines to the service of students and faculty throughout the college as aids to understanding diverse cultural contexts that shape beliefs, values, and practices. The main charge of the unit is to examine critically the social practices, institutions, "helping" agencies, and other social sites where disenfranchised and marginalized groups struggle for greater control over their futures.

**GRADUATE COURSES**

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

501 Special Project (1) 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. Prereq. Program. May be repeated. Maximum 12 hrs. S/N only. E


505 History of Olympics: Ancient and Modern (3) Examination of various aspects of ancient and modern Games. Ancient Olympics 776 BC to 393 AD: Panhellenic Games. Modern Olympics 1896 to date: political, social class, gender, and economic issues that influence Games. F, Su


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

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

526 Philosophy of Education (3) Truth, knowledge, and valuation in relation to work of schools. F, Su

530 Psychology of Sport (3) Social psychological factors influencing human behavior in sport contexts: discussion of contemporary theory, research, and methodology. Prereq: General psychology course or consent of instructor.

534 Motor Behavior and Skill Acquisition (3) Topical and advanced aspects of human movement behavior to acquisition and performance of skills; discussion of current research and methodology.

539 Development of Education Thought (3) Historical and philosophical approaches to writing and living of influential educators. Plato, Quintilian, Comenius, Rousseau, Pestalozzi, Froebel, Dewey. Prereq: Graduate status and consent of instructor. F, SS

540 Foundations of Educational Policy (3) Relationship between theory, policy, and practice; educational policies that arise from philosophical and practical considerations in educational enterprise. F, SS

541 Special Topics (1-3) Advanced study in selected disciplinary or professional areas of physical education and/or sport. May be repeated.

542 Sociological Aspects of Sport (3) Social and cultural factors influencing sport and physical education. Premise: Issues and research applications. Prereq: Consent of instructor. (Same as Sociology 542.)

545 Educational Sociology (3) Sociological analysis of American education system. Controversial social issues that affect educational system and potential solutions offered by various programs. Open to juniors, seniors, and graduate students. F

548 Topics in Sociology of Education (3) May be repeated. E

549 Topics in Philosophy of Education (3) May be repeated. E

590 Cultural Studies Seminar (1) Two semester sequence (Fall and Spring). Research discussion about cultural studies: presentations, videos, and readings. Prereq: Admission to doctoral program with concentration in cultural studies in education. May be repeated. Maximum 4 hrs. S/N only. E

591 Issues in Cultural Studies (3) Discourse, schools, and selected principal contemporary issues in field. Prereq: Admission to doctoral program with concentration in cultural studies in education. F

592 Justice, Schools, and Sports (3) Social justice issues: education and sport practices. Social justice, moral commitments to others in educational and sport settings, and equal opportunity to access public goods and benefits. Prereq: Admission to doctoral program with concentration in cultural studies in education. F

593 Independent Study (1-3) May be repeated. S/N or letter grade. E

594 Supervised Readings (1-3) May be repeated. S/N or letter grade. E

596 Special Topics (1-3) Advanced study in selected aspects of cultural studies. May be repeated. Maximum 9 hrs. S/N or letter grade. E

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

604 Seminar in Curriculum and Instruction (1) Required 2 consecutive semesters. S/N only. E

607 Advanced Seminar in the Social Foundations of Education (3) Interdisciplinary team-taught seminar. Readings selected by faculty and participants from classic studies and current periodical literature in anthropology, sociology, history, and philosophy of education. Part of generality courses for Ph.D. program. Prereq: Doctoral student in Education.

608 Seminar in Philosophy of Education (3) Selected philosophical issues in education. Prereq: 2 courses in history or philosophy of education. May be repeated with consent of instructor. E

625 Seminar in History of Education (3) Selected historical issues in education and philosophy of education. May be repeated with consent of instructor. Sp

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

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

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

660 Ethnographic Research Methods in Education (3) Design, implementation and evaluation of ethnographic research in education. Critical reading and evaluation of...

681 Practicum (1-3) Intern experience in areas of major interest. May be repeated.

683 Independent Study (1-3) May be repeated. S/NC or letter grade. E.

694 Supervised Reading (1-3) May be repeated. S/NC or letter grade. E.

695 Special Topics (1-3) Study for doctoral students in selected aspects of cultural studies. May be repeated. Maximum 9 hrs. S/NC or letter grade.

Ecology and Evolutionary Biology

(College of Arts and Sciences)

MAJOR DEGREES

Ecology and Evolutionary Biology M.S., Ph.D.

A.C. Echternacht, Head
W.O. Smith, Associate Head

Professors:

Bunting, D. L., Ph.D. Oklahoma State
Burgardt, P. M., Ph.D. Chicago
Belknap, P. A., Ph.D. Minnesota
Chertoff, A. C., Ph.D. Kansas
Delcourt, H., Ph.D. Minnesota
Greenberg, N. B., Ph.D. Rutgers
Gross, L. J., Ph.D. Cornell
Hallam, T. G., Ph.D. Missouri
Harris, W. F., Ph.D. Tennessee
McCormick, J. F., Ph.D. Emory
McCranken, G. F., Ph.D. Cornell
Pan, M. L., Ph.D. Pennsylvania Pirrill, S. H., Ph.D. New Mexico State
Reichert, S. E., Ph.D. Wisconsin
Sayler, G. S., Ph.D. Idaho
Schultz, T. W., Ph.D. Tennessee
Simberloff, D. (Gore Hunger Chair of Excellence), Ph.D. Harvard
Smith, W. O. Ph.D. Duke
Stacey, G., Ph.D. Texas
Vaughan, G. L. (Emeritus), Ph.D. Duke

Associate Professors:

Amundsen, C. C., Ph.D. Colorado
Boake, C. R. B., Ph.D. Cornell
Belknap, H., Ph.D. Minnesota
Drake, J. A., Ph.D. Purdue
Fox, D. J., Ph.D. Johns Hopkins
Gittleman, J. L., Ph.D. Sussex (UK)
Kot, M., Ph.D. Arizona
Pigliucci, M., Ph.D. Connecticut

Assistant Professors:

Cruzian, M. B. C., Ph.D. SUNY (Stony Brook)
Gavillet, S., Ph.D. Moscow State

Research Associate Professor:

Grebe, M. J., Ph.D. Alaska

Shared faculty are drawn from other University departments, the Oak Ridge National Laboratory, the National Biological Service, and the Tennessee Valley Authority.

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

REQUIREMENTS FOR ADMISSION

Applications are accepted once a year. The deadline for receipt of all application materials is 15 January for those applicants wishing to enroll in the following Fall or Spring semesters. Applications completed as of that date, or received after that date, will not be considered. Applicants are expected to have a comprehensive background consistent with a Bachelor's degree in one of the life sciences. They are expected to make sure a minimum of one year of general biology, two years of general chemistry, one year of physics, and one year of college-level calculus. Occasionally, applicants who are highly qualified otherwise but lack one of these courses or course sequences will be admitted with the expectation that they will make up the first year of graduate study. Applicants are required to submit scores from the general Graduate Record Examination (GRE) and successful applicants will usually have a composite score on the verbal, mathematical and analytical sections of the GRE of at least 1550. Submission of scores on appropriate (e.g., biology, mathematics) advanced GRE examinations are recommended but required. Applicants are also expected to have an overall grade-point average of at least 3.0, and 2.7 or above for all science and mathematics courses, on a 4.0 scale (successful applicants will usually have grade-point averages well above these minima).

Application must be made to both the Graduate School and the department. The departmental application requires 3 letters of reference from persons capable of assessing the candidate's suitability for graduate work in biology and a statement of professional goals and reasons for applying to this program. Applicants for the doctoral degree are expected to have made prior contact with potential research advisors in the department's graduate program and this approach is recommended for applicants for the Master's degree program as well. Inquiries should be directed to the Chair, Graduate Affairs Committee, Department of Ecology and Evolutionary Biology, The University of Tennessee, Knoxville, TN 37996-1610.

THE MASTER'S PROGRAMS

In addition to general requirements of the Graduate School, aspirants for the Master of Science degree are expected to: (1) during the first semester in residence, take a prescriptive diagnostic examination covering major concepts in ecology and evolutionary biology. The examination may be taken twice and must be passed before the student is admitted to candidacy; (2) complete course requirements as determined by the department and the student's faculty thesis research committee; and (3) satisfactorily complete and defend a research thesis.

THE DOCTORAL PROGRAMS

In addition to general requirements of The Graduate School, aspirants for the Doctor of Philosophy degree are expected to: (1) during the first semester in residence, take a prescriptive diagnostic examination covering major concepts in ecology and evolutionary biology. The examination may be taken twice and must be passed before the student is admitted to candidacy; (2) complete course requirements as determined by the department and the student's faculty dissertation research committee; (3) pass a written and oral comprehensive examination designed to test for adequate knowledge in those areas essential to the student's research program; and (4) satisfactorily complete and defend a dissertation. The department does not require a reading knowledge of a foreign language, but this may be imposed by the student's faculty dissertation research committee. If so, the student has the option of demonstrating reading knowledge of the prescribed language by either (a) passing the official reading examination given by the language department or (b) earning a grade of at least a B in the second semester of a special language reading course for graduate students.

MINOR IN ENVIRONMENTAL POLICY

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

GRADUATE COURSES

403 Plant Evolution (3) (Same as Botany 403.)

411-412 Minicourse in Ecology and Evolutionary Biology (3) Selected advanced topics in ecology, behavior, and evolutionary biology, concentrated in time and subject matter. Consult departmental listing for topics offered. Prereq. As announced. May be repeated. Maximum 4 hrs may apply toward departmental major.

431 Plant Ecology (4) (Same as Botany 431.)

445 Introduction to Oceanography (4) Basic oceanography: physical, chemical, geological, and biological processes and patterns. Oceanic subdivisions: upwellings, polar oceans, hydrothermal vents, gyres, coral reefs, estuaries, and coastal regions. Field trip to coastal required. Prereq. General Biology and General Chemistry; General Ecology recommended.

450 Comparative Animal Behavior (3) Principles and methods of ethology: ecological, developmental, physiological and evolutionary aspects. (Same as Psychology 450.)

459 Comparative Animal Behavior Laboratory (3) Introduction to observational and experimental research in ethology. Coreq. 450. (Same as Psychology 459.)


461 Special Topics in Organismal Biology (3) Evolution, ecology, biogeography, classification, and anatomy of selected animal and plant taxa. Prereq. General Ecology or consent of instructor.

470 Aquatic Ecology (4) Introduction to the physical-chemical nature of aquatic environments with emphasis on biotic communities and their interrelationships. Prereq. General Chemistry and General Ecology. 4 hrs and 1 lab.

484 Conservation Biology (3) Application of principles and techniques of ecological research to conservation of biological diversity at genetic, population, community, and ecosystem levels. Prereq: General Genetics and General Ecology.

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

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

503 Ecology and Evolutionary Biology Seminar (1) Advanced topics in ecology, behavior, and evolutionary biology. Senior departmental majors only. Required of all first- and second-year graduate students. May be repeated. Maximum 4 hrs. S/NC only.

504 Special Topics (1-3) Selected directed readings or special course in topics of current interest. Consul department listing for offerings. May be repeated with consent of instructor. Maximum 9 hrs. S/NC only.

505 Basic Concepts in Organic Evolution (3) Processes and patterns in organic evolution. Prereq: Admission to program in Ecology and Evolutionary Biology. Required of all first-year students. F

507 Basic Concepts in Ecology (3) Contemporary issues in ecology. Prereq: Admission to program in Ecology and Evolutionary Biology. Required of all first-year students. F

508 Introduction to Faculty Research (1) Orientation of new graduate students to current research of departmental graduate faculty. Prereq: Admission to program in Ecology and Evolutionary Biology. Required of all first-year students. S/NC only.

509 Foundations: Readings in Ecology (1-2) Readings and discussion of classic papers in field.

511 Foundations: Readings in Evolution (1-2) Readings and discussion of classic papers in field.

513 Foundations: Readings in Behavior (1-2) Readings and discussion of classic papers in field.

515 Foundations: Readings in Environmental Toxicology (1-2) Readings and discussion of classic papers in field.

516 Colloquium in Ethology (1) (Same as Psychology 516+)

520 Ecology for Planners and Engineers (3) Ecological principles and effects that human-caused changes have on living organisms. Lectures and field trips. Appropriate for students in Planning and Environmental Engineering. Not intended for graduate students in Ecology and Evolutionary Biology.

524 Physiological Ecology of Animals (3) Adaptive physiological response of animals to natural changes in or extremes of physical and biotic environment. Terrestrial vertebrates. Prereq: Undergraduate courses in animal physiology and ecology, Biochemistry and Cellular and Molecular Biology 410, Organic Chemistry or equivalent. (Same as Biochemistry and Molecular Biology 524+.)

575 Ecological Genetics (3) Genetics of natural populations, using both single-locus and quantitative genetic approaches. Prereq: 573 and statistics course.

577 Landscape Ecology (3) Ecological structure, function, and change through time of landscape mosaic: quantitative measures of landscape heterogeneity; responses of organisms to changes in landscape heterogeneity. Prereq: General Ecology or equivalent or consent of instructor.

581-582 Mathematical Ecology (3,3) (Same as Mathematics 581-582+.)

533 Zoogeography (3) Processes determining geographic distribution of organisms and distribution and composition of animal communities. Prereq. Ecology course or consent of instructor.

585 Mathematical Evolutionary Theory (3) (Same as Mathematics 585+.)

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

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

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

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

601 Advanced Topics (1-3) Reading and discussion of recent advances. Consult the department listing for offerings. May be repeated with consent of department. Maximum 9 hrs.

602 Current Topics in Environmental Toxicology (1) Critical review of environmental research and methods in environmental toxicology. Behavioral, neurotoxicology, chemical and ecological effects, biostatistics and epidemiology. Prereq: Biochemistry and Cellular and Molecular Biology 410, Organic Chemistry or equivalent. May be repeated with consent of department. Maximum 4 hrs. (Same as Biochemistry and Cellular and Molecular Biology 602.) S/NC only. E

607 Seminar in Ecology and Evolutionary Biology (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs.

635 Environmental Assessment and Sustainable Development in Third World Countries (3) Concepts and methods of environmental impact assessment and risk assessment. Sustainable development concepts and issues in developing countries. Prereq. General ecology or equivalent. (Same as Botany 635 and Planning 635.)

681-682 Advanced Mathematical Ecology (3,3) (Same as Mathematics 681-682.)

### Economics

(Featured in the College of Business Administration)

#### DEGREES

**Economics** ........................................... M.A., Ph.D.
**Business Administration** ................................ MBA

Matthew N. Murray, Head

Professors: Bohn, Robert A., Ph.D. Washington (St. Louis)
Bowby, Roger L. (Emeritus), Ph.D., .... Texas
Carroll, Sidney L., Ph.D. .... Stanford
Chang, Hui S., Ph.D. .... Vanderbilt
Clark, Don P., Ph.D. .... Michigan State
Cole, William E. (Emeritus), Ph.D. .... Texas
Davidson, Paul J. (Fred Holly Chair of Excellence), Ph.D. .... Pennsylvania
Dworkin, T. W., Ph.D. .... Ohio State
Garrison, Charles F., Ph.D. .... Kentucky
Herzog, Henry W., Ph.D. .... Maryland
Jensen, Hans E. (Emeritus), Ph.D. .... Michigan
Lee, Feng-Yao, Ph.D. .... Michigan State
Moore, John R. (Distinguished Prof.) (Emeritus), Ph.D. .... Texas

**Associate Professors:**
Farmer, Amy L. (Liaison), Ph.D. .... Duke
Gauger, Jean A., Ph.D. .... Iowa State
Glustov, Errol, Ph.D. .... Stanford
Kahn, James R., Ph.D. .... Maryland
Murray, M. N., Ph.D. .... Syracuse

**Assistant Professors:**
Bruce, Donald, Ph.D. .... Syracuse
Santore, Rudy, Ph.D. .... Ohio State
Stangel, Victor O., Ph.D. .... California (Davis)
Stanley, Denise L., Ph.D. .... Wisconsin
Stewart, Steven W., Ph.D. .... New Mexico

The Department of Economics offers graduate programs leading to the M.A. and Ph.D. The M.A. may be completed by either a thesis or non-thesis option, while the Ph.D. requires successful completion of a dissertation. Applicants to these programs should contact the Director of Graduate Studies, Department of Economics, for further information. The Department also offers an area of concentration for the MBA degree. Students interested in the MBA program should contact the Director of Graduate Business Programs, College of Business Administration.

### ACADEMIC STANDARDS

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

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

THE MASTER'S PROGRAM

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

The non-thesis option requires 30 hours of coursework at the 400 level or above. Of these, at least 15 hours must be in a single field of economics. The remaining 15 hours must be in one field of economics and must include 511, 512, 513, and 514. A maximum of 6 hours may be in an area other than economics.

The thesis option requires 36 hours of coursework at the 400 level or above, including at least 24 hours at the 500 level or above, and 9 hours of coursework at the 600 level or above.

Students electing the non-thesis option are required to pass a final comprehensive examination.

The thesis option requires 30 hours of coursework at the 400 level or above, including at least 24 hours at the 500 level or above, and 6 hours of coursework at the 600 level or above.

MINOR IN ENVIRONMENTAL POLICY

The program is designed to give master's and doctoral level graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. The program is coordinated by a committee of representatives from the following participating departments and programs:

- Agricultural Economics and Rural Sociology
- Botany
- Civil and Environmental Engineering
- Ecology and Evolutionary Biology
- Economics
- Forestry
- Wildlife and Fisheries
- Geography
- Management
- Political Science
- Sociology

Students may request admission to the minor following admission to a graduate program in one or more participating departments. Students in good standing in one of these programs may apply for admission to the minor in environmental policy. The coordinating committee will consider the admission of interested students.

Admission to the Ph.D. program is based on promise of outstanding scholarship, as demonstrated by previous academic performance, by scores achieved on the general portion of the GRE, and by recommendations. The program requires a minimum of 48 hours of coursework beyond the bachelor's degree or 24 hours beyond the master's degree, at least 24 hours of 500 Doctoral Research and Dissertation, and successful completion of the following:

1. Students are required to complete the following core requirements:
   a. Economic Theory: Microeconomic theory and macroeconomic theory by a qualifying exam taken not later than the beginning of the fourth semester of study.
   b. History of Economics: Completion of 515 or 615 with a grade of B or better, or by qualifying examination.
   c. Quantitative Methods: Completion of 581, 582, and 583 with grades of B or better, or by qualifying examination.

Students failing a qualifying examination must reattempt the examination the next time offered. A qualifying examination may be taken a third time only with approval of the department. Failing a qualifying examination for a third time will result in dismissal from the doctoral program.

2. Students are required to demonstrate competence by comprehensive examination in at least two fields of specialization in economics. Students failing a comprehensive examination must retake the examination the next time offered. A comprehensive examination in a specific field may be taken a third time only with approval of the department.

3. Students are required to complete with a grade of B or better two elective courses in economics at the 500 level or above, outside the core subject areas and outside the fields of specialization.

4. Students are required to complete a doctoral dissertation and to defend it successfully before the faculty.

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.

ACADEMIC COMMON MARKET

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

GRADUATE COURSES

400 Special Topics (3) Topics vary. Prereq: Determined by department. May be repeated.

413 Macroeconomic Fluctuations (3) Analysis of historical data, methods of analyzing macro-economic fluctuations, theoretical explanations of cycles, and role of monetary and fiscal policies in aggregate economy. Major writing requirement. Prereq: Intermediate Macroeconomics or consent of instructor.

415 History of Economics (3) Same as History 415.

424 Political Economy of World Development (3) Topics vary. Latin America, Asia, Soviet Union, 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. Minimum 9 hrs.


462 Economics of Resources and Environmental Policy (3) Economic analysis of environmental policy and allocation of resources. Benefits and costs of development of natural resources and impacts of growth on environment. Major writing requirement. Prereq: 201.

471 Public Finance: Optimal Government Functions and Expenditure Analysis (3) Problems of collective consumption, external effects, public investment, social decision making. Major writing requirement. Prereq: 201.

472 Public Finance: Taxation and Intergovernmental Relations (3) Analysis of individual taxes and of tax systems, non-tax sources of revenue, fiscal federalism. Major writing requirement. Prereq: 201.

482 Introduction to Mathematical Economics (3) Application of basic mathematical tools: calculus, matrix algebra, etc., to major topics of economic theory. Prereq: Intermediate Microeconomics with B or better and Calculus.

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

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

511-12 Microeconomic Theory (3,3) Theory of consumer choice and demand, theory of revealed preference, attributes of goods and implicit prices, market demand, labor supply, individual behavior, uncertainty, theory of firm, theory of production and cost, market structures, derived demand and factor pricing, introduction to welfare economics; market failure and theory of second best, pure exchange.

513-14 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, 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.

537 Managing in a Regulated Economy (3) Economic effects of antitrust and public utility, international and environmental regulation on business. Development of decision-making skills in areas of governmental-business relations.

577 Environmental Economics and Policy Management (3) Interdisciplinary perspective on goals of sustainable economic development and environmental quality. Development of decision-making tools and conflict resolution.
579 Environmental Policy Research Workshop (1) Multidisciplinary analysis of advanced topics in environmental policy. Students prepare and present a major writing requirement. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.


583 Econometric Techniques (3) Multivariate time series, panel data and limited dependent variable analysis applied to economic problems. Prereq: 582.

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

613 Advanced Macroeconomic Theory (3) Prereq: 514 or equivalent.


621 International Economics (3) Comparative advantage, trade migration, commodity composition of trade, protectionist devices, protectionist arguments, trade liberalization, U.S. trade policy, exchange rate determination, balance of payments adjustment, multinational corporations, and international capital flows. Prereq: 512 and 514.

623 Economic Development: Theories and Policies (3) Principal theories explaining economic behavior in developing countries and development 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 and developing countries of Asia and Africa. Prereq: 21 hrs of upper division undergraduate social science or consent of instructor.


642 Labor History and Legislation (3) Development of organized labor as an important economic and political force in U.S. from Colonial times to present. Evolution of legal status of labor unions and of individual workers vis-a-vis their employers.

651 Monetary Theory (3) Study of money, credit, and liquidity as related to real output determination, interest rates, employment, and prices. Prereq: 513.

652 Topics in Monetary Theory (3) Advanced monetary models, issues in monetary policy, open economy monetary theory and policy. Student participation. Prereq: 651.

661 Regional and Urban Location and Development Theory (3) Theory of regional and urban development, growth, and resource allocation. Human migration, economic bases for land-use patterns, central places, and urban form. Spatial inequalities and urban problems. National policies for regional and urban assistance.

662 Methods of Regional and Urban Analysis (3) Theory of regional urban economic structure and growth. Regional income and product accounts, shift and share analysis, economic base studies, and regional urban input-output models. Theory and problem solution.

571 Public Finance: Optimal Government Size and Expenditure Analysis (3) Theory of public goods and externalities; public choice. Expenditure incidence and determinants; benefit cost analysis.

572 Public Finance: Taxation and Intergovernmental Relations (3) Theory of taxation; tax incidence and tax efficiency; policy analysis of U.S. tax structure at federal, state, and local levels. Theory of fiscal federalism and intergovernmental relations.

677 Environmental and Natural Resource Economics (3) Alternative paradigms for allocating and valuing environmental resources. Examination of issues related to market failure and differences between renewable and nonrenewable resources.

678 Economics of Environmental Policy (3) Topics in environmental policy analysis. Consideration of alternative policy instruments, defining policy objectives and role of risk in decision-making process.

682 Econometric Methods (3) Advanced topics in econometrics. Prereq: 583 or equivalent.

690 Workshop (3) Advanced topics in economics. Student participation. Prereq: Consent of instructor. May be repeated. Maximum 3 hrs.

**Education**

(College of Education)

**MAJORS**

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<td>Leadership Studies in Education....................</td>
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The College of Education offers the Master of Science, Educational Specialist, Doctor of Education, and Doctor of Philosophy degrees in cooperation with eleven individual units: Counseling Education and Counseling Psychology (CECP), Cultural Studies in Education (CSE), Education in the Sciences, Mathematics, Research and Technology (ESMRT), Exercise Science (ES), Holistic Teaching/Learning (HTL), Inclusive Early Childhood Education (IECE), Language, Communication, and Humanities Education (LCE), Leadership in Education (LSE), Psychosocial Issues in Education (LSE), Rehabilitation, Deafness, and Human Services (RDHS), School Counseling (CECP), and Sport and Physical Activity (SPA).

The master's degree with a major in Education has two tracks. Track 1 is intended for students who are licensed to teach English, elementary education, foreign language, mathematics, natural science, social science, early childhood education, and other special education concentrations. Both options require the completion of 60 hours of coursework plus supervised practicum and internship experiences working with clients. The concentration in school counseling is fully accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP) and requires completion of 60 hours of coursework plus supervised practicum and internship experiences working with clients. A final examination is required of all students.

**Counseling**

The master's degree with a major in Counseling offers concentrations (with abbreviated unit designations) in: Mental health counseling (CECP), Rehabilitation counseling (RDHS), School counseling (CECP), and Special education: early childhood (IECE). The program includes thesis and non-thesis options. The concentration in mental health counseling is fully accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP) and requires completion of 60 hours of coursework plus supervised practicum and internship experiences working with clients. The concentration in school counseling is fully accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP) and requires 48 hours of coursework, including supervised practicum and internship experiences working with clients. A final examination is required of all students.

**Education**

The master's degree with a major in Education has two tracks. Track 1 is intended for students who are licensed to teach English, elementary education, foreign language, mathematics, natural science, social science, early childhood education, and other special education concentrations. Both options require the completion of 60 hours of coursework plus supervised practicum and internship experiences working with clients. A final examination is required of all students.

**Track 1 - Concentrations (with abbreviated unit designations) are available in:**
- Art education (LCHE)
- Curriculum, assessment, and instruction (ESMRT)
- Education of the deaf and hard of hearing (RDHS)
- Elementary education (HTL and IECE)
- English education (LCHE)
- Foreign language/ESL education (LCHE)
- Instructional technology (ESMRT)
- Mathematics education (ESMRT)
- Modified and comprehensive special education (HTL)
- Reading education (HTL)
- Science education (ESMRT)
- Social foundations (CSE)
- Special education: early childhood (IECE)

The thesis option requires the completion of 30 hours, including 6 hours of Thesis 500. The non-thesis option requires the completion of 33 hours of coursework (36 hours for special education concentrations). Both options
require a minimum of 12 hours in the major discipline (18 hours for special education concentrations).

**Track 2 - Concentrations (with abbreviated unit designations)**
- Art education (LCHE)
- Elementary teaching (HTL and IECE)
- Educational administration and supervision (LSE)
- Special education: early childhood (IECE)

The thesis option requires completion of 36 hours, plus 6 hours of Thesis 500 for a total of 42 hours. The non-thesis option requires 36 hours, including 24 hours of prescribed licensure coursework and 12 hours in the academic discipline as approved by the student's committee.

For both tracks, a comprehensive written examination is required. An oral exam is given over the thesis.

**Educational Psychology**
The master's degree with a major in Educational Psychology is offered with concentrations (with abbreviated unit designations) in:
- Adult education (PES)
- Individual & collaborative learning (PES)

Both programs include thesis and non-thesis options. The major in Educational Psychology requires 36 hours. The concentration in adult education requires a minimum of 12 hours in adult education courses. A final examination is required of all master's degree students.

**Human Performance and Sport Studies**
The master's degree with a major in Human Performance and Sport Studies offers concentrations (with abbreviated unit designations) in:
- Exercise science (exercise physiology; biomechanics/sports medicine) (ES)
- Sport studies (SPA)
- Sport management (SPA)

Applicants must submit a unit admission application and 3 letters of recommendation. Both thesis and non-thesis options are available. The non-thesis option requires 32 hours, including a project and a course in research design or an approved specialized research class. The thesis option requires the completion of 30 hours, including 6 hours of Thesis 500. Both options require a minimum of 12 hours of sport studies, exercise science, or sport management courses.

**Leadership Studies in Education**
The master's degree program with a major in Leadership Studies in Education offers a concentration in educational administration and supervision (LSE), requiring a minimum of 30 hours, including 6 hours of Thesis 500 for the thesis option, or 33 hours for the non-thesis option.

The concentration in educational administration and supervision consists of a minimum of 18 hours of coursework in Educational Administration and Supervision. A final oral examination is required for the thesis option, with a written exam at the option of the committee. A final written comprehensive examination is required for the non-thesis option, with an oral exam at the option of the committee. Students entering either of these options must complete the introductory core consisting of Educational Administration and Supervision 513, 515, 516, and 535 or a demonstrated computer proficiency. These courses are prerequisites to other courses in the unit.

**THE SPECIALIST IN EDUCATION PROGRAM**
The Educational Specialist degree program with a major in Education encompasses concentrations (with abbreviated unit designations) in:
- Curriculum, assessment, and instruction (ESMRT)
- Educational administration & supervision (LSE)
- Foreign language/ESL education (LCHE)
- Instructional technology (ESMRT)
- Mathematics education (ESMRT)
- Reading education (HTL)
- School counseling (CECP)
- School psychology (PES)
- Social science education (HTL)

The instructional and curricular concentrations require completion of a minimum of 30 hours of coursework beyond the master's degree, including 8 hours in core courses, 18 hours in specialized courses, and 6 hours to be determined by the student's committee. The educational administration and supervision concentration requires the completion of a minimum of 60 hours beyond the baccalaureate, including a 6-hour cognate within or external to the college, and a highly recommended internship. Both thesis and non-thesis options are available. The school counseling concentration requires a minimum of 22 hours beyond the master's degree but not fewer than 60 hours beyond the baccalaureate, including practicum and internship experiences. The school psychology concentration requires the completion of a minimum of 66 semester hours beyond the baccalaureate. Refer to Degree Requirements under The Graduate School for complete program requirements.

**THE DOCTOR OF EDUCATION PROGRAM**
The Ed.D. program with a major in Education is available in the following concentrations (with abbreviated unit designations):
- Curriculum, assessment, and instruction (ESMRT)
- Educational psychology: collaborative learning (PES)
- Elementary education (HTL)
- English/foreign language/ESL education (LCHE)
- Instructional technology (ESMRT)
- Leadership for teaching and learning (LSE)
- Mathematics education (ESMRT)
- Reading education (HTL)
- Science education (ESMRT)
- Social science education (HTL)

In addition to the requirements of The Graduate School, the hour requirements in the curricular and instructional concentration areas are determined by the student's doctoral committee. A comprehensive examination and an oral examination on the dissertation are required.

The concentration in educational psychology: collaborative learning requires the completion of a minimum of 90 hours beyond the baccalaureate degree and incorporates a cohort model through which students participate in core courses as a group. This program offers an alternative residency which includes a two-year, on-campus, continuous enrollment in six to nine hours per semester including summers. During this time period, students are enrolled in a doctoral seminar (630) for four of the six semesters and participate with faculty on research teams for 12 of the required hours. Contact the program coordinator for additional information and program requirements.

The requirements for the concentrations in educational administration and supervision and higher education are determined on an individual basis by each student's doctoral committee. Course requirements include a 6-9 hour cognate within the college and a 6-9 hour minimum external to the college. Additional course requirements include completion of two consecutive semesters of Educational Administration and Supervision 604 during residence. Though an internship is highly recommended, it is not required. A foreign language requirement is at the discretion of the committee. A written comprehensive examination, as well as an oral examination on the dissertation, is required. An alternative residency, which includes a two-year, on-campus, continuous enrollment in LSE 606, Leadership Forum, is available for qualified students.

**THE DOCTOR OF PHILOSOPHY PROGRAM**
The intercollegiate Ph.D. program with a major in Education provides fourteen concentrations. The units participating in the Ph.D. program are Counselor Education and Counseling Psychology; Cultural Studies in Education; Education in the Sciences; Educational Psychology: collaborative learning; Educational Administration and Supervision; English Education (LCHE); Foreign Language/ESL Education (LCHE); Mathematics, Research, and Technology; Exercise Science; Holistic Teaching/Learning; Inclusive Early Childhood Education; Language, Communication, and Humanities Education; Leadership Studies in Education; Psychoeducational Studies; and Rehabilitation, Deafness, and Human Services.

The program requirements are:

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<tr>
<th>Requirements</th>
<th>Minimum Hours</th>
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<tbody>
<tr>
<td>Research Area</td>
<td>15</td>
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<tr>
<td>Foreign or Computer Language (demonstrate proficiency)</td>
<td>6</td>
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<tr>
<td>General Core Requirements</td>
<td></td>
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<tr>
<td>Option A</td>
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<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/Leadership Theory</td>
<td>2</td>
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<tr>
<td>Trans-college seminar; two consecutive semesters</td>
<td>2</td>
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<tr>
<td>Option B</td>
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<tr>
<td>Philosophy of education</td>
<td>3</td>
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<tr>
<td>History of education</td>
<td>3</td>
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<tr>
<td>Administrative theory</td>
<td>3</td>
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<td>Learning theory</td>
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Option C

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Graduate credit which may be applied to a 36-semester hour Track 2 master's degree with a major in Education.

To earn initial teacher licensure, students must complete undergraduate prerequisite courses, gain admission to The Graduate School as a degree seeking student, and following 24 hours of coursework:

**Fall Semester**
- 575 Internship (4 hrs)
- 574 Analysis of Teaching for Professional Development (2 hrs)

**Spring Semester**
- 575 Internship (8 hrs)
- 591 Clinical Studies (4 hrs)

**TOTAL** 24 hrs

Further details concerning the teacher licensure program and the Track 2 master's degree program are available through the College of Education Advising Center (Claxton Addition, Room 214).

**MINOR IN GERONTOLOGY**

Graduate students in the units of Counselor Education and Counseling Psychology, Exercise Science, or Psychocultural Studies, 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.S. program in Counseling is available to residents of Kentucky. The M.S. program in Education is available to residents of the state of Kentucky and concentration in education of the deaf and hard of hearing (early childhood special education), Louisiana (concentration in foreign language/ESL education-Track 1 only), or Maryland, South Carolina, Virginia, or West Virginia (concentration in education of the deaf and hard of hearing). The M.S. program in Human Performance and Sport Studies is available to residents of Arkansas or Maryland; and Alabama, South Carolina, or Virginia (concentration in sport management only). The Ed.D. program in Education (concentration in educational psychology only) is available to residents of Kentucky. The Ph.D. program in Education is available to residents of the state of Arkansas (concentration in counseling psychology, educational administration and supervision higher education, educational psychology, or school psychology). Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

**GRADUATE COURSES**

**510 Advanced Educational and Clinical Procedures (3-6)** Integration of advanced educational and clinical procedures; skills and knowledge for implementing instruction and for consulting with other persons in treatment of exceptional individuals. May be repeated. Maximum 6 hrs.

**571 Seminar (1-3)** Curricular, instructional technology, elementary education, secondary education, social
Education in the Sciences, Mathematics, Research, and Technology

(College of Education)

MAJOR

DEGREES

Education

M.S., Ed.S., Ed.D., Ph.D.

M. Everett Myer, Leader

Professors:

Clark, Charles E., Ph.D. .......... Louisiana State
Dessart, Donald J., Ph.D. ............ Maryland
Doak, E. Dale, Ed.D. ................ Colorado
French, Russell, Ph.D. .............. Ohio State
Hipple, Theodore W., Ph.D. ......... Illinois
McIntyre, Lonnie E., Ed.D. ......... Indiana
Myer, M. E. (Liaison), Ph.D. ......... Florida
Ray, John R., Ed.D. ................. Tennessee
Roese, C. E., Ph.D. .................. Ohio State

Associate Professors:

Connelly, Mary Jane, Ed.D. ........ VPJ
Grant, A. D., Ph.D. .................. Wisconsin
Mear, C. T., Ph.D. ................. Ohio State

The Education in the Sciences, Mathematics, Research, and Technology unit participates in undergraduate programs leading to degrees, majors, and concentrations in Master of Science Education

Track 1-curriculum, assessment, and instruction
Track 1-instructional technology
Track 2-science education
Track 2-secondary teaching

Educational Specialist

Education
Curriculum, assessment, and instruction
Instructional technology
Mathematics education
Science education

Doctor of Education

Education
Curriculum, assessment, and instruction
Instructional technology
Mathematics education
Science education

Doctor of Philosophy

Education
Instructional technology/curriculum Mathematics/science/social science education
Research/assessment/evaluation

See Education under Fields of instruction for full description of all degree requirements.

The unit is composed of four areas: science and mathematics education, educational research and statistics, instructional media and technology, and curriculum studies. The mission of all areas focuses on the preparation of teachers and instructors in curriculum and integrative mathematics and sciences and in the preparation of various other professionals who desire to utilize educational research and instructional technology.

GRADUATE COURSES

475 Utilization of Instructional Media (3) Basic concepts of communication and instructional development for improving instruction through use of media. (Same as Information Sciences 475.) E

485 Teaching Mathematics, Grades 7-12 (3) Preparation of teaching plans, evaluation, materials for teaching mathematics, teacher simulation and directed observation in schools. Prereq: Admission to Teacher Education Program. F

496 Teaching Science Grades 7-12 (3) Methods, materials, recent trends in science and environmental education programs for secondary schools. Prereq: Admission to teacher education. F

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

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when a 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 Lasc of Thesis (2-3) May be repeated. Maximum 8 hrs. S/NC only. E

518 Educational Specialist Research and Thesis (3) May be repeated. P/NP only. E

520 Techniques of Research in Education (3) Study and application. F

521 Computer Applications in Classroom (3) Computer applications and peripheries in and classroom. Appropriate for all grades and subjects as well as non-school instructional situations. Prereq: Microcomputer and Instructional Design, Applications of Instruction Technology in Elementary and Middle School Teaching, or Introduction to Instructional Computing. E

522 Programs and Materials in Elementary School Mathematics (3) Examination, development, and use of materials for creating an active learning environment for learning mathematics in elementary and middle schools. Prereq: 520, 543, or equivalent. Su

530 Teaching Mathematics to Young Children: K-4 (3) Unit planning, daily planning, grouping and other strategies of teaching mathematics. For those with little preparation in teaching elementary school mathematics. F

531 Teaching Science in Elementary and Middle Schools (3) Recent trends in methods, materials and content in teaching elementary school science. Prereq: Course in teaching elementary school science or consent of instructor. Su

535 Program Evaluation in Education (3) Issues and practices in planning and conducting program and curriculum evaluation in variety of settings. Fundamentals of design, measurement, philosophy, ethics, and underlying values; proper role and use of evaluation in educational organizations. Prereq: Consent of Instructor. (Same as Education Sciences 534.) 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

543 Teaching Mathematics in Middle School: 5-8 (3) Unit planning, daily planning, grouping and other strategies of teaching mathematics. For those with little preparation in teaching middle school mathematics. Sp

577 The Junior High and Middle School Curriculum (3) Curriculum and instructional design for junior high and middle schools. Characteristics of students, curriculum designs, instructional patterns, and organization and structure of junior high and middle schools. Su

580 Curriculum Planning and Development (3) Foundations and principles of curriculum planning and development. Historical analysis of curriculum theory, principles of planning and development, and classroom applications for improved learning. F

580 Student Assessment (3) Processes for assessing and reporting student progress, interpretation and use of available assessment data, methods of assessment other than tests and measurements, portfolios, performance tasks, exhibitions. F

581 Educational Statistics (3) Applications of descriptive and inferential statistics to educational and instructional research. Use of computer statistics in educational research. Prereq: One year of college mathematics, an elementary course in statistics, or consent of instructor. E

585 Instructional Trends and Issues in Science Education (3) Analysis of current trends in science instruction, instructional issues facing elementary, secondary, and college science educators, and application of learning theory to teaching biological, physical, and environmental sciences. Prereq: 496, Holistic Teaching/Learning 422, or equivalent. Su

586 Administering Instructional Media Programs (3) Leadership roles and responsibilities of professional media administrator in variety of organizational settings.

589 Advanced Production of Audiovisual Software (3) Basic instruction in design and development of audiovisual software, and introduction to computer technology.

592 The Junior High and Middle School Curriculum (3) Curriculum and instruction in junior high and middle school. Characteristics of students, curriculum designs, instructional patterns, and organization and structure of junior high and middle schools. Prereq: Course in teaching middle school science or consent of instructor. Su

593 Special Topics (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 Independent Study (1-3) May be repeated. S/NC or letter grade. E

596 Curricular Trends and Issues in Science Education (3) Analysis of elementary and secondary curriculum projects for biological, physical, and environmental sciences. Impact of current learning theories on future curriculum development projects. Prereq: Holistic Teaching/Learning 422, or equivalent. Prereq or coreq: 555 or consent of instructor. Su
Electrical and Computer Engineering
(College of Engineering)

MAJOR DEGREES

Electrical Engineering ......................... M.S., Ph.D.

T. V. Blalock, Acting Head

Professors:
Abdi, Mongi A., Ph.D. .................. Tennessee
Alexeff, Igor (Emeritus), PE, Ph.D. ........ Wisconsin
Bailey, J. Milton (Emeritus), Ph.D. .................. Georgia Tech
Birdwell, J. Douglas, Ph.D. .................. MIT
Bishop, Asa O., Jr., Ph.D. .................. Clemson
Blalock, T. Vaughn (Emeritus), Ph.D. ......... Tennessee
Bodenheimer, Robert E. (Emeritus), Ph.D. .......

Bose, Bimal K. (Condra Chair of Excellence), Ph.D. .................. Northwestern
Boudin, Donald W., PE, Ph.D. .................. Vanderbilt
Gonzalez, R. C. (Emeritus), Ph.D. ............ Florida
Googe, Joseph M. (Emeritus), PE, Ph.D. ..........

Green, Walter L. Ph.D. .................. Texas A & M
Hung, James C. (Emeritus), PE, Ph.D. ............ New York
Karim, Mohammad A. (Liaisen), Ph.D. ........ Alabama
Kennedy, Eldredge J., Ph.D. ............. Tennessee
Lawer, J. S., Ph.D. ..................... Michigan State
Neft, Herbert P. (Emeritus), Ph.D. ............ Detroit
 Pace, Marshall O., PE, Ph.D. .................. Florida
Rochelle, Robert W. (Emeritus), Ph.D. ............. Maryland
Roth, J. Reece, Ph.D. ..................... Cornell
Symonds, Frederick W. (Emeritus), Ph.D. ......... Nottingham
Tillman, James D. (Emeritus), Ph.D. .......... Auburn

Associate Professors:
Bomar, Bruce W. (UTS), Ph.D. ............. Tennessee
Crilly, Paul B., Ph.D. .................... New Mexico State
Joseph, Roy D. (UTS), Ph.D. ............... Case Western
Koch, Daniel, Ph.D. ....................... Missouri (Rolla)
Newport, Danny, Ph.D. .................. Tennessee
Rochelle, James M., Ph.D. .................... Tennessee
Walker, Alvernon, Ph.D. .................. NC State
Walter, J. Wayne, Ph.D. .................. Tennessee

Assistant Professors:
Montoya, Tom P., Ph.D. ..................... Georgia Tech
Smith, L. Montgomery (UTS), Ph.D. ........
Smith, Philip W. ....................... Tennessee
Whitaker, Ross T., Ph.D. .................. North Carolina

The Department of Electrical and Computer Engineering offers graduate degrees leading to the Master of Science with a major in Electrical Engineering. Graduate students are able to conduct research in a wide variety of electrical engineering areas including communication, computer engineering, computer vision and robotics, electromagnetics, electro-optics, image processing, information processing, intelligent control, microelectronics, mixed-signal VLSI, monolithic sensors, industrial plasma engineering, power electronics and systems, sensor fusion, and signal processing. The department maintains a strong joint program in mixed-signal VLSI and monolithic sensors with the Oak Ridge National Laboratory, Instrumentation Division. This program provides students with unique opportunities to receive career-related training at ORNL while satisfying thesis or dissertation requirements of the graduate program. The Department of Electrical and Computer Engineering and the Department of Nuclear Engineering jointly offer a master's degree program in the field of fusion energy. Students may have the opportunity to do their master's thesis either at the Fusion Energy Division of ORNL or at the Plasma Science Laboratory, affiliated with the Electrical and Computer Engineering Department. Departmental graduate programs are also available at the Space Institute, Tullahoma. Some of the electrical engineering courses are offered in the evening. Engineers working in industry are encouraged to participate in the Department's graduate program. Further information about these various programs is available from the department.

The Departmental Graduate Committee is responsible for administering, promoting, and advancing the general well-being of the graduate program. Departmental actions regarding a graduate student may be appealed in writing, first to the departmental graduate committee then to the department faculty.

THE MASTER'S PROGRAM

Graduate work leading to the Master of Science with a major in Electrical Engineering may be completed during one academic year of full-time study, or two to three years of part-time study.

Admission Requirements

Applicants for admission to the M.S. degree program are expected to have completed a bachelor's degree in Electrical Engineering with an average of at least 3.0 out of 4.0 both overall and in the senior year. All applicants whose native language is not English, including those who have earned degrees at U.S. institutions, must score at least 550 on the TOEFL exam to be considered for admission to the program.

Students who hold the bachelor's degree in a field other than electrical engineering are also expected to have a minimum cumulative grade-point average of 3.0 and a minimum senior year average of 3.0 in that field. The department will require that selected undergraduate courses be taken to make the background of these students comparable to that of students who hold a bachelor's degree in Electrical Engineering. These undergraduate courses may include electrical engineering courses from the sophomore and junior years and one senior electrical engineering sequence of the student's choice. The specific set of undergraduate courses required will be chosen in view of the applicant's prior education and experience. The student will be admitted under non-degree status until the required undergraduate courses are successfully completed with a 3.0 average.

Master's Degree Requirements

Students may choose between a thesis option and a project (non-thesis) option M.S. program. All students must file a Master's Program Plan with the departmental graduate committee specifying which option they have selected. A semester-by-semester schedule of the courses they intend to take must be filed by the members of the student's master's committee. Students may change between the thesis and project options, one time, by filing an amended Master's Program Plan.

Thesis Option: Specific requirements of the thesis option are a minimum of 30 semester hours including:
1. Electrical Engineering 503 and 504.
2. Six semester hours of mathematics at the 400 level or above selected from a list approved by the graduate committee, or 6 semester hours of EE courses at the 500 level or above, or 6 semester hours of non-EE courses approved by the student's master's committee and the graduate committee.

3. An additional 12 semester hours of 500-level work in electrical engineering including 6 semester hours in the student's major area of electrical engineering and 6 semester hours in a second area of electrical engineering approved by the student's master's committee.


5. A final oral examination covering the thesis and related coursework.

**Non-Thesis Option:** Specific requirements of the project (non-thesis) option are a minimum of 33 semester hours including:

1. Electrical Engineering 503 and 504.

2. Six semester hours of mathematics at the 400 level or above selected from a list approved by the graduate committee, or 6 semester hours of EE courses at the 500 level or above, or 6 semester hours of non-EE courses approved by the student's master's committee and the graduate committee.

3. An additional 18 semester hours of 500-level work in electrical engineering courses, with at least 6 hours of 500-level work in each of two areas of electrical engineering.

4. Electrical Engineering 501 (project in lieu of thesis) with a minimum grade of B. This course will be administered by the student's master's committee. A written project proposal describing what the student will do in the course must be submitted in advance for the graduate committee's approval. A written final report and oral presentation is required and one copy of the final draft must be submitted to the graduate committee.

5. A final written and oral examination covering the project and related coursework.

**THE DOCTORAL PROGRAM**

The Ph.D. degree program in Electrical Engineering may be pursued in the concentration areas of circuit theory, computer, computer communications, electromagnetic theory, plasma engineering, power systems, solid-state electronics, power electronics, and control systems. Applicants are required to submit scores on the General Graduate Record Exam. A TOEFL score of 550 is required for non-native speakers of English, including those who have earned degrees at U.S. institutions. Specific departmental requirements for the Ph.D. include the following:

1. A Master of Science or Master of Engineering degree.

2. A minimum of 24 semester hours of coursework beyond the Master's, excluding research and dissertation credit. These hours must include:
   a. A minimum of 12 semester hours in electrical engineering at the 500 and 600 levels.
   b. A minimum of 6 semester hours of 600 level course work. At least 3 hours of this work must be in an area other than the student's major area.
   c. A minimum of 6 hours of mathematics courses at the 500 level or above and approved by the electrical engineering graduate committee.

3. One foreign language if the student's faculty committee feels that a reading knowledge of a foreign language is crucial to the student's research efforts.

4. Satisfactory performance on a qualifying examination and a comprehensive examination. The qualifying examination is prepared by the Electrical Engineering faculty and consists of two 4-hour written examinations covering courses required in the undergraduate electrical engineering curriculum through the junior level. The qualifying examination is offered twice each year (January and August) and is to be taken the first time it is offered after the student enrolls in the program. A student who fails the qualifying examination must take and pass the examination the next time it is offered to remain in the program. A minimum of 18 hours of coursework must be completed after the student has taken the qualifying examination the first time.

A comprehensive examination is required by The Graduate School of this department. The comprehensive exam is administered by the student's committee; the exam results are reported to the graduate committee for approval; and the exam is filed in the department. The comprehensive exam is given when the student is ready to apply for admission to candidacy. The comprehensive exam consists of both written and oral parts. The written part consists of at least two sections: a complete review of the literature in the student's dissertation topic, and a review of the major tools to be used in the dissertation work. The student's committee may require additional written sections. The students must demonstrate a mastery of the dissertation area, ability to think analytically and creatively, skill in using academic resources, and ability to complete the dissertation satisfactorily. The oral part consists primarily of a professional presentation of a proposal for dissertation work and its defense. The committee may cover additional topics in the oral part.

5. Participation in departmental seminars.


**GRADUATE COURSES**

**ENGR 421 Electric Energy Systems (3)** Structure and operation of electrical energy grid; fault analysis; fault capacity; transient stability; control; reliability, balanced and unbalanced faults; power system protection; system stability. Level 1 design projects. Pre Req: Linear System Analysis, Electric Energy System Components, Systems and Power Laboratory.


**ENGR 423 Electric Machines (3)** Principles of electromechanical energy conversion. Design procedures for AC and DC machines; construction and performance constraints. Effects of machine parameters on steady state and dynamic performances; the d-q model; reference frames. Level 1 design projects. Pre Req: Linear System Analysis, Electric Energy System Components.

**ENGR 431 Operational Amplifier Circuits (3)** Linear and nonlinear active circuits using operational amplifiers. Operational, instrumentation, isolation, bridge, rms and logarithmic converters and function generators; rectifiers, references, active filters, modulation and demodulation, sinusoidal generators. Noise fundamentals; calculations in circuits. Design for specified pole-zero functions. Application: transducer interfacing. Level 1 design projects which require laboratory work. Pre Req: Linear System Analysis, Electric Energy System Components.

**ENGR 432 Electronic Amplifiers (4)** Feedback amplifier principles; wideband linear amplifier design; low-noise preamplifier design; linear regulated power design; linear regulated power supply design and switching regulator principles. Radio frequency amplifier design; oscillator principles; laboratory experiments and design projects. Level 2 design projects which require laboratory work. Pre Req: 431.

**ENGR 441 Digital Communications (3)** Discrete Fourier Transforms. Binary and M-ary Signaling, digital communication in present of noise, matched filtering and equalization, Information theory. Level 1 design projects. Pre Req: Analog Communication Amplitude and Frequency Modulation.

**ENGR 442 Communication System Design (4)** Application of communication theory to system design. Development of communication system specifications. System simulation utilizing graphical programming languages and computer. Hardware and software design and simulation. Construction and performance evaluation of complete analog or digital radio transmitter and receiver or significant subsystems. Level 2 design projects. Pre Req: 441.

**ENGR 443 Antennas and Propagation (3)** Antenna theory: fundamental antenna components and parameters (directivity, gain, patterns, etc.) and signal propagation. Theory and design of linear and loop antennas, arrays, and other simple antennas. Level 1 design projects. Pre Req: Transient Analysis Fields, Analog Communication Amplitude and Frequency Modulation.

**ENGR 451 Microprocessors and Microcontrollers in Electrical Engineering (3)** Project-oriented course using microcomputer systems to develop system design projects with a modern computerized integrated design environment. Knowledge of basic microcomputer components and microcomputer design methodology will be required. Level 1 design projects which require laboratory work. Pre Req: 451.

**ENGR 452 Organization and Design of Digital Systems and Computers (4)** Considerations for hardware organization of computer and digital systems. ALU and CPU structures, computer control unit organization, storage systems, and I/O interface design and programming. Control unit design and interface. Level 2 design projects which require laboratory work. Pre Req: 451.

**ENGR 453 Physics of Fusion Energy (3)** High temperature plasma physics relevant to fusion plasma, principles of fusion reactors, and engineering physics constraints on fusion reactors. Level 2 design projects. Pre Req: Senior standing. Non-majors require consent of instructor. (Same as Nuclear Engineering 453)
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, loss, charging, conduction, and breakdown in vacuum, gas, liquid, solid, and composite insulation systems. Testing with low-noise instrumentation, pulse height analysis, optics, acoustics, and bridges; associated statistics and distributed parameter effects. Studies drawn from active research on power systems, electronic circuits and devices, shielding, and stress grading. Prereq: 503, 504, and consent of instructor.

631 Advanced Topics in Electronic Instrumentation (3) Based on particular interests of students. Fundamental physical processes in instrumentation transducers: thermoelectric, magnetic/electric, electromagnetic and quantum-mechanical devices. Prereq: 531-32 and consent of instructor.


643 Detection and Estimation Theory (3) Detection theory; coding theory; system identification. Signals with unknown parameters; optimal filter synthesis; adaptive systems; sequential detection; suboptimal detection. Prereq: 504 or consent of instructor.

644 Coding and Information Theory (3) Structure of algebraic and probabilistic codes; linear codes, convolutional codes, error-correcting codes, encoding methods, identification schemes; deterministic, stochastic, and hierarchical methods. Prereq: 643.

651 Computer-Aided Design of VLSI Systems I (3) Fabrication of microelectronic devices; computer architecture design: algorithmic state machines; partitioning; structured design methodology. Prereq: 551-1 or consent of instructor.

652 Computer-Aided Design of VLSI Systems II (3) Computer-aided design logic: design and implementation of fully custom and large scale integrated (VLSI) circuits; design for testability; testing of fabricated chips. Prereq: 651.

653 Advanced Plasma Physics I (3) Basic concepts of high temperature plasmas; magnetohydrodynamics and kinetic descriptions of plasma, plasma transport, plasma waves, equilibrium, and stability. Prereq: Physics 541-2, 561-2 or 563-4, or consent of instructor. (Same as Physics 563.)


671 Image Processing and Robotics (3) Three-dimensional scene modeling and recognition, multi-sensor systems. Prereq: 572 or 573 or consent of instructor.

672 Image Processing and Robotics II (3) Stereovision, shape theory. Prereq: 671.

673 Image Processing and Robotics III (3) Time-varying imagery, path planning and navigation. Prereq: 672.

691 Advanced Graduate Seminar I (1) Research in department. May be repeated. S/N or letter grade.
presentation of a paper at a professional meeting or departmental colloquium. All capstone experiences normally occur after the completion of 24 hours of coursework and must be approved by the Director of Graduate Studies.

Final Examination: A candidate presenting a thesis must pass a one-hour oral examination; a candidate presenting a creative project must pass a ninety-minute oral examination. The examination consists of a short thesis defense, but chiefly of questions covering the general history of English and American literature, not merely the coursework taken. A reading list of primary works designed to help the student prepare for these questions is available in the office of the Director of Graduate Studies in English.

Coursework: Writing students must pass a written examination, followed by a one-hour oral examination, both consisting of the same sort of questions as the examination taken by the thesis student.

Residence Requirement: There is no residence requirement for the M.A., but students should attempt to pursue a full-time program whenever possible.

WRITING CONCENTRATION

The master's program with writing concentration is intended for those students who plan to do free-lance writing, specialize in teaching writing courses at the college level, or work as professional writers in business or industry.

Requirements

The requirements for the writing concentration are the same as those for the thesis option above with the following exceptions:

Coursework: Writing students may substitute two 400-level writing courses for two 500-level courses. Students must take at least 9 hours in writing and 9 in literature, the remaining 6 to be selected from any English courses at the proper level. Of the courses in writing, at least 3 hours must be taken at the 500 level; additional 500-level courses are strongly recommended.

Writing Projects: One of the following writing projects for six hours of credit:

1. A thesis, using research to analyze some aspect of writing or rhetorical theory.

2. A creative project, such as a collection of poems or short stories, a short novel, a play, or a creative work of non-fiction prose.

The nature and length of each project will be determined by the Director of Graduate Studies after consulting with the student and the project director. In addition to the director, two other English Department faculty members will supervise and approve the project; at least one should be from the literature faculty.

Final Examination: The reading list may be modified by the M.A. examining committee, meeting as a body with the student, to reflect the candidate's particular writing emphasis. However, most of the oral examination should focus upon the literature outlined in the original reading list.

THE DOCTORAL PROGRAM

Requirements

A student must successfully complete a program of study, normally 6 full semesters as outlined below, approved by the candidate's committee or the Director of Graduate Studies in English.

Coursework: At least 51 semester hours beyond the B.A. (of which at least 24 semester hours must be beyond the M.A.) to include at least 21 semester hours at the 600 level; at least 15 semester hours at the 500 level or above (only 3 hours of 593 Independent Study may be applied toward the M.A. and 3 after the M.A.); a special three-hour course in teaching composition; and 12 additional hours at any level, including the 400 level. Up to 6 of these additional hours may be taken in some 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. This represents 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 must be fulfilled in one of the following ways:

1. Two languages approved by the Director of Graduate Studies in English. The requirement for each language may be fulfilled by: (a) completion of French 302 or German 332 with a grade of B or better; (b) completion at UT Knoxville of any two courses on the 300 level or above in the foreign language or literature with at least a grade of B in each course; (c) passing of the regular Ph.D. foreign language examination as currently administered at UT Knoxville.

2. One modern language approved by the Director of Graduate Studies in English. This requirement must be fulfilled by a passing grade on the language examination given by UT Knoxville and completion of two courses in the foreign language at the 400 level or above, at least one of which must be at the 500 level or above. A minimum grade of B must be received in each course.

3. One modern language approved by the Director of Graduate Studies in English and intensive study of the English language. This requirement must be fulfilled by completion of (a), (b), or (c) below:

(a) completion of 10 semester hours in one foreign language; and completion of 6 semester hours in English language courses with grades of B or better, at least three of which must be from English 508 or 509 History of the English Language (offered in alternate years only). For the other 3 hours, the student may either complete the history of the language sequence or choose one other course in language taught in the Department of English at the 400 level or above 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 and/or dissertation hours each semester. For students on assistantships, full-time consists of at least 6 hours of courses and/or dissertation hours and 3 hours of teaching each semester.

GRADUATE COURSES

Note: Students enrolling in English graduate courses must first register in the office of the Director of Graduate Studies in 306 McClung Tower.

401 Medieval Literature (3) Reading and analysis of selected medieval literary masterpieces in modern English.

402 Chaucer (3) Reading and analysis of 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 romantic tragedies, including Othello; problem plays, including Measure for Measure; and dramatic romances, including The Tempest.

406 Renaissance Drama (3) English theatre between 1599 and 1640 through reading of representative plays by Shakespeare's contemporaries: Marlowe, Webster, Jonson.

409 Spenser and his Contemporaries (3) Principal achievements in prose and poetry of sixteenth century authors: Spenser, Wyatt, Marlowe, More, Sidney, and Bacon.

410 Milton, Donne and their Contemporaries (3) Principal achievements in prose and poetry of first two-thirds of seventeenth century: poetry of Milton, Donne, Marvell, and prose of Browne, Bacon, Walton.

411 Literature of Restoration and Early Eighteenth Century: Dryden to Pope (3) Survey of English literature and culture from 1660 to 1745.

412 Literature of Later Eighteenth Century: Johnson to Burns (3) Survey of English literature and culture from 1745 to 1800.

413 Restoration and Eighteenth-Century Genres and Modes (3) A major genre or literary mode: drama, novel, poetry, non-fiction prose, satire, romance, or epic; written between 1660 and 1800. May be repeated.

414 Romantic Poetry and Prose I (3) Wordsworth, Coleridge, and Blake; readings from Lamb, De Quincey, and other prose writers.

415 Romantic Poetry and Prose II (3) Keats, Shelley and Byron; readings from Hazlit, Peacock, and other prose writers.

416 Victorian Poetry and Prose I (3) Tennyson, Pre-Raphaelites, 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) Works from authors such as Joyce and Woolf through contemporary British fiction writers.

425 Modern American Fiction (3) Novelists since the Second World War.
442 Women Writers in Britain (3) Literary consciousness and works by women in Britain. Topics vary: Mary de Francia, Margery Kempe, Susan Hatherley, Jane Austen, Emily, and Dickinson.

432 Colonial, Federal, and Early National American Literature (3) From Columbus to Washington Irving.

433 American Realism and Naturalism (3) Development of realism and naturalism in American literature. Topics vary: Twain, Howells, James, Twain, Crane, and Norris.

434 Modern American Literature (3) World War II to present.

435 American Novel before 1900 (3) From earliest sentimental novels through Brown and Cooper, and major figures to 1900: Hawthorne, Melville, Stowe, Clemens, and James.

436 Modern American Novel (3) Hemingway, Faulkner, Hemingway, and various writers from the advent of modern to the end of World War II.

452 Modern Drama, 1860-1945 (3) Survey of British, American, and international drama since World War I.

453 Contemporary Drama (3) Survey of British, American, and international drama since World War II.

454 Twentieth-Century International Novel (3) Fiction in English translation from such writers as Kafka and Camus through contemporary authors.

455 Persuasive Writing (3) Writing and analyzing persuasive texts in public, private, and academic contexts. Prereq: Advanced Expository Writing or consent of instructor.

456 Contemporary/Postmodern Literature (3) Studies in literature literature written after World War II. Content will vary. May be repeated with consent of instructor. Maximum 6 hrs.

460 Technical Editing (3) Editing technical material for publication. Principles of style, format, editing, layout, and production management. Prereq: Technical and Professional Writing 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: Technical and Professional Writing or consent of instructor.

463 Advanced Poetry Writing (3) Further development of skills acquired in basic writing poetry course. Prereq: 363 or consent of instructor.

464 Advanced Fiction Writing (3) Further development of skills acquired in basic writing fiction course. Prereq: 385 or consent of instructor.

465 Writing, Layout, and Production of Technical Documents (3) Principles of design for desktop publishing. Production of documents to be incorporated into professional portfolio. Prereq: Technical and Professional Writing or consent of instructor.

470 Special Topics in Rhetoric (3) Topics vary. Prereq: Advanced Expository Writing or consent of instructor. May be repeated with consent of department. Maximum 6 hrs.

471 Sociolinguistics (3) Study of language in relation to society. Empirical and theoretical focus. Large-scale units: tribes, nations, social groups. Prereq: 371 or 372 or Linguistics 200 or consent of instructor. (Same as Linguistics 471 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, political, and linguistic variables. Prereq: 371 or 372 or Linguistics 200 or consent of instructor. (Same as Linguistics 472.)

473 Teaching English as a Second or Foreign Language (3) Major issues affecting teaching ESL/ESL; political implications of teaching ESL/ESL; introduction to second language acquisition; learner variables in language learning; traditional and innovative approaches to ESL/ESL; beginning and time for teaching ESL. Prereq: Second year of foreign language or consent of instructor. (Same as Linguistics 473.)

474 Second Language Acquisition (3) How humans learn second languages. Theoretical models and research differences between first and second language acquisition; learner variables; sociocultural factors; and implications for second foreign language instruction. (Same as Linguistics 474.)

475 Literary Criticism (3) Historical survey of major works of literary criticism.


481 Studies in Folklore (3) Topics vary. May be repeated with different topic. Maximum 6 hrs.

482 Major Authors (3) Content varies. Concentrated study of at least one of the most influential writers in British or American literary history: e.g., Donne, Pope, Austen, Tennyson, Whitman, Faulkner, Lawrence, Baldwin, and Morrison.

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.)

490 Language and Law (3) Language in Anglo-American legal process; focus on differences between spoken and written language; lexical and syntactic ambiguity; pragmatics; speech act analysis; and language rights of linguistic minorities. Prereq: Foundations of the English Language or The Structure of Modern English or consent of instructor. (Same as Linguistics 490.)

491 Introduction to Rhetoric and Composition (3) Historical, theoretical, and empirical models of rhetoric in composition and implications for teaching of composition. Prereq: Advanced Expository Writing or consent of instructor.

495 Rhetoric and Legal Discourse (3) Application of basic principles of persuasive writing to legal materials. Issue identification and argument through written position paper; briefs, and appellate court opinions. Practice in writing and evaluation of legal discourse. Prereq: Consent of instructor. Maximum 6 hrs.

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

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

505 Teaching Freshman Composition (3) Introduces students to the academic writing process 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, definition of English teacher, theory of literary, and methods of research; collecting of information, evaluation of materials, and transmitting of results of scholarship.

507 Applied Criticism: The Rhetoric of Literary Forms (3) Study and application of major themes which major critics have applied in the history of poetry and prose fiction. May be repeated. Maximum 6 hrs.

508 History of the English Language I (3) Historical, theoretical, and syntactic development of English language. Old and Middle English. F, A

509 History of the English Language II (3) Historical, theoretical, and syntactic development of English language with concentration on developments after 1500, especially in American English. Sp, A

513-14 Readings in Medieval Literature (3,3) Reading and analysis of selected masterpieces of Old and Middle English literature and their Continental sources in Modern English. May be repeated. Maximum 9 hrs. each.

520-21 Readings and Analysis in Selected Areas of the Sixteenth and Seventeenth-Century Prose, Poetry, and Drama (3,3) Content varies: genre, theme, literary movement, or other coherent emphasis. May be repeated. Maximum 9 hrs. each.

530-31 Readings in English Literature of the Restoration and Eighteenth Century (3,3) Topics vary. Genre, poetry, prose, forms, drama, or period. May be repeated. Earlier eighteenth century, later eighteenth century. May be repeated. Maximum 9 hrs. each.

540-41 Readings in English Literature of the Nineteenth Century I/II (3,3) Topics vary. Genre, theme, literary movement, or other coherent emphasis. May be repeated. Maximum 9 hrs. each.

552 Readings in Black American Literature (3) Content varies: genre, theme, literary movement, or other coherent emphasis. May be repeated. Maximum 9 hrs. each.

560-61 Readings in Twentieth-Century Literature (3,3) Content varies: genre, theme, literary movement, or other coherent emphasis. May be repeated. Maximum 9 hrs. each.

563 Special Topics in Literature (3) Topics vary. May be repeated. Maximum 9 hrs.

567 Introduction to Contemporary Criticism (3) Introduces survey of literary criticism from New Criticism to present.

580 Fiction Writing (3) Advanced fiction projects under supervision of instructor. May be repeated. Maximum 6 hrs.

581 Colloquium in Poetry Writing (3) Major poetic project or continuation of project begun in 463. Individual consultation with instructor. Consent of instructor. Maximum 6 hrs.

582 Special Topics in Writing (1-3) Topics vary. May be repeated. Maximum 6 hrs. Consent of instructor. Maximum 6 hrs.

583 Special Topics in Literature (3) Topics vary. May be repeated. Maximum 9 hrs.

585 Issues in Invasion, Style, and Audience (3) Theoretical perspectives on contemporary research in rhetoric and composition.

586 History of Rhetoric I (3) Survey of rhetoric from Sophists to Rhetorics

587 History of Rhetoric II (3) Survey of rhetoric from Bacon to present.

588 Readings in Applied Rhetoric (3) Topics vary. Writing across curriculum, writing centers, technical communication, text linguistics. May be repeated. Maximum 6 hrs.

590 Topics in Critical Theory (3) Topics vary. May be repeated. Maximum 9 hrs.
Entomology and Plant Pathology

(College of Agricultural Sciences and Natural Resources)

MAJOR DEGREE
Entomology and Plant Pathology M.S.

Charles D. Pless, Acting Head

Professors:
Bernard, Ernest C., Ph.D. ........................................ Georgia
Gerhardt, Reid R. (Liaison), Ph.D. .................................... NC State
Grant, Jerome E., Ph.D. .............................................. Clemson
Hilly, James W. (Emeritus), Ph.D. ................................... Ohio State
Johnson, Leander F. (Emeritus), Ph.D. .............................. Georgia

Associate Professors:
Guinn, Kimberly D., Ph.D. ........................................ NC State
Owens, Bonnie H., Ph.D. ............................................. NC State
Reddick, Bradford B., Ph.D. ......................................... Clemson

Assistant Professor:
Perea, Roberto M., Ph.D. ............................................ Florida

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

THE MASTER'S PROGRAM

Admission Requirements

For admission to the M.S. degree program, a student must meet all requirements of The University of Tennessee Graduate School and have completed (1) general botany or biology, 8 hours; (2) advanced biological sciences, 8 hours; (3) general inorganic chemistry, 6-8 hours; (4) organic chemistry, 3 hours. In addition, three completed rating forms and a written statement of career goals and interest in entomology or plant pathology are required.

Degree Requirements

The program requires a written thesis based on original research and the completion of a minimum of 24 hours of coursework for graduate credit, approved by the student's advisory committee. Included in the course requirements are two acceptable seminar presentations for 1 hour each. An oral final exam must be passed to the satisfaction of the advisory committee after the thesis has been completed. A minor is not required but may be selected at the option of the student. The minor will include at least 6 hours and 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

410 Diseases and Insects of Ornamental Plants (3)
 Symptoms, identification and management of diseases and insect pests that affect plants in greenhouse, nursery, and landscape environments. Prereq: Plant Pathology or Economic Entomology or consent of instructor. Sp, A

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

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

510 Plant Disease Fungi (4) Morphology, taxonomy, and biology of plant pathogenic fungi. Isolation and identification of plant pathogenic fungi. Prereq: 313 or consent of instructor. 2 hrs and 2 labs. (Same as Ornamental Horticulture and Landscape Design 511.) F, A

512 Soilborne Plant Pathogens (3) Causal agents; host-parasite-soil environment interactions; epidemiology; and biological control of soil-borne plant diseases; seasonal plant-bacterial interactions. Prereq: Plant Pathology or consent of instructor. Sp, A

514 Bacterial Plant Diseases (4) Morphology, taxonomy, and biology of bacterial plant diseases; infection and disease development, pathogenesis and resistance, diagnosis, detection, and control of bacterial plant diseases; beneficial plant-bacterial interactions. Prereq: Plant Pathology or consent of instructor. 3 hrs and 1 lab. Sp, A

515 Physiology of Plant Disease (3) Biochemical and physiological events involved in host-pathogen interactions. Mechanisms of disease resistance. Prereq: Introductory plant pathology or physiology, or consent of instructor. F, A

520 Plant Parasitic Nematodes (4) Morphology, physiology, pathology of nematodes. Prereq: 521. Sp, A

521 Plant Virology (3) Symptomatology, epidemiology, and management of virus infection; structure, morphology, replication, transmission, purification, characterization, and classification of plant viruses; serology; plant pathogenic viroids, mycoplasmas and viroids. Prereq: 313 or consent of instructor. 2 hrs and 1 lab. Sp, A

523 Field Crop and Vegetable Insects (2) Identification, biology, and management of insects afflicting crop and vegetable crops. Prereq: 521 or basic entomology course. 1 hr and 1 lab. Sp, A

525 Medical and Veterinary Entomology (3) Morphology, taxonomy, and biology of arthropod parasites and vectors of pathogens of humans and animals. Ecology and behavior of vectors in relation to pathogen transmission and control. Prereq: 521 or 525, or consent of instructor. 10 hrs. Sp, A

530 Integrated Pest Management (3) Principles and application of biological, cultural, genetic, and behavioral, and chemical methods of control to maintain pest control to pest populations below economic threshold levels. Prereq: 321 or consent of instructor. (Same as Plant and Soil Science 530). F, A

531 Special Problems in Entomology (1-3) Comprehensive individual study of current problems. May be repeated. Maximum 6 hrs. E

532 Special Problems in Plant Pathology (1-4) Comprehensive individual study of current problems. May be repeated. Maximum 6 hrs. E

533 Concentrated Study in Entomology (1-3) Selected subjects in entomology for advanced students, concentrated in time and subject matter. Prereq: 321 or basic entomology course. May be repeated. Maximum 6 hrs. F, Sp

541 Seminar (1) Review of literature and current research in entomology and plant pathology. May be repeated. Maximum 2 hrs. E
The following retention policy applies to all graduate students seeking a degree in the Exercise Science unit:

1. Graduate students are required to maintain an overall 3.0 GPA.
2. Any student who falls below this standard will be advised in writing by the unit leader of the need to discuss the matter with his/her advisor.
3. If a student's overall GPA remains below 3.0 for a second semester, the student will have his/her degree status revoked.

GRADUATE ASSISTANTSHIPS

A limited number of graduate assistantships are available for qualified women and men who are graduates of accredited colleges or universities. These assistantships are open to students in the master's and doctoral programs. Students interested in these opportunities should file their applications before February. Letters should be addressed to Graduate Assistantships Coordinator, Exercise Science Unit, The University of Tennessee, Knoxville, TN 37996-2700.

GRADUATE COURSES

480 Physiology of Exercise (3) Functions of body in muscular work physiological activities of fatigue, training and adaptation to environmental factors. Prereq: Human Physiology or general chemistry. 2 hrs and 1 lab. (Same as Biochemistry and Cellular and Molecular Biology 480.)

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

501 Special Project (3) Cullminating exercise for nonthesis major. Research study suitable for publication, or practicum requiring special written work.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses University facitlities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/N/C only, E

503 Problems in Lieux of Thesis (2-3) May be repeated. Maximum 9 hrs. S/N/C only, E

508 Research Seminar in Exercise Science (3) Research for writing of thesis and in individual research projects. Prereq: Research 480. May be repeated. S/N/C only, E


568 Physical Activity and Positive Health (3) Review of current, experimental, and experimental evidence concerning relationship and effects of exercise on health-related components of fitness. Prereq: Elementary statistics, 480 and 414 or equivalents. (Same as Public Health 568.)


Finance

(College of Business Administration)

MAJOR

Business Administration ............. MBA, Ph.D.

James W. Wansley, Head

Finance

MAJOR

Business Administration ............. MBA, Ph.D.

James W. Wansley, Head

Professors:

Black, Harold A. (James F. Smith, Jr., Prof.), Ph.D. ............... Ohio State
Boehm, T. P., Ph.D.,........... Washington (St. Louis)
DeGennaro, R. P. (TN Bankers Assoc. Scholar)., Ph.D. ............... Ohio State
Real Estate Investment and Finance (3) Financial and market analysis used for making decision to purchase. Relationship of primary and secondary mortgage markets.


Portfolio Analysis and Management (3) Portfolio theory and evidence of behavior of security returns with view to determination of rational investment policy. Statistical analysis of risk and return of portfolios. Portfolio evaluation and revision, capital market theory, and extensions of portfolio analysis. Prereq: Business Administration 504 and 505 or consent of instructor.


Seminar in Finance: Theory of the Firm (3) Financial theory of firm and financial decision making under conditions of uncertainty, equilibrium models of firm, option pricing, agency theory, capital structure, economics of information, and dividend policy.


Business Administration Concentrations

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

MBA Concentration: Finance

The curriculum offers courses for those interested in careers in corporate financial management, security analysis and investments, banking and financial institutions, and real estate.

Minimum course requirements are three courses: Finance 510 (6 hours), plus two from the following: 512, 522, 532, 551, and 581.

Ph.D. Concentration: Finance

Minimum course requirements are finance seminars 641, 642, 651, 652.

Graduate Courses

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

510 Contemporary Concepts and Methods in Finance (3) Strategic issues and broad-based valuation concepts in finance; integration of approach in investments, corporate finance, and institutions areas. Prereq: Business Administration 504 and 505 or consent of instructor.

512 Problems in Financial Management (3) Readings and cases that apply finance theory to real-world investment, financing, and asset management problems. Prereq: Business Administration 504 and 505 or consent of instructor.

522 Portfolio Analysis and Management (3) Portfolio theory and evidence of behavior of security returns with view to determination of rational investment policy. Statistical analysis of risk and return of portfolios. Portfolio evaluation and revision, capital market theory, and extensions of portfolio analysis. Prereq: Business Administration 504 and 505 or consent of instructor.

532 Financial Institutions (3) Analysis of management policies of financial institutions: asset, liability, and capital management. Legal, economic, and regulatory environment and implications for management. Financial institution structure and competition. 

551 Financial Management of a New Enterprise (3) Financial issues of new business formation, control, and long-term planning of new enterprises. Acquirement of venture capital. Prereq: Business Administration 504 and 505 or consent of instructor.

581 Real Estate Investment and Finance (3) Financial and market analysis used to make real estate investment decisions. Effects of various financing options on rate of return on income-producing properties. Effect of various financing options on consumer’s decision to purchase. Relationship between primary and secondary mortgage markets and impact of those markets on cost and availability of funds for real estate lending. Effects of government intervention (taxation, subsidization, and regulation) in both real estate and mortgage markets. Prereq: Business Administration 504 and 505 or consent of instructor.

599 Special Topics in Finance (1-3) Topics vary. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. S/NC or letter grade.


Seminar in Finance II: Theory of the Firm (3) Financial theory of firm and financial decision making under conditions of uncertainty, equilibrium models of firm, option pricing, agency theory, capital structure, economics of information, and dividend policy.

651 Advanced Seminar in Finance (3) Recent theoretical and empirical developments in micro-finance literature. Topics vary. May be repeated. Maximum 6 hrs.

652 Advanced Seminar in Finance (3) Recent theoretical and empirical developments in micro-finance literature. Topics vary. May be repeated. Maximum 6 hrs.

Food Science and Technology

(Majors in Agricultural Sciences and Natural Resources)

Majors

Clark J. Brekke, Head

Assistants

Golden, D. A. (Liaison), Ph.D., M.S., Ph.D. Wisconsin
Hultbert, G. Ph.D., Ph.D., Ph.D. Illinois
van Laack, R. L., Ph.D., Ph.D. Utah

Fields

1. Completion of a master's degree in a field, or a closely related field, or passing a special qualifying examination is required for admission.

2. In addition to the thesis requirement, a minimum of 24 semester hours of graduate coursework is required. This work must be approved by the student's committee and a minimum of 14 hours must be courses numbered above 500. The committee may require additional coursework if the student's progress or background indicates such need. 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.

3. An oral, final examination covering the thesis and coursework is 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.
3. A minimum of 72 hours beyond the Bachelor's degree, excluding credit for the master's thesis, is required. Of this, 24 semester hours must be 600 Doctoral Research and Dissertation.
4. At least 24 hours of coursework numbered above 500 are required exclusive of doctoral research and dissertation. At least 6 of the 24 hours must be courses numbered above 600.
5. A minimum of 6 hours of courses for graduate credit must be taken outside the Department of Food Science and Technology.
6. All candidates must complete 601 (2 hrs.) and are expected to attend 601 during their Ph.D. program.
7. Each candidate must pass both written and oral comprehensive examinations prior to admission to candidacy. Major professors will advise candidates on competencies expected. A final oral examination is required that includes a defense of the dissertation and subject matter that the student's committee considers appropriate.

GRADUATE COURSES

430 Sensory Evaluation of Food (3) Principles and methods of sensory evaluation of foods. Prereq: Basic statistics. 2 hrs and 1 lab. F

452 Science of Dairy Foods (3) Science and technology of processing of milk and its products. Prereq: Food Laws and Regulations, Food Chemistry, Food Microbiology and Lab, and Food Preservation or consent of instructor. 2 hrs and 1 lab. Sp

460 Meat Science (3) Carcass characteristics of meat animals, muscle structure and composition, cut identification, cutting, freezing, and freezing technology. Prereq: Food Industry or consent of instructor. Sp

469 Meat Science Lab (1) Slaughter and processing methods for beef, pork, lamb and poultry. Coreq: 460. Sp

470 Food Crop Products (3) Food products from plant types, manufacturing systems, quality attributes and utility. Prereq: Food Preservation and 3 hrs biological science or consent of instructor. 3 hrs and 1 lab. Sp

480 Cereal Science and Bakery Products (3) Chemistry and technology of processing cereal grains, interactions of ingredients during production and storage of baked products. Prereq: Food Laws and Regulations, Food Chemistry, and Food Preservation or consent of instructor. 2 hrs and 1 lab. Sp

490 Food Laws and Regulations (3) Laws and regulations designed to preserve safety, wholesomeness, and nutritional quality of United States food supply; precedent case studies and their impacts on laws and regulations. Prereq: The Food Industry; consent of instructor for non-majors. Recommended prereq: Core courses in Food Science and Technology. F

495 Food Processing System Analysis and Evaluation (3) Design and evaluation of food processing operations to produce safe and acceptable quality food product. Prereq: Food Chemistry, Food Microbiology, Food Preservation or consent of instructor. Sp

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

501 Seminar (1) Individual reports and discussion on topics from current literature. May be repeated. Maximum 3 hrs. F,Sp

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

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

507 Professional Development Seminar (1) (Same as Agriculture 507, Animal Science 507, Biosystems Engineering 507, Biosystems Engineering Technology 507, Ornamental Horticulture and Landscape Design 507, and Plant and Soil Sciences 507) S/NC only. F

508 Scientific Communication (1) (Same as Agriculture 508, Animal Science 508, Ornamental Horticulture and Landscape Design 508, and Plant and Soil Sciences 508.) F

510 Instrumental Analysis of Food (3) Modern instrumental methods for control of food manufacturing processes. Prereq: Food Chemistry: 2 hrs and 1 lab. F

511 Color of Foods (2) Chemical basis, measurements, and reactions involved in color changes in foods. Manufacture and application of colorants in foods. Prereq: Food Chemistry or equivalent. 1 hr and 1 lab. F, A

512 Flavor of Foods (2) Chemical basis, measurements, and reactions involved in flavor changes in foods. Manufacture and application of flavorings in foods. Prereq: Food Chemistry or equivalent. 1 hr and 1 lab. F, A

515 Food Carbohydrates, Proteins and Lipids (4) Advanced study of chemical and physical attributes of carbohydrate, protein, and lipid components of foods; effects of components on production of safe and consistent quality food products; changes during processing and in storage of food products. Prereq: Food Chemistry or equivalent. 3 hrs and 1 lab. Sp

520 Food and Industrial Fermentations (3) Microbiology, biochemistry and technology of food-related fermentations involving dairy products, meat, cereals, fruits and vegetables. Production of food ingredients and by-product utilization. Prereq: Food Microbiology and Lab, Food Preservation, Biochemistry and Cellular and Molecular Biology 410 or equivalent. 2 hrs and 1 lab. Sp, A

521 Advanced Food Microbiology (3) Extrinsic and intrinsic factors associated with foods and food processing that relate to growth, survival, inhibition, detection, and recovery of foodborne pathogens and spoilage organisms; traditional and current approaches to microbiological food safety and quality. Prereq: Food Microbiology and Lab or equivalent. 2 hrs and 1 lab. Sp, A

540 Food Product Development (3) Art, science and technology of developing and marketing new food products. Prereq: Food Preservation. 2 hrs and 1 lab. Sp

560 Advanced Meat Science (3) Physical and chemical changes that occur in conversion of muscle meat; effect of postmortem treatments on meat quality, composition and palatability; packaging, preservation and quality control. Prereq: 460. 2 hrs and 1 lab. Sp, A

580 Food Oils and Fats (2) Chemistry and technology of food oils and fats processing and use; oils from seeds, Prereq: Food Chemistry or equivalent. 1 hr and 1 lab. Sp

590 Special Topics In Food Technology and Science (1-3) Critical reviews of current research and production and processing 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: Food Chemistry, 501, or consent of instructor. Sp, A

640 Advanced Food Processing (3) Role of processing treatments in modification of food properties; texture, flavor and color changes. Prereq: Food Preservation 510, 511, 512 or consent of instructor. Sp

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 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 can be achieved through the University's Department of Ecology and Evolutionary Biology.

The mission of the Department of Forestry, Wildlife and Fisheries is to advance the management, utilization, and appreciation of natural resources in Tennessee, the region and beyond through programs in teaching, research and extension.

THE MASTER'S PROGRAMS

Both thesis and non-thesis options are available for the major in Forestry; a thesis is required in Wildlife and Fisheries Science. For admission, the student must have a Bachelor's degree from an accredited institution in
Forestry, wildlife, fisheries, or other natural resource area. Applicants must take the general Graduate Record Examination (GRE) with minimum scores required. Graduate School rating forms or letters of recommendation from three individuals familiar with the applicant's academic ability are required. The department also has an application that must be submitted at the time of application to the Graduate School.

Graduate Courses

421 Forest and Wildland Resource Economics (3) Production functions, supply-demand and market analysis; non-market projects and programs; economic analysis and decision models; investment and financial analysis; managerial economics; taxes; forest products marketing. Prereq: Forest Resource Analysis or consent of instructor. F

422 Forest and Wildland Resource Policy (3) Policy formulation; criteria for policy determination; forest and wildland law and regulation; theory of conflict resolution; formal and informal resolution. Prereq: Senior standing or consent of instructor. F

423 Wildland Recreation Planning and Management (3) Planning processes; recreation site design; project management; strategies and methods of visitor and recreation site management; case studies. Even-year field trips. Prereq: Wildland Recreation or consent of instructor. 2 hrs and 1 lab. Sp

433 Wood Adhesives and Glued Wood Products (2) Theory and practice of adhesive bonding of wood; wood substrate-adhesive interface for bonding; principles of adhesion; wood adhesives; gluing of solid wood and composite wood manufacturing practices; laboratory manufacture and testing of adhesives, adhesive bond strength and glued wood product performance; dry field trips. Prereq: Wood Properties and Uses and Wood Identification, or consent of instructor. 1 hr and 2 labs. F

434 Wood Processing and Machining (3) Primary log breakdown and secondary processing into major products. Fundamentals of technology for major types of cutting operations; sawing; profiling; planing; veneer cutting; and laser machining; day field trip. Prereq: Wood Properties and Uses and Wood Identification, or consent of instructor. 1 hr and 2 labs. F

450 Recreation Planning for Forests and Associated Lands (3) Planning process for recreation development on forest and associated lands; analysis and critique of specific contemporary alternatives. Overnight field trips. Prereq: Senior level in forest recreation or consent of instructor. P

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 be repeated. Maximum 2 hrs. S/NC only. E

511 Problem Analysis in Forest Resources (3) Problem identification, analysis and solution in forest resource management. Identify, analyze and prepare written report. Topic and report must have approval of graduate committee. Available only to students in non-thesis option for 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. E

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. P

525 Management of Forestry, Wildlife and Fisheries (4) Current technologies and management strategies concerning wise use of fore, wildlife, and fisheries resources necessary for decision making and implementation. Prereq: 6 hrs of biological sciences or consent of instructor. Available to majors in Forestry and in Wildlife and Fisheries Science. 4 hrs and 1 lab. Sp

535 Environmental Impacts to Natural Ecosystems (3) Current environmental problems impacting natural ecosystems: climatic change, acid deposition, air pollution, species declines, and introduction of exotic species. Management methodologies to mitigate environmental problems. Overnight field trips. Prereq: 416 or equivalent or consent of instructor. Applicable to majors in Forestry and in Wildlife and Fisheries Science. 2 hrs and 1 lab. Sp

540 Wildlife Techniques (2) Methods of wildlife damage control, forest, farm, and wildlife habitat management, data gathering techniques and management plan preparation. Weekend field trips. Prereq: Principles of Wildlife and Fisheries Science

Graduate Courses

421 Forest and Wildland Resource Economics (3) Production functions, supply-demand and market analysis; non-market projects and programs; economic analysis and decision models; investment and financial analysis; managerial economics; taxes; forest products marketing. Prereq: Forest Resource Analysis or consent of instructor. F

422 Forest and Wildland Resource Policy (3) Policy formulation; criteria for policy determination; forest and wildland law and regulation; theory of conflict resolution; formal and informal resolution. Prereq: Senior standing or consent of instructor. F

423 Wildland Recreation Planning and Management (3) Planning processes; recreation site design; project management; strategies and methods of visitor and recreation site management; case studies. Even-year field trips. Prereq: Wildland Recreation or consent of instructor. 2 hrs and 1 lab. Sp

433 Wood Adhesives and Glued Wood Products (2) Theory and practice of adhesive bonding of wood; wood substrate-adhesive interface for bonding; principles of adhesion; wood adhesives; gluing of solid wood and composite wood manufacturing practices; laboratory manufacture and testing of adhesives, adhesive bond strength and glued wood product performance; dry field trips. Prereq: Wood Properties and Uses and Wood Identification, or consent of instructor. 1 hr and 2 labs. F

434 Wood Processing and Machining (3) Primary log breakdown and secondary processing into major products. Fundamentals of technology for major types of cutting operations; sawing; profiling; planing; veneer cutting; and laser machining; day field trip. Prereq: Wood Properties and Uses and Wood Identification, or consent of instructor. 1 hr and 2 labs. F

450 Recreation Planning for Forests and Associated Lands (3) Planning process for recreation development on forest and associated lands; analysis and critique of specific contemporary alternatives. Overnight field trips. Prereq: Senior level in forest recreation or consent of instructor. P

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 be repeated. Maximum 2 hrs. S/NC only. E

511 Problem Analysis in Forest Resources (3) Problem identification, analysis and solution in forest resource management. Identify, analyze and prepare written report. Topic and report must have approval of graduate committee. Available only to students in non-thesis option for 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. E

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. P

525 Management of Forestry, Wildlife and Fisheries (4) Current technologies and management strategies concerning wise use of forest, wildlife, and fisheries resources necessary for decision making and implementation. Prereq: 6 hrs of biological sciences or consent of instructor. Available to majors in Forestry and in Wildlife and Fisheries Science. 4 hrs and 1 lab. Sp

535 Environmental Impacts to Natural Ecosystems (3) Current environmental problems impacting natural ecosystems: climatic change, acid deposition, air pollution, species declines, and introduction of exotic species. Management methodologies to mitigate environmental problems. Overnight field trips. Prereq: 416 or equivalent or consent of instructor. Applicable to majors in Forestry and in Wildlife and Fisheries Science. 2 hrs and 1 lab. Sp

540 Wildlife Techniques (2) Methods of wildlife damage control, forest, farm, and wildlife habitat management, data gathering techniques and management plan preparation. Weekend field trips. Prereq: Principles of Wildlife and Fisheries Science

Graduate Courses

421 Forest and Wildland Resource Economics (3) Production functions, supply-demand and market analysis; non-market projects and programs; economic analysis and decision models; investment and financial analysis; managerial economics; taxes; forest products marketing. Prereq: Forest Resource Analysis or consent of instructor. F

422 Forest and Wildland Resource Policy (3) Policy formulation; criteria for policy determination; forest and wildland law and regulation; theory of conflict resolution; formal and informal resolution. Prereq: Senior standing or consent of instructor. F

423 Wildland Recreation Planning and Management (3) Planning processes; recreation site design; project management; strategies and methods of visitor and recreation site management; case studies. Even-year field trips. Prereq: Wildland Recreation or consent of instructor. 2 hrs and 1 lab. Sp

433 Wood Adhesives and Glued Wood Products (2) Theory and practice of adhesive bonding of wood; wood substrate-adhesive interface for bonding; principles of adhesion; wood adhesives; gluing of solid wood and composite wood manufacturing practices; laboratory manufacture and testing of adhesives, adhesive bond strength and glued wood product performance; dry field trips. Prereq: Wood Properties and Uses and Wood Identification, or consent of instructor. 1 hr and 2 labs. F

434 Wood Processing and Machining (3) Primary log breakdown and secondary processing into major products. Fundamentals of technology for major types of cutting operations; sawing; profiling; planing; veneer cutting; and laser machining; day field trip. Prereq: Wood Properties and Uses and Wood Identification, or consent of instructor. 1 hr and 2 labs. F

450 Recreation Planning for Forests and Associated Lands (3) Planning process for recreation development on forest and associated lands; analysis and critique of specific contemporary alternatives. Overnight field trips. Prereq: Senior level in forest recreation or consent of instructor. P

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 be repeated. Maximum 2 hrs. S/NC only. E

511 Problem Analysis in Forest Resources (3) Problem identification, analysis and solution in forest resource management. Identify, analyze and prepare written report. Topic and report must have approval of graduate committee. Available only to students in non-thesis option for 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. E

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. P

525 Management of Forestry, Wildlife and Fisheries (4) Current technologies and management strategies concerning wise use of forest, wildlife, and fisheries resources necessary for decision making and implementation. Prereq: 6 hrs of biological sciences or consent of instructor. Available to majors in Forestry and in Wildlife and Fisheries Science. 4 hrs and 1 lab. Sp

535 Environmental Impacts to Natural Ecosystems (3) Current environmental problems impacting natural ecosystems: climatic change, acid deposition, air pollution, species declines, and introduction of exotic species. Management methodologies to mitigate environmental problems. Overnight field trips. Prereq: 416 or equivalent or consent of instructor. Applicable to majors in Forestry and in Wildlife and Fisheries Science. 2 hrs and 1 lab. Sp

540 Wildlife Techniques (2) Methods of wildlife damage control, forest, farm, and wildlife habitat management, data gathering techniques and management plan preparation. Weekend field trips. Prereq: Principles of Wildlife and Fisheries Science
French
See Modern Foreign Languages and Literatures

Geography

(College of Arts and Sciences)

MAJOR

DEGREES

Geography..............................................M.S., Ph.D.

Carol Harden, Head

Professors:
Aiken, Charles S., Ph.D. ......... Georgia
Bell, Thomas L., Ph.D. ............... Iowa
Foresta, Ronald, Ph.D. ..................... Rutgers
Hammond, E. H. (Emeritus), Ph.D. .... California
Jumper, Sidney R. (Emeritus), Ph.D............ Tennessee
Long, Robert G. (Emeritus), Ph.D. ............... Virginia

Associate Professors:
Brinkman, Leonard W., Jr., Ph.D. ....... Wisconsin
Harden, Carol P., Ph.D. ................ Colorado
Hor, Sally P., Ph.D. ..................... California
Rehder, John B., Ph.D. ................ Louisiana State
Shaw, Shih-Lung, Ph.D. ..................... Ohio State

Assistant Professor:
Orvis, Kenneth H., Ph.D. .............. California

The department offers the Master of Science and Doctor of Philosophy degrees. The master's degree emphasizes development of professional competence as a geographer and offers 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 graduate work in location analysis, transportation, and related areas of geography. The dissertation topic should be chosen within the student's areas of research specialization. Examinations required for admission to candidacy include a written comprehensive exam. The program must include 504, 515, 599, 9 hours of 500-level seminars, and (at each offering) 600-level residencies. A minimum of 9 hours must be completed in related fields outside the department. Competence in cartography and related techniques is required. Additional tools, including languages, will be required as appropriate to the student's areas of research specialization. All parts of the written comprehensive examination should be taken within the same semester.

MINOR IN ENVIRONMENTAL POLICY

The department participates in a program designed to give graduate students an opportunity to develop an understanding of the natural environment. The program must include 504, 515, 3 hours of 500-level seminars, and (at each offering) 600-level residencies. A minimum of 9 hours must be completed in related fields outside the department. Competence in cartography and related techniques is required. Additional tools, including languages, will be required as appropriate to the student's areas of research specialization. All parts of the written comprehensive examination should be taken within the same semester.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The Ph.D. program in Geography is available to residents of the states of Alabama, Arkansas, Mississippi, Virginia, and West Virginia. The master's program is also available to residents of Texas. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

410 Global Positioning Systems and Geographic Data
(3) Theory, field and laboratory use of Global Positioning Systems for capturing digital geographic data; management of geographic data; coordinate systems; datum issues, scanning and digitizing, map standards, and uncertainties in Geographic Information Systems. Three 2-hr and 2-1/2-hr lab.
445 Geography of Resources (3) Study of factors related to variations in resource availability from time to time and place to place; energy and metallic resources. Prereq: World Geography or Economic Geography; Core Concepts or consent of instructor.

450 Process Geomorphology (3) Same as Geology 450.

451 Teaching and Learning Geography (3) Preparation of prospective teachers in content, skills, strategies, and understandings needed for effective teaching and assessment of geography in K-12 schools. Course organization and content based largely on that of National Geography Standards.

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

501 Colloquium in Geography (1) Discussion of departmenal research, current research literature, and general topics. Registration required of resident graduate students whenever offered. May be repeated. Maximum 4 hrs. May be applied toward graduate degree. S/C only.

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

504 Introduction to Geographical Research (1) Research interests and methods of departmental faculty. Research frontiers in geography. Required of new graduate students.

505 Directed Research (2-6) Research on problems as defined by individual students. May be repeated with consent of instructor. Maximum 9 hrs. S/NC or letter grade.

509 Topics in Geography (2-3) Topics vary. Prereq: Consent of instructor. May be repeated with consent of instructor. Maximum 8 hrs. S/NC or letter grade.

510 Geographic Software Design (3) Algorithms for spatial analysis, software design, and program implementation in stand alone and distributed computing environments. Prereq: Consent of instructor.

513 Topics in Remote Sensing (3) Applied research using imagery for interpretation and mapping of geographic data. Prereq: 410 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.

515 Topics in Quantitative Geography (3) Multivariate analysis applied to problems in geographic research. Prereq: 315 and 410 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.

517 Geographic Information Management and Processing (3) Concepts and methods in management of geographic information. Database design, manipulation, sampling, and analysis. Prereq: Consent of instructor.

519 Graduate Practicum in Cartography/Remote Sensing/GIS (2-6) Prereq: Written consent of department before registration. May be repeated with consent of instructor. Maximum 8 hrs.

521 Topics in Cultural Geography (3) Examination of trends, problems, and methods in cultural geography. Prereq: 421 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.

522 Topics in Global Change (3) Emerging trends, anticipated problems and methods in global change research and response. Prereq: 415 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.

533 Topics in Physical Geography (3) Examination of trends, problems, and methods in the area of climatology. Prereq: 430 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.

534 Topics in Climatology (3) Trends, problems, and methods in the area of climatology. Prereq: 430 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.
The Department of Geological Sciences offers both the M.S. and Ph.D. degrees in Geology. Persons interested in these programs should contact the Director of Graduate Admissions in the department.

For admission, applicants must provide transcripts of previous university work, two rating forms or letters of recommendation, and GRE scores (general). Students are not normally admitted under non-degree status.

Prerequisites 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 Department offers the thesis option in the master's program. Graduation requires successful oral defense of a written thesis and a minimum of 30 semester hours in graduate coursework.

Course requirements are a minimum of 30 semester hours, including:
1. Six hours of Thesis 500.
2. Registration in 585 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 at the 500 level. Including at least one course from each of the following five areas, students are expected to be conversant in a wide field of geological sciences.

Graduate courses include:

- Group 2: 500-level geology courses, 9 hours of 500-level or higher geology courses, and 6 hours of additional graduate courses.

The comprehensive examination includes both written and oral parts in which the candidate will be tested on his/her knowledge of the area concerning the proposed dissertation and related fields. The candidate is expected to be conversant in a wide field of geological sciences.

A minimum of 24 hours of graded coursework beyond the master's degree is required in addition to the 24 hours of dissertation 600. The coursework includes the 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 allowed.

The student must demonstrate a reading knowledge of a foreign language in which there is a body of geologic literature, as approved by the student's dissertation committee. The foreign language requirement may be waived for Ph.D. students whose native language is not English and who have demonstrated mastery of the English language, as determined by the student's dissertation committee.

Graduate Courses

401 Quantitative Methods in Geology (3) Applications of calculus and differential equations to problems in earth sciences. Examples of diffusion equations in hydrogeology, wave equation in geophysics, mechanical modeling and boundary conditions in structural geology and tectonics. Prereq: The Dynamic Earth or Earth, Life, and Time, 2 semesters of Calculus.


411 Optical Mineralogy (2) Laboratory course on principles of optical microscopy. Use of petrographic microscope to identify rock-forming minerals with applications to petrology and environmental mineralogy. Prereq: Mineralogy.

412 Elements of X-ray Diffraction (2) Laboratory course on principles and applications of X-ray diffraction. Phase identification, quantitative determination of mineral abundances in mixtures, and crystal structure determination. Prereq: Mineralogy.

420 Paleoclimatology (4) Principles of palaeoclimatology as applied to fossils and fossil assemblages. Data collection and interpretation. Paleoclimatology designed around preparation of scientific reports based on field and laboratory analysis. Writing emphasis course. 3 hrs and 1 lab.

421 Invertebrate Paleontology (4) Survey of invertebrate animal phyla: skeletal structure and preservation, functional morphology, ecology, and stratigraphic distribution. Prereq: Paleobiology or consent of instructor. 2 hrs and 2 1/2 labs.

440 Field Geology (5) Summer field course for advanced undergraduate geology majors and first-year graduate students in geology. Taught off-campus and requires full-time attendance. Synthesis of major aspects of geological sciences in a societal context. Field techniques demonstrated, practiced, and applied to solution of geologic problems. Prereq: Completion of major core courses and consent of instructor.

450 Process Geomorphology (3) Integrative approach to development of surface of earth. Emphasis on processes, examples, case histories, maps, remote sensing imagery. Prereq: 101-02. (Same as Geography 450.) 2 hrs and 1-2 lab.

455 Basic Environmental Geology (3) Applications of geological sciences toward comprehension of effects of geologic processes between atomic structure and distribution and behavior of elements in earth's crust. Prereq: Chemistry 120-20, recommended pre: 330, 2 hours and 1 lab.


471 Fieldwork in Geophysics (2) Geophysical investigations applied to solution of problems in tectonics, hydrogeology, or environment. Summer field course off-campus. Requires full time for 2 or more weeks. Prereq: 470 or consent of instructor.

475 Physical and Chemical Systems of the Earth (3) Development of physical earth from solar nebula to present. Form, composition, and evolution of hydrosphere, atmosphere, and crust. Interdependence of earthquakes, volcanism, plate tectonics, geodynamics, chemical and isotopic processes of the earth's surface, and the earth's atmosphere. Historical perspective on major controversies of the past, and problems of the future. Prereq: 15 of 900 level of geology courses numbered 300 and above. 2 hrs and 1 discussion.

480 Principles of Economic Geology (4) Ore-forming processes, classification of mineral deposits, survey of different types of mineral deposits with examples, and metallogenesis. Prereq: 310 and 330 or equivalents. Recommended pre: 460, 1 hour and 1-2 lab.

485 Principles of Hydrogeology (3) Physical principles of flow, transport, and geochemistry of groundwater. Solution of transport processes. Prereq: 470, Dynamic Earth, 2 semesters of Calculus. Fundamentals of Physics or equivalent, or consent of instructor. (Same as Civil Engineering 485)

486 Hydrology Laboratory (1) Applied and demonstrated principles of hydrogeology in field and laboratory. Prereq: or coreq: 485 or Environmental Engineering 536 or consent of instructor.

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

502 Registration for Use of Facilities (2-15) Required for the student not otherwise registered during any semester when the student uses University facilities on the faculty or staff time before degree is completed. May not be used toward degree requirements. May be repeated. S/N only. E

505 Structure of the Southern and Central Appalachians (2) Structural development of Southern and Central Appalachians from extentional Late Proterozoic--Early Paleozoic rift-platform margin through processes related to compressional events producing accretory tectonic elements that formed Appalachian orogeny through Paleozoic. Comparisons to similar orogens. Prereq: Structural Geology.

510 Clay Mineralogy (3) Origin, chemistry, structure, and properties of clay minerals; application of mineralogical techniques in clay mineralogy. Prereq: 310 and 588 or equivalent. 2 hours and 1 lab.

521 Data Analysis in Geology and Environmental Science (3) Application of statistical and other quantitative techniques in processing computer data. Prereq: 524 or equivalent. 2 hours and 1 lab.

530 Petrogenesis of Crystalline Rocks (4) Origin and properties of igneous and metamorphic rocks, magmatic and subduction processes and physical conditions. Laboratory involves petrographic study of granite and basaltic rocks in thin section. Prereq: 101, 2 hours and 1 lab.

536 Ground Water Hydrology (3) Same as Environmental Engineering 536.

540 Seminar in Local Geology (1) Introduction to geology of Southern Appalachians. 1 hr plus fieldtrips.
Health

A graduate program is available leading to the Master of Science with a major in Health Promotion and Health Education (thesis and non-thesis options), requiring completion of 30 semester hours. The program emphasizes research skills development by those already employed in the health professions with each student completing a realistic health-related research proposal as a major developmental activity.

The Doctor of Philosophy with a major in Human Ecology offers a concentration in community health. Perspectives of social, behavioral and biomedical sciences are incorporated with educational models appropriate for addressing community health needs.

THE PH.D. CONCENTRATION

The community health concentration integrates the behavioral and natural sciences with public health, community health education, health promotion and the safety sciences to prepare scholars with an interest in improving the health of the nation.

Requirements include:
1. Minimum 21 hours of foundation courses: 610, 620, 6 hours of statistics, 3 hours of specialized research methods, and 6 hours of natural or behavioral sciences.
2. Minimum 21 hours in primary specialization: 530, 540, 650, 655, 660 and 6 hours of electives.
3. Minimum 12 hours in supporting specialization in a focused area: public health, safety, gerontology or a program approved by doctoral committee.
4. Minimum 6 hours in a cognate area.

GRADUATE COURSES

400 Consumer Health (3) Survey of major consumer health care providers and health care services; selecting, purchasing, evaluating and financing medical and health care services/products. (Same as Public Health 400.) Sp

405 Alcoholism and Alcohol Education (3) Problems of alcoholism. Factors which make alcoholism serious health and safety problem. Various types of educational and intervention programs. F

German

See Modern Foreign Languages and Literatures
Public Health

Graduate study with a major in Public Health leads to the Master of Public Health (M.P.H.). Three professional preparation concentrations are available: community health education, gerontology, and health administration. Prerequisites for professional practice in improving community health emphasize a population perspective, service-learning and application opportunities through rigorous internships. The M.P.H. program is accredited by the Council on Education for Public Health. A minor in statistics is available to interested M.P.H. students due to the public health affiliation with the Intercollegiate Graduate Statistics Programs.

ADMISSION REQUIREMENTS

A statement of the applicant’s educational and career goals and three rating forms are required. Request application packet from the department. Preferential consideration for admission to degree status shall be given to those with a minimum undergraduate grade point average of 2.8 and with at least one year of professional experience in a health-related occupation. As a restricted program, non-degree admission requires department recommendation. Prerequisites for complete applications are 1 February for Summer term and 1 April for Fall semester.

THE MASTER’S PROGRAM

The M.P.H. is a non-thesis program requiring completion of 36 semester hours of coursework including 9 weeks of field practice. The field internship provides a full-time experience with an affiliated health agency or organization offering one or more health programs. It is designed to meet the needs of public health practitioners and educators. A master’s essay is a means 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 a major advisor. A single block of credit will be granted, provided that the student has completed approved graduate level courses toward the M.S. degree for successful completion of approved graduate level courses required in the Department of Health and Safety Sciences. The Department of Health and Safety Sciences will award a maximum of 11 semester hours of credit toward the M.S. degree for successful completion of approved courses required in the Department of Nutrition. All courses for which cross-credit is awarded must be approved by the Public Health Academic Program Committee and the student’s graduate committee. A single block of credit will be granted, provided that the student has completed approved graduate level courses toward the M.S. degree for successful completion of approved courses required in the Department of Nutrition. All courses for which cross-credit is awarded must be approved by the Public Health Academic Program Committee and the student’s graduate committee. A single block of credit will be granted, provided that the student has completed approved graduate level courses toward the M.S. degree for successful completion of approved courses required in the Department of Nutrition. All courses for which cross-credit is awarded must be approved by the Public Health Academic Program Committee and the student’s graduate committee. A single block of credit will be granted, provided that the student has completed approved graduate level courses toward the M.S. degree for successful completion of approved courses required in the Department of Nutrition. All courses for which cross-credit is awarded must be approved by the Public Health Academic Program Committee and the student’s graduate committee. A single block of credit will be granted, provided that the student has completed approved graduate level courses toward the M.S. degree for successful completion of approved courses required in the Department of Nutrition.
History

(College of Arts and Sciences)

MAJOR DEGREES

History ........................................ M.A., Ph.D.

John R. Finger, Head

Professors:
Bergeron, Paul H., Ph.D. ................. Vanderbilt
Chmielewski, Edward V. (Emeritus), Ph.D. .......... Harvard
Culler, E. Wayne, Ph.D. ............... Texas
Farris, W. Wayne, Ph.D. .......... Harvard
Finger, John R., Ph.D. .......... Washington
Haas, Arthur G., Ph.D. .......... Chicago
Hao, Yin-Ping (Lindsay Young Prof.), Ph.D. .......... Illinois
Haskins, Ralph W. (Emeritus), Ph.D. .......... California
Klein, Milton M. (Emeritus) (Distinguished Prof.), Ph.D. .......... Columbia
Moser, Harold, Ph.D. .............. Wisconsin
Norrell, R. Jeff (Bernadotte Schmitt Prof.), Ph.D. .......... Vanderbilt
Ratner, Lorman A., Ph.D. .......... Cornell
Utley, Jonathan G. (Emeritus) .......... Illinois
Wheeler, W. Bruce, Ph.D. .......... Virginia

Associate Professors:
Ash, Stephen V., Ph.D. ................. Tennessee
Bing, J. Daniel, Ph.D. ................. Indiana
Bohstedt, John, Ph.D. .............. Harvard
Brummelt, Palmira R., Ph.D. .......... Chicago
Burnham, Thomas E., Ph.D. .......... Toronto
Diacon, Todd A., Ph.D. .......... Wisconsin
Higgs, Catherine A., Ph.D. .......... Yale
Johnson, Charles W., Ph.D. .......... Michigan
Muldowyn, John, Ph.D. .......... Yale
Pinckey, Paul J., Ph.D. .......... Vanderbilt

Assistant Professors:
Bast, Robert J., Ph.D. ................. Arizona
Bradley, Owen P., Ph.D. .......... Cornell
Glover, Lorri, Ph.D. ............... Kentucky
Jlievicius, Vejas G., Ph.D. .......... Pennsylvania
Piehler, G. Kurt, Ph.D. .......... Rutgers

The Department of History offers graduate study leading to the Master of Arts and Doctor of Philosophy degrees. The M.A. program includes a thesis and non-thesis option. The doctoral program has concentrations in American and European history with special focuses in the areas identified under Group II doctoral fields and Group III teaching fields.

THE MASTER'S PROGRAM

Admission Requirements
1. Successful completion of a baccalaureate degree from an accredited institution, preferably with a major in history.
2. Acceptable scores on the Graduate Record Examination (general).

General Requirements
Complete 510 and a 600-level research seminar normally during the fall and spring semesters of the first year in the graduate program. Complete 521 in preparation for the M.A. examination. As many as 9 related hours may be taken outside the department. As many as 9 graduate courses are offered which may be applied toward the M.A. degrees. 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 work followed 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.

language requirements

Students must demonstrate competence in one foreign language through coursework or examination. The student's doctoral committee may specify any other languages or research tools, such as statistics, essential for the student's preparation. The foreign language requirement must be fulfilled before taking the comprehensive examination.

Group III (Teaching Field) Examination
This is a one-hour oral exam which must be completed at any time before the comprehensive examination is taken. If a student fails this, he or she may retake the exam one time only and must do so the following semester.

Comprehensive Examination
The comprehensive examination 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 exam are separate examinations, and Group I must be passed before taking Group II, and the latter passed prior to taking the oral portion. A student who fails any one of the three parts (Group I or Group II or the Oral) which constitute the Comprehensive Exam must repeat the failed exam the following semester, excluding summer. A second failure on any one of the three parts (regardless of which one) will cause the student to be dropped from the History graduate program. Likewise, a student who does not repeat a failed exam within the allotted time (one semester) will be dropped from the program.
Admission to Candidacy
Upon successful completion of the above requirements, a doctoral student may be admitted to candidacy.

Doctoral Fields
Group I:
- Premodern Europe
- Modern Europe
- United States (colonial to present)

Group II:
To be defined by the student’s doctoral committee from within one of the following fields:
- United States
- Colonial/Early Republic
- 19th century
- 20th century
- Regional
- Military and Foreign Relations
- Social and Cultural
- American Political
- European
- Medieval
- Early Modern
- Modern
- Political and Diplomatic
- Intellectual and Cultural
- Social and Economic
- National Fields

Group III (Examined Teaching Field):
- World Civilization
- Western Civilization
- U.S. Civilization

Dissertation and Defense
Original research forms the basis for the dissertation. Doctoral candidates must register for a minimum of 3 hours of 600 Dissertation Research each semester and must complete 24 hours of dissertation credit. A final oral defense is given on the dissertation in its historical context. The program must be completed within eight years from admission as a potential candidate.

GRADUATE COURSES

415 Western Economic Thought Since the 18th Century
Methods of study of doctrinal history. Origins and evolution of major doctrines: classical and neoclassical economics; economics of Keynes and his followers, principal developments of second half of 20th century. Major writing requirement. May not be used toward graduate degree in History. Prereq: Introductory Economics or consent of instructor. (Same as Economics 415.)

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

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


511 Teaching World Civilization (3) Methodology, conceptualization, historiography, textbook selection and syllabus construction to prepare students to teach courses in world civilization.

512 Teaching Western Civilization (3) Methodology, conceptualization, historiography, textbook selection and syllabus construction to prepare students to teach courses in western civilization.

513 Teaching United States History (3) Methodology, conceptualization, historiography, textbook selection and syllabus construction to prepare students to teach courses in U.S. history.

521 M.A. Readings (3) Directed readings in preparation for M.A. examinations. Open only to master’s candidates in history. May be repeated. Maximum 6 hrs. S/NC only.

531 Topics in Premodern Europe (3) Reading seminar: secondary sources on premodern European movements and trends. Focus varies. May be repeated. Maximum 15 hrs.

532 Topics in Modern Europe (3) Reading seminar: secondary sources on movements and trends that are multinational in focus. Focus varies. May be repeated. Maximum 15 hrs.

533 Topics in European National History (3) Reading seminar: secondary sources on international topics, usually British, Russian, German or French. Focus varies. May be repeated. Maximum 15 hrs.


543 Topics in 20th-Century United States (3) Reading seminar: secondary sources on 20th-century U.S. Focus varies. May be repeated. Maximum 15 hrs.

551 Topics in the History of Foreign Relations (3) Reading seminar: secondary sources on foreign relations. Focus varies. May be repeated. Maximum 15 hrs.

552 Topics in Military History (3) Reading seminar: secondary sources on military history. Focus varies. May be repeated. Maximum 15 hrs.

553 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.

554 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.

555 Topics in United States Social and Economic History (3) Reading seminar: secondary sources on U.S. social and economic history. Focus varies. May be repeated. Maximum 15 hrs.

556 Topics in European Social and Economic History (3) Reading seminar: secondary sources on social or economic history of European nations. Focus varies. May be repeated. Maximum 15 hrs.

557 Topics in Cultural and Intellectual History (3) Reading seminar: secondary sources on cultural and intellectual history. Focus varies. May be repeated. Maximum 15 hrs.

558 Topics in United States Regional and Local History (3) Reading seminar: secondary sources on regions, states and cities of the South. Focus varies. May be repeated. Maximum 15 hrs.

559 Topics in Latin American History (3) Reading seminar: secondary sources in Latin America. Focus varies. May be repeated. Maximum 15 hrs.

560 Topics in Asian History (3) Reading seminar: secondary sources on Asian history. East Asia and Middle East. Focus varies. May be repeated. Maximum 15 hrs.

561 Topics in World History (3) Reading seminar: secondary sources for new topics. Focus varies. May be repeated. Maximum 15 hrs.

562 Topics in World History (3) Reading seminar: secondary sources in world history. May be repeated. Maximum 9 hrs.

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

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

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

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

621 Directed Readings (3) Directed readings to prepare candidates for doctoral comprehensive examination. May be repeated. Maximum 1 per doctoral field. S/NC only.

632 Seminar in Modern European History (3) Research seminar in primary sources culminating in scholarly paper in modern European history. Focus varies. May be repeated. Maximum 15 hrs.


651 Seminar in Military and Foreign Relations History (3) Research seminar in primary sources culminating in scholarly paper in military or foreign relations. Focus varies. Not restricted by national grouping. May be repeated. Maximum 15 hrs.


658 Seminar in United States Regional and Local History (3) Research seminar in primary sources culminating in scholarly paper in regional and local history. Focus varies. May be repeated. Maximum 15 hrs.

Holistic Teaching/Learning

(College of Education)

MAJORS

DEGREES

Education

L. Knight, Leader

Professors:

- Alexander, J. Estill (Emeritus), Ed.D.
- Kentucky Davis, A. R., Ph.D.
- Ohio State Hargis, Charles H. (Liaison), Ed.D.
- Colorado State Harris, G. A. Jr., Ph.D.
- Michigan Huff, P. (Emeritus), Ph.D.
- Ohio State Jost, Karl J., Ed.D.
- Oklahoma Knight, Lester N., Ph.D.
- Texas Rowell, C. Glennon, Ed.D.
- George Peabody Schindler, W. Jean, Ph.D.
- Kent State Turner, T. N., Ed.D.
- Pennsylvania

Associate Professors:

- Chao, Charles A., Ph.D.
- Ohio State Hannum, Michael C., Ed.D.
- Northern Colorado

Assistant Professors:

- Gilrane, Colleen P., Ph.D.
- Illinois Hendricks, A. D., Ph.D.
- Alabama

Instructor:

- Butterworth, Jennifer R., Ph.D.
- Vanderbilt

The Holistic Teaching/Learning unit participates in graduate programs leading to degrees, majors, and concentrations in Master of Science in Education.

Track 1-Elementary Education
Track 1-Modified and Comprehensive Education
Track 1-Secondary Education
Track 1-Social Science Education
Track 2-Elementary Teaching
Track 2-Modified and Comprehensive Special Education
Track 2-Secondary Teaching
The unit's central emphasis is on holistic, integrative, and interdisciplinary teaching/learning as opposed to teaching disciplinary subject content (e.g., science, mathematics, language arts) as separate entities. The focus is on the student in the classroom and how children learn and how language is central to the teaching/learning process. The faculty believe that students should be prepared as teachers who can facilitate learning rather than merely dispense content. Central to the philosophy of holistic teaching and learning is knowing each individual child's learning style, abilities, and interests.

**GRADUATE COURSES**

419 Psychology and Education of Students with Mild Disabilities (3) Nature and characteristics of persons with mild handicaps and educational strategies appropriate for these persons. Prereq: Special Education Principles, Special Education Strategies, and admission to teacher education program. Coreq. 420. F

420 Field Experience in Modified Programs (3) Practice in teaching in modified programs: planning, developing, implementing, and evaluating instruction. Prereq: Special Education Principles, Special Education Strategies, and admission to teacher education program. Coreq. 420. S/N only. F

421 Elementary and Middle School Science and Social Studies Instruction (3) Methodology and materials for teaching science and social sciences. Development of functional relationships and entities of two fields. Not open to students with previous work or background in teaching science and/or social studies. Prereq. Admission to teacher education. S

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/readiness and writing). Not open to students with recent course in language arts methods. Prereq. Admission to teacher education. F

430 Elementary and Middle School Developmental Reading Instruction (3) Word recognition (including phonics), comprehension, evaluation, and materials. Not open to students with recent course in reading methods. Prereq. Admission to teacher education. F

431 Field Experience in Comprehensive Programs (3) Prereq: Special Education Principles, Special Education Strategies, and admission to teacher education program. Coreq. S/N only. F

432 Psychology and Education of Students with Moderate/Severe Disabilities (6) Nature and characteristics of persons with moderate/severe disabilities and educational strategies appropriate for those persons. Prereq. Special Education Principles, Special Education Strategies, and admission to teacher education program. F

434 Topics in Reading Education (1-6) Prereq. Admission to teacher education and course in reading education. May be repeated. Maximum 6 hrs. S

454 Teaching Strategies and Issues in Social Studies Education (3) Goals, objectives, techniques, materials, and evaluation; directed observation in public schools; preparation of teaching plans and materials; simulated teaching experiences. Prereq. Admission to Teacher Education Program.

456 Speech and Language Basis of Learning Disabilities in the Classroom (3) Normal communication development; understanding of speech and language impairments in school-age children; integration of oral/written communication skills into existing curriculum, especially for high incidence special education majors.

470 Psychology of the Exceptional Child (3) Varieties of exceptional children; general characteristics and educational needs. Implications of developmental variation for functioning as adults. Opportunity to expand study upon particular exceptionalism. Enrollment limited to non-special education majors.

500 Thesis (1-16) 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 (2-3) May be repeated. Maximum 6 hrs. S/N only. E

504 Studies and Theory in Language Development (3) Studies and theory of language development in children. Prereq. 1 elementary school language arts course or consent of instructor. F

505 Elementary and Middle School Teaching Methods II (6) Applied methods of teaching reading, language arts, science, social studies, and mathematics; accommodation strategies for students with diverse needs. Prereq. Elementary and Middle School Teaching Methods I. Coreq. 579. F

506 Internships in Teaching in Special Education and Rehabilitation (3-15) Placement in professional settings in public schools or agencies under supervision of master practitioners. Enrollment limited to those in fifth-year program. S/N only.

518 Educational Specialist Research and Thesis (3) May be repeated. P/NP only. E

521 Teaching Social Studies in Elementary and Middle Schools (3) Planning and techniques. Trends in curriculum, development of concepts and generalizations, integration of social science with teaching of social studies or consent of instructor. Sp

523 Diagnosis and Correction of Children's Difficulties in Learning Mathematics (3) Children's difficulties in learning mathematics and procedures for helping classroom teachers. Prereq. 522 or equivalent or consent of instructor. Sp


525 Strategies, Programs, and Materials for Teaching Elementary Social Studies (3) Analysis of new and innovative social studies programs and materials and trends in social studies education. Prereq. Previous course in teaching of social studies or consent of instructor. Sp

527 Elementary School Curriculum (3) Examination, evaluation and application of current curriculum in early childhood education. Prereq. Consent of instructor. F

528 Teaching Language Arts Elementary and Middle School (3) Recent trends and current materials and methods in teaching of elementary language arts (except reading). Prereq. Consent of instructor or consent of instructor. F

529 Practicum in Diagnosis and Remediation of Difficulties in Learning Mathematics (3) Assessment and problem solving for children having difficulties in learning elementary school mathematics. Prereq. Consent of instructor. Su

530 Teaching Reading in Elementary and Middle Schools (3) Trends in methods, materials, basic approaches, skill development and assessment procedures for teaching reading at elementary school level. Prereq. Course in teaching of reading (single or joint with instructor). F, Su

534 Seminar in Reading Education (1-6) May be repeated. Maximum 6 hrs. E

536 Psychology of Reading (3) Reading act, relationship between learning theory and reading, role in reading in child's overall intellectual development. Affective and cultural factors. Prereq. 500-level course in reading education or consent of instructor. F

537 Diagnosis and Correction of Classroom Reading Problems (3) Theoretical and practical applications of specific reading diagnostic techniques; testing of elementary and/or secondary school students; preparing case studies and conducting parent conferences. Prereq. Course in diagnosis and correction of classroom reading problems or consent of instructor.

538 Practicum in Diagnosis of Reading Problems (3) Application of learning and teaching methodology in working with elementary and/or secondary school students on one-to-one or small group basis. Prereq. Course in diagnosis and correction of reading problems or consent of instructor.

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. All 1100-level language arts courses or consent of instructor.

553 Assessment of Exceptional Students (3) Current issues related to assessment; advanced study of evaluation models for special education, dynamic and other innovative assessment approaches; advanced study of application to educational programming; basic statistics and application in assessment.

554 Developmental Reading Practicum (3) Diagnosing and teaching children having developmental and corrective reading needs. Prereq. Course in diagnosis and correction of reading problems or consent of instructor. May be repeated. Maximum 4 hrs. Su

555 Characteristics of Affective/Motivational Functioning in Children with Disabilities (3) Definition, methods, identification and symptoms of children with affective motivational developmental disability. Comparison of normal developmental and that of children identified as disturbed or behavior disordered.

556 Instructional Systems for Affective/Motivational Education for Children with Disabilities (3) Educational strategies and models of instruction; simulation, demonstration, and practical teaching of developmental and that of children identified as disturbed or behavior disordered.

565 Seminar in Research Techniques in Special Education (3) Evaluation of appropriate research methodologies with handicapped populations.


590 Application of Microcomputer Technology in Special Education and Vocational Rehabilitation (3) Applic
Human Ecology
(College of Human Ecology)

MAJOR

Human Ecology ........................................ Ph.D.

The College of Human Ecology offers the Doctor of Philosophy degrees with a major in Human Ecology.

ADMISSION REQUIREMENTS

A completed file for review includes the Graduate School application file, departmental application, Graduate Record Examination (GRE) scores for the general test and three Graduate School Rating Forms completed by individuals who can attest to the potential for graduate education. Forms may be obtained from the Dean's Office, College of Human Ecology.

THE DOCTORAL PROGRAM

Graduate study leading to the Doctor of Philosophy degree with a major in Human Ecology is available in the Departments of Child and Family Studies; Consumer and Industry Services Management; Health and Safety Sciences; Human Resource Development; Nutrition. Concentration areas are child and family studies, community health, human resource development, nutrition science, textile science, and retail and consumer sciences. A major challenge of the doctoral program in Human Ecology is to draw upon basic research generated from the natural sciences, social sciences, human resources, and the arts, and to provide a holistic perspective that contributes to the improvement of individual and family well being. Within the College of Human Ecology, research from one discipline is enhanced by encompassing and utilizing the findings of research from other disciplines.

The Ph.D. is a research degree granted only to individuals who demonstrate proficiency in conducting original research. Course requirements for the degree are determined by the student's faculty committee, based upon college and departmental requirements and student needs. The Graduate School sets minimum requirements for the doctoral degree.

More specific information about the course of study is given under the individual academic departments that administer the Ph.D. concentrations.

MINOR IN GERONTOLOGY

An interdepartmental/interdisciplinary minor in gerontology gives the graduate student an opportunity for combining the knowledge and experience about aging in American society with his/her own major concentration.

Core courses and an internship are offered by the College of Social Work and selected departments within the colleges of Human Ecology, Education, and Arts and Sciences. A cross-listed seminar between contributing programs is designed to integrate experiences from different sources and to demonstrate the multi-faceted nature of working within an aging society.

Declaration of a Minor
Prior to earning more than one-half the total hours required for this minor, students must complete a "Declaration of a Minor in the College of Human Ecology" form. Copies of this form are available in the Dean's Office, Room 110, Jessie Harris Building.

Core Experience
Students must complete a core experience of 12 semester hours taken from at least three different departments including nine hours taken from outside the major department. Coursework needs to comply with the following framework:

1. Core coursework, 9 hours required. A variety of coursework may be taken toward satisfaction of this requirement. Courses which are offered on a regular basis include: Health 406, 465, Health/Public Health 560, Nutrition 518, Public Health 623, Retail and Consumer Studies 560, Social Work 666, Sociology 415, Psychosocial Studies 504, 522, 525, 526.
2. Advanced practicum, 2 hours required.
3. Students should register under practicum experiences in the "home" department of the supervising faculty.
4. Successful completion of a comprehensive examination covering subject matter of the minor.

Graduate Committee
At least one faculty member from the Gerontology Policy Committee who is qualified to work with graduate students, must serve on the graduate committees of each student who declares a gerontology minor. Contact Dr. Jim Moran, Associate Dean in Human Ecology, for a current list.

Admission to Candidacy
When application is made for admission to candidacy, indication of the minor must be noted on the Admission to Candidacy form.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The Ph.D. program in Human Ecology is available to residents of Alabama, Kentucky, Mississippi, Virginia (concentration in health education only), or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

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

520 Registration for Use of Facilities (3-15) Required for students who do not otherwise register during any semester when student uses University facilities and/or prior faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NP only. E

510 Integrative Nature of Home Economics (3) History and philosophy of home economics. Analysis of current programs and future directions in field. Examination of research, integrative framework. F.A

520 Directed Study in Human Ecology (1-3) Integrative topics. Prereq: At least 9 hrs of graduate study in college including courses from at least two departments or consent of instructor. May be repeated. Maximum 6 hrs. E
Human Resource Development

(College of Human Ecology)

MAJORS DEGREES

Human Ecology ......................... Ph.D.
Human Resource Development ......... M.S.

Gregory C. Petty, Head

Professors:
Campbell, Clifton P., Ed.D. .......... Maryland
Cheek, Gerald D. (Emeritus). Ph.D. ..... Kansas State
Coakley, Carroll B. (Emeritus). Ph.D. ..... Wisconsin
Craig, David G. (Emeritus). Ed.D. ...... Cornell
DeJonge, Jacqueline O., Ph.D. ...... Iowa State
Haskell, Roger W. (Emeritus). Ph.D. .. Purdue
Petty, Gregory C. Ph.D. .......... Missouri
Wagoner, George A. (Emeritus). M.S. .. Indiana

Associate Professors:
Brewer, Ernest W. (Liaison), Ph.D. ..... Tennessee
Dean, Peter J., II. Ph.D. ............... Iowa
Sclut, Vickie J., Ed.D. ................. Tennessee

Assistant Professor:
Pierce, Randal. Ph.D. ................. Ohio State

THE MASTER'S PROGRAM

The Master of Science degree with a major in Human Resource Development provides a flexible graduate program for professionals wishing to pursue graduate study within and across subject areas of Human Resource Development; those who work with individuals to help them enter the workforce; those who train individuals already in the workforce; and those who help individuals in the workforce advance their positions.

The M.S. degree with a major in Human Resource Development offers two concentrations, each providing opportunities for specialized interests. The training and development concentration is designed to meet the needs of professionals who work in programs encompassing all areas of human resource development. Applicants without an undergraduate degree in an area related to human resource development may be required to take 501 as a prerequisite and to complete an internship as part of their program. The teacher licensure concentration is specifically for students who seek initial teacher licensure in family and consumer sciences education, business and marketing education, and technology education. This program requires admission to Teacher Education and has specific prerequisites. Thesis and non-thesis options are available for both tracks.

Admission Requirements

Training and Development Concentration applicants are to submit an application for admission to the Teacher Education School, three letters of reference from individuals familiar with their potential for success in academic work, and a statement describing personal career objectives directly to the Department of Human Resource Development. Applicants must meet the admission requirements of the Teacher Education School and present evidence of ability to do graduate work, including a GPA of at least 2.7 on a 4.0 scale for the last two years of undergraduate work. Any student below this level of academic quality must justify admission via other exceptional credentials. If the applicant has prior work experience in human resource development, a reference letter should also be provided by the work supervisor. Recent Graduate Record Examination or Miller’s Analogy Test scores are required of all applicants except for those applying for the teacher licensure concentration. Students who have not taken an appropriate undergraduate statistics course will be required to take one as part of their graduate program. All applicants are required to be interviewed by the department admissions board.

Teacher Licensure Concentration applicants are to submit an application for admission to the Teacher Education School with a GPA of at least 3.0 and an oral comprehensive examination. The internship experience (575) is twelve hours of credit and is the culminating experience. Students choose another 3 hours of coursework to support the teaching field. The thesis option requires six hours of Thesis and an oral comprehensive examination. The 39-hour non-thesis option (36 hours if statistics is waived) includes 3 hours of research methodology (604) and a letter of reference from persons familiar with their potential for success in doctoral work, and a statement describing personal career objectives directly to the Department of Human Resource Development.

Applicants must hold a master’s degree from an accredited institution and present evidence of ability to do Ph.D. work, including having maintained a graduate GPA of 3.3 on a 4.0 scale or better. If the applicant has prior work experience in human resource development, a reference letter should also be provided by the work supervisor. Graduate Record Examination scores are required of all applicants. All applicants are required to be interviewed by the department admissions board.

Note: For students in the Nashville area, only the training and development concentration is available.

THE PH.D. CONCENTRATION

Admission Requirements

Applicants are to submit an application for admission to the Teacher Education School, five letters of reference from persons familiar with their potential for success in doctoral work, and a statement describing personal career objectives directly to the Department of Human Resource Development. Applicants must hold a master’s degree from an accredited institution and present evidence of ability to do Ph.D. work, including having maintained a graduate GPA of 3.3 on a 4.0 scale or better. If the applicant has prior work experience in human resource development, a reference letter should also be provided by the work supervisor. Graduate Record Examination scores are required of all applicants. All applicants are required to be interviewed by the department admissions board.

Any person whose native language is not English must submit results of the Test of English as a Foreign Language (TOEFL). A minimum score of 600 is required for admission consideration.

Degree Requirements

The Doctor of Philosophy degree with a major in Human Ecology and a concentration in human resource development is for graduate students who seek careers in higher education or as managers/administrators of HRD. The curriculum is designed to enable students to achieve professional objectives, develop...
needed competencies, and gain desirable experiences and understanding of human resource development. Students must possess a master's degree before acceptance to the program. A minimum of 95 hours beyond the baccalaureate is required.

Concentration (15 hours): Must include courses to support Human Resource Development and may be taken from the master's degree.

Departmental Core (17 hours): Must include 510, 511, 512, 557, 559 or equivalents and 604.

Specialization (12 hours): Must support a career path of university faculty member or manager of education/training.

Cognate (6 hours): Must be drawn from an academic unit outside the department, support specialization, and be represented by a committee member.

Related Studies (6 hours): Research and theory in support of theoretical framework.

Research and Statistics (15 hours): Statistics must include advanced statistics such as multivariate analysis and computer application, 9 hours minimum; research methodology must include 504 and 610 or equivalents, 6 hours minimum.

Internship (6-6 hours): Required for those changing career path.

Dissertation (24 hours): Must be original research project.

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 is available to residents of the state of Kentucky. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions.

GRADUATE COURSES

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.

430 Principles and Organization of Business and Marketing Education (3) Historical background and development needs. Principles of vocational education in business and marketing; understanding of institutions, establishing, evaluating, and improving programs.

455 Learner and Program Evaluation (3) Assessing effectiveness of teaching or educational programs; developing performance-based measures; evaluating job performance; and measuring learner progress. Prereq: Program Planning for Training, Development, and Education.

476 Supervised Occupational Experience (3) Practical field experience in business/industry/community-based settings related to area of study. Prereq: Senior standing and consent of advisor. May be repeated. Maximum 9 hrs. E

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

501 Survey of Human Resource Development (3) Training and development as practiced in organizations: needs assessment, transfer of workplace skills, evaluation, development of training program proposals, assessment

of personal competencies, values, goals, and training program design and administration.

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) May be repeated. Maximum 6 hrs. S/NC only. E

504 Research in Human Resource Development (3) Solution of problems encountered in human resource development. Review of studies unique to human resource development. Prereq: 604 or equivalent credit. F, Su

505 Selection, Placement, and Follow-up Procedures in Human Resource Development (3) Methods and procedures utilized in establishing criteria for trainee selection and placement. Prereq: Program Planning for Training, Development, and Education. F, Su

506 Developing Organizational Resources (3) Strategies for developing human and organizational resources through community partnerships and learning. Effective utilization of human resources through active learning programs. Sp

509 Internship in Human Resource Development (3) Practical field experiences in selected settings under supervision of practical and departmental representative. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E


512 Human Resource Management (3) Process-systems approach to human resource management: interdependent human resource activities (planning, work design, staff development, training and development, compensation, etc.) and organizational goals.

513 Special Topics in Human Resource Development (1-3) Specific objectives, activities, and evaluation. Prereq: Consent of Instructor. May be repeated. Maximum 9 hrs. E

514 Individual Study in Human Resource Development (3) Prereq: Consent of supervising instructor. Approval form must be filed in office of department head. May be repeated. Maximum 6 hrs. E

515 Microcomputer Operations and Programming in Education (3) Operating procedures and BASIC programming for education and training applications. Hands-on experience in operating and programming microcomputers, writing, debugging and running educational programs using sequential data files. Prereq: Teaching, administrative, or related experience in education or training; or consent of instructor.

516 Microcomputer Software Development (3) Advanced software design in BASIC, random access and binary files, search and sort algorithms, and bitmapped graphics for educational environments. Hands-on programming and development program. Prereq: 515 or consent of instructor.

521 Design and Development of Instruction (3) Curriculum development and program planning; design of instruction; development of testing materials for classroom and educational purposes; and development of advisory committees. Prereq: Consent of instructor.

551 Organization and Supervision of VOE and Marketing Programs (3) Developing office and marketing occupations, guidelines for cooperative laboratory, and model office programs. Trends in office and cooperative education, physical facilities, state plans, instructor qualifications and advisory committees. Prereq: Consent of instructor. F, Su

552 Administration of Industrial Education Programs (3) Developing, staffing, administering and evaluating training, industrial and technical education programs in secondary and post-secondary school settings. Prereq: Consent of Instructor. F, Su

554 Technical Program Planning (3) Instructional systems attending to analysis, design, development, implementation, and evaluation of technical, instructional and related training. Prereq: Curriculum development courses and consent of instructor. F, Su

555 Internship in Human Resource Development (3) Practical field experiences in selected settings under supervision of practical and departmental representative. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E

556 Organization Development (3) Strategies and interventions for organizational change and development of staff. Models, assessment, organizational change and consultants role. Prereq: Consent of instructor. F

597 Methods of Teaching Conceptual Content (3) Proper selection and effective application of methods for teaching and learning conceptual content. Communication strategies for conceptual content comprehension, retention, and application.

598 Seminar in Industrial Education (1-3) Current issues, innovations, problems associated with technical programs. Prereq: 12 hrs of graduate courses. May be repeated. Maximum 6 hrs. E

599 Program Evaluation (3) Concepts, principles, practices, theories, and trends related to program evaluation. Planning and conducting a comprehensive program evaluation in a variety of settings. Fundamentals of design, measurement, return-on-investment (ROI), and presentation and dissemination of results to stakeholders.

600 International Perspective of Workforce Training (3) Examination and comparison of workforce systems in highly industrialized countries. In-school training programs, out-of-school training systems, update training of incumbent workers, retraining displaced workers, transfer of new technologies, and role and responsibilities of businesses, private sector organizations/agencies, and state and federal government agencies.

602 Grant Writing and Project Implementation (3) Writing, planning, and implementing federal and state sponsored projects and proposals. Prereq: Consent of instructor.

654 Self-Directed Work Teams (3) Theory and practice of implementing self-directed work teams, motivating employees, increasing employee productivity via teams and related issues.

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

671 Curriculum Planning in Human Resource Development (3) Curriculum theory, models, contents, planning evaluation, and implementation of specialized program areas. Prereq: 555 or equivalent credit. F, Su

684 Research Forum in Human Resource Development (2) Development of theoretical framework, research design, evaluation techniques and qualitative and quantitative strategies for investigations of problems and issues in human resource development. Initial enrollment Fall only. Continuous enrollment required for 2 yrs. May be repeated. Maximum 12 hrs. S/NC only. E

690 Research Development in Human Resource Development (3) Proposal development, theoretical base,
Inclusive Early Childhood Education

(College of Education)

MAJORS DEGREES

Education ........................................ M.S., Ph.D.

Susan Benner, Leader

Professors:

Benner, Susan M., Ed.D. .......... Columbia
Coleman, Laurence J., Ph.D. .......... Kent State
Hatch, J. Amos, Ph.D. .......... Florida

Associate Professor:

Cagle, Lynn C., Ed.D. .......... Georgia

Assistant Professor:

Judge, Sharon L., Ph.D. .......... California (Santa Barbara)

The inclusive Early Childhood Education unit participates in graduate programs leading to degrees, majors, and concentrations in:

- Master of Science in Education

Education

- Track 1: special education: early childhood
- Track 2: elementary education
- Track 2: special education: early childhood
- Track 2: elementary teaching

Doctor of Philosophy

Education

- Early childhood education

See Education under Fields of Instruction for full description of all degree requirements. Early childhood licensure and degree programs are also available through the College of Human Ecology.

The unit is focused on the preparation of teachers for the education of all young children with and without disabilities in inclusive settings. All young children are defined as children from birth to age eight, including children of poverty, those of color, with disabilities, with advanced development and "mainstreamed" children.

GRADUATE COURSES

465 Early Childhood Education: Program Development and Teaching in Kindergarten (3) Curriculum planning, classroom organization and management practices for teaching young children; relationship of kindergarten to total elementary school. Prereq: Admission to teacher education.

454 Education of the Gifted and Talented Children (3) Orientation to psychometric and behavioral studies of giftedness. Analysis of past and present school practices and their influence on curriculum and program implementation. Sp
research based on accepted theory, organizational behavior, psychology, management, and statistics. The degree program is administered by a committee appointed by the Associate Vice Chancellor and Dean of The Graduate School on recommendations from the Management Department head and the program director.

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

**ADMISSION REQUIREMENTS**

Applicants for admission should request information and application forms from both the Office of Graduate Admissions and Records (218 Student Services Building) and the Director, Industrial and Organizational Psychology Program at the 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: New students are admitted in fall semester only, and applications must be received by the Graduate Admissions and Records Office by February 1.

The master's degree in Industrial and Organizational Psychology is generally not required of individuals pursuing a doctoral degree.

**General Requirements**

At least one year of college mathematics and one course in statistics are required. Ordinarily, an undergraduate grade-point average of 3.5 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 DOCTORAL PROGRAM**

The Ph.D. degree with a major in Industrial and Organizational Psychology can be completed with a minimum of 90 semester hours in the major. Students must be in residence full time for one year; must maintain an overall 3.0 grade-point average with no more than one grade below B in the I/O Psychology, General Psychology, and Statistics core; must complete an applied research project prior to beginning dissertation work; must pass a comprehensive examination; and must pass a final oral examination on their dissertation research.

**Course Requirements:**

<table>
<thead>
<tr>
<th>Course Requirements</th>
<th>Hours</th>
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<tbody>
<tr>
<td>I/O Psychology Core</td>
<td>9</td>
</tr>
<tr>
<td>567, 568, 569</td>
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<table>
<thead>
<tr>
<th>Research Core</th>
<th>12</th>
</tr>
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<tbody>
<tr>
<td>Statistical Principles (Statistics 537 &amp; 538 or equivalents)</td>
<td></td>
</tr>
<tr>
<td>Multivariate Statistics (Statistics 579, 679 or equivalent)</td>
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<tr>
<td>Advanced Research Methods (605 or equivalent)</td>
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</table>

<table>
<thead>
<tr>
<th>General Psychology Core</th>
<th>9</th>
</tr>
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<tbody>
<tr>
<td>One course in each of the following areas: biological bases of behavior, cognitive bases of behavior, history and systems of psychology.</td>
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<table>
<thead>
<tr>
<th>I/O Psychology Seminars</th>
<th>9</th>
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<tbody>
<tr>
<td>600 level I/0PSY courses, from a program committee approved list.</td>
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<tr>
<th>Approved Electives</th>
<th>9</th>
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<tbody>
<tr>
<td>Courses supporting the student's course of study.</td>
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</table>

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<tr>
<th>Supervised Practicum, Internship, or Field Training (890)</th>
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<tbody>
<tr>
<td>Ethics (635 or equivalent)</td>
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<tr>
<td>Dissertatiion (600)</td>
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<tr>
<td>TOTAL</td>
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</tbody>
</table>

**ACADEMIC COMMON MARKET**

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

**GRADUATE COURSES**

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
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<tbody>
<tr>
<td>520</td>
<td>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 complete. May not be used toward degree requirements. May be repeated. S/N/C only. E</td>
</tr>
<tr>
<td>525</td>
<td>Research in Industrial/Organizational Psychology (1-3) Available only to students admitted to program or by prearrangement with program director. May be repeated. Maximum 6 hrs. S/N/C or letter grade.</td>
</tr>
<tr>
<td>567-68</td>
<td>Proseminar in Industrial/Organizational Psychology (3,3) Basic thought, concepts, and issues required for advanced graduate study in industrial and organizational psychology. Must be taken during first year of study in program. Consent of instructor required for non-program students.</td>
</tr>
<tr>
<td>569</td>
<td>Applied Measurement for Industrial/Organizational Psychology (3) Basic techniques for collection and evaluation of individual and organizational data using both classical and modern psychometric techniques. Relevant statistical models: reliability analysis, and exploratory and confirmatory factor analyses.</td>
</tr>
<tr>
<td>600</td>
<td>Doctoral Research and Dissertation (3-15) P/N/P only.</td>
</tr>
<tr>
<td>605</td>
<td>Advanced Research Methods in Psychology (3) Critical analysis of new and evolving techniques for psychological research; new statistical and psychometric methods.</td>
</tr>
<tr>
<td>610</td>
<td>Individual Organizations Seminar (3) Bridging principles and processes which link individual attributes with macro organization concern; culture, climate, and group decision-making.</td>
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<tr>
<td>611</td>
<td>Seminar in Organizational Leadership (3) Current theories, concepts, and issues associated with psychology of organizational leadership. Prereq: 567-68 or consent of instructor.</td>
</tr>
<tr>
<td>612</td>
<td>Seminar in Work Motivation (3) Current theories, concepts, and issues associated with psychology of work motivation. Prereq: 567-68 or consent of instructor.</td>
</tr>
<tr>
<td>613</td>
<td>Seminar in Performance Appraisal (3) Current issues, problems, and research in performance appraisal and criterion development; applications in compensation. Prereq: 567-68 or consent of instructor.</td>
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</table>

**DEGREES**

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<thead>
<tr>
<th>Degree</th>
<th>Major</th>
<th>Degree</th>
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<tbody>
<tr>
<td>M.S.</td>
<td>Industrial Engineering</td>
<td>M.S.-MBA</td>
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<tr>
<td>T. E. Shannon, Acting Head</td>
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**Professors:**


**Associate Professors:**


**Assistant Professors:**


**Industrial Engineering**

(College of Engineering)

**MAJOR DEGREES**

<table>
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<tr>
<th>Degree</th>
<th>Major</th>
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<tbody>
<tr>
<td>M.S.</td>
<td>Industrial Engineering</td>
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<tr>
<th>Faculty</th>
<th>Department</th>
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<tbody>
<tr>
<td>T. E. Shannon, Acting Head</td>
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</tr>
</tbody>
</table>

**Professors:**


**Associate Professors:**


**Assistant Professors:**


The Department of Industrial Engineering offers a graduate program leading to the Master of Science degree with a major in Industrial Engineering, concentrations in traditional industrial engineering, engineering management, and manufacturing systems engineering. The Ph.D. with a major in Engineering Science is available through the Department of Mechanical and Aerospace Engineering and Engineering Science with a concentration in industrial engineering.
THE MASTER'S PROGRAM

Students who enroll in the Master of Science degree may select a concentration in industrial engineering, engineering management or manufacturing systems engineering. Admission is open to graduates of ABET-accredited undergraduate curricula in engineering, or to graduates of other technical curricula who satisfy prerequisites depending on their academic backgrounds. Policies concerning prerequisite requirements will be determined by the Industrial Engineering faculty.

Industrial Engineering

Under the industrial engineering concentration, students may select either the thesis or non-thesis option. The thesis option requires 27 hours of coursework and 6 hours thesis. The non-thesis option requires 30 hours of coursework plus a 3-hour design project.

Depending upon a student's background and career objectives, graduate work in industrial engineering enables the student to select an area of specialization from operations research, human factors engineering, information systems engineering, maintenance and reliability engineering, or general industrial engineering.

Engineering Management

The engineering management concentration has an additional admission requirement of two years' U.S. industrial experience as a practicing engineer or scientist, or current full-time employment in an appropriate engineering or applied science position. The program is non-thesis and requires 33 hours of coursework plus a 3-hour thesis. This concentration is fully supported off-campus utilizing electronic media for video taping and interactive distance teaching methods.

Manufacturing Systems Engineering

Under the manufacturing systems engineering concentration, students may select either the thesis or non-thesis option when taking the M.S. degree program, or the non-thesis option only when taking the dual M.S.-MBA program. The thesis option requires 27 hours of coursework and 6 hours of thesis. The non-thesis option requires 30 hours of coursework (33 hours in the dual M.S.-MBA program) plus a 3-hour design or industrial project problem.

DUAL M.S.-MBA PROGRAM

The College of Engineering and the College of Business Administration offer a coordinated program leading to the Master of Science degree with a major in Industrial Engineering (concentration in manufacturing systems engineering) and the Master of Business Administration degree (concentration in manufacturing management). The dual program saves the student one or two semesters over the time that would be required to earn both degrees independently.

The establishment of the dual program addresses the critical need for personnel trained in both engineering and management who can integrate this increasingly complex body of knowledge into the efficient operation of manufacturing and production firms. The program is designed to accommodate the interests of students who desire a career leading to a leadership position in a manufacturing/production organization.

Admission Requirements

Applications are accepted for fall semester only. Applications for the M.S.-MBA program must make separate application to, and be competitively and independently accepted by, The Graduate School for the Master of Business Administration degree program and the Master of Science degree program with a major in Industrial Engineering, and by the Dual Program Committee.

Students will initially apply for the MBA program, indicating on that application the intent to pursue the dual M.S.-MBA program in manufacturing (refer to the MBA program for separate instructions). Students accepted for both degree programs will be assigned by the Dual Program Committee advisors who will be responsible for supervision of the student's progress through the dual program.

Applications by U.S. citizens and permanent residents received after the MBA application deadline (March 1) will be considered as space allows. Additional information is required, and different application dates are established by The Graduate School for international students.

Curriculum

The curriculum in the first academic year of the dual M.S.-MBA program is the two-semester core of the MBA program (two 15-hour courses, one each semester). A 1-hour seminar course each semester in manufacturing will also be taken concurrently during the first two semesters (required for graduate credit). A 3-hour design or industrial project problem will be accomplished in the summer term of the first year. This will be part of a summer internship in industry, and the project will be academically supervised by a faculty member associated with the dual program.

During the second year, 27 hours of coursework will be completed in the manufacturing systems engineering concentration in Industrial Engineering plus an additional 9 hours of graduate courses in the College of Business Administration acceptable in meeting the requirements of the MBA program. Fifteen hours will be taken during each of the first two semesters of the second academic year. A culminating 6-hour integrated case study requiring use of most previous material, and a final examination as required by the Dual Program Committee, will be taken during the first session of summer term of the second year.

The dual degree candidate must satisfy the curriculum and graduation requirements of the Department of Industrial Engineering and the College of Business Administration. Dual degree students withdrawing from the dual program before completion of both degrees will not receive credit toward graduation in either degree program for courses in the other degree program, except as such courses qualify for credit without regard to the dual degree program. The M.S. and the MBA degrees will be awarded upon successful completion of the requirements of the dual program.

Approved Dual Credit

A maximum of 6 semester hours of approved graduate-level courses completed in the College of Business Administration may be counted toward the M.S. degree program with a major in Industrial Engineering. A maximum of 15 semester hours of approved graduate-level courses completed in the Department of Industrial Engineering may be counted toward the MBA degree program. The approval of courses is the responsibility of the Dual Program Committee and the student's assigned advisor.

Note: Any 400-level course required in the Bachelor of Science in Industrial Engineering program at UT Knoxville may not be used for graduate credit in the M.S. degree program.

Industrial Engineering

GRADUATE COURSES

401 Integrated Manufacturing Systems (NC) and CNC machine tools, robotics and related materials handling systems, hand automation, alternative integrated manufacturing systems, and manufacturing information control systems. Prereq: 400.

402 Production System Planning and Control (NC) Theory and application of forecasting systems, regression and time series models, independent demand inventory models, development of safety stock, optimization of policies. Coverage of modules of Manufacturing Resource Planning (MRP) Systems: master production scheduling, resource requirements planning, bill of material and inventory, facility structures, material requirements planning, capacity planning, shop floor and purchase order control. Overview of just-in-time inventory concepts and MRP's role in manufacturing automation. Prereq: 301.


405 Engineering Economic Analysis (NC) Engineering economy and application in engineering practice. Time value of money and discounted cash flow techniques. Decision making based on the time value of money and discounted cash flow techniques. Decision making based on the time value of money and discounted cash flow techniques. Decision making based on the time value of money and discounted cash flow techniques. Decision making based on the time value of money and discounted cash flow techniques. Decision making based on the time value of money and discounted cash flow techniques. Decision making based on the time value of money and discounted cash flow techniques. Decision making based on the time value of money and discounted cash flow techniques. Decision making based on the time value of money and discounted cash flow techniques. Decision making based on the time value of money and discounted cash flow techniques.
Science and Engineering 484, and Mechanical Engineering 484.

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

501 Design Project (3-15) 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 time before degree is completed. May not be used toward degree requirements. "Drop registered." Prereq: Enrollment in non-thesis program. May be repeated. Maximum 6 hrs. S/NC only.

513 Facilities Planning and Design (3) Modern materials handling techniques, computer-aided layout techniques, application of operation research models, and use of these to design manufacturing facility. Prereq: Production Facilities Design and Material Handling or consent of instructor.

514 Advanced Information Systems Analysis and Design (3) Systems analysis and systems control concepts applied to systems of information. Role of IE in office and factory of future. Management support systems, decision support systems, and integrated support systems.

515 Advanced Production and Inventory Systems (3) Advanced topics in production planning and inventory systems. Material requirements planning; production planning and master scheduling; just-in-time concepts; distribution requirements planning; and other selected topics. Prereq: 402 or consent of instructor.

517 Reliability Engineering (3) Continuous time random processes with applications to availability of equipment and manufacturing systems. Failure densities and failure data analysis. Maintainability; reliability-based criteria for product acceptance. Prereq: 516.

518 Advanced Engineering Economic Analysis (3) Application of engineering economic analysis in complex decision situations. Inflation and price changes; uncertainty evaluation using nonprobabilistic techniques; capital financing and project allocation; evaluations involving equipment replacement, investor-owned utilities, and public works projects; probabilistic risk analysis including computer simulation and decision trees; multiattribute decision analysis; and other advanced topics. Prereq: 505 and Probability and Statistics for Scientists and Engineers I or equivalent.

519 Human Factors Engineering and Ergonomics (3) Application of human factor and ergonomic concepts and principles to design and analysis of man/machine systems and products. Human factors in information processing; human computer interface; design of workstations and office ergonomics; design of displays and controls; hand tool design; and cumulative trauma injuries. Prereq: Probability and Statistics for Scientists and Engineers I or consent of instructor.

520 Human Factors and Product Safety Engineering (3) Role of human factors and safety engineering, legal implications in product design, product liability, system safety, and system failure analysis. Product testing, reliability, and system safety analysis techniques. Case histories of safety investigations, reconstruction, and causation, and product liability litigation. Prereq: 519 or consent of instructor.

521 Advanced Human Factors Engineering Methodology (3) Advanced methodologies used in human factors engineering. Observations, functional task analysis, computerized human factors design methods; human reliability and error prediction; evaluation of human-machine interface; modeling techniques; questionnaire and survey development; and other selected topics. Prereq: 519 or consent of instructor.

522 Optimization Methods in Industrial Engineering (3) Classical optimization applied to constrained and unconstrained, non-linear, integer, and integer programming; search techniques; decision-making under uncertainty; game theory; and dynamic programming. Prereq: Operations Research or Engineering Management 537.

523 Mathematical Programming (3) Same as Management Science 531.


526 Systems Modeling and Simulation (3) Modeling of discrete, continuous, and combined systems using current simulation software. Input distributions, output data analysis, model validation, variance reduction techniques, and design of simulation experiments. (Same as Management Science 526.)

527 Lean Production Systems (3) Characteristics and performance of mass and lean production systems. Lean production concepts and principles. Planning, designing, and implementing lean production systems: line balancing, setup time reduction, maintenance support and other selected topics. Application at enterprise level to achieve strategic competitive goals. Prereq: 515 or consent of instructor.

591-92-93 Special Topics in Industrial Engineering (1-3, 1-3, 1-3) Individual or group research projects. Prereq: Consent of instructor. May be repeated.


602 Nonlinear Optimization (3) Same as Management Science 561.


606 Advanced Topics in Human Factors, Safety and Biomechanical Engineering (3) Advanced topics in human factors engineering and safety, biomechanics, and accident prevention. Prereq: 537 or consent of instructor.

607 Advanced Human Factors, Safety and Biomechanical Engineering (3) Application of human factors, safety, and biomechanical engineering concepts and principles to design and analysis of man/machine systems and products. Human factors in information processing; human computer interface; design of workstations and office ergonomics; design of displays and controls; hand tool design; and cumulative trauma injuries. Prereq: Probability and Statistics for Scientists and Engineers I or consent of instructor.

608 Theory and Practice of Engineering Management (3) Manager's perspective; business definition; management planning and control; performance measurement; process management; quality, productivity, and organizational capabilities. Principles of total quality management; systems theory, analysis, and design; process control; production lines; statistical process control; and other selected topics. Prereq: 537 or consent of instructor.

610 Special Topics in Industrial Engineering (3-3, 1-1-1) Individual or group research projects. Prereq: Graduate standing and consent of instructor. May be repeated with consent of instructor.

611-12-13 Advanced Topics in Industrial Engineering (3, 3, 3) Study of advanced research topics for graduate students. Prereq: 537 or consent of instructor.

612-13-14 Advanced Topics in Industrial Engineering (3, 3, 3) Study of advanced research topics for graduate students. Prereq: 537 or consent of instructor.

615 Total Quality Management and Beyond (3) Continu-ous improvement in capabilities, competitiveness, and productivity of organizations. Principles of total quality management; systems theory, analysis, and design; process control; production lines; statistical process control; and other selected topics. Prereq: 537 or consent of instructor.

618 Simulation (3) Computer simulation: queuing; inventory control; personnel scheduling; and other selected topics. Prereq: 122 or permission of instructor.

620 Project Management (3) Development and management of engineering projects. Project proposal preparation; resource and cost estimating; and techniques for project planning, organizing, and controlling. Prereq: 518, 523, 537 or consent of instructor.

621-92-93 Special Topics in Industrial Engineering (1, 1, 1) Individual or group research projects. Prereq: Consent of instructor. May be repeated.

622 Optimization Methods in Engineering Systems (3) Classical optimization applied to constrained and unconstrained, non-linear, integer, and integer programming; search techniques; decision-making under uncertainty; game theory; and dynamic programming. Prereq: Operations Research or Engineering Management 537.

635 Project Management (3) Development and management of engineering projects. Project proposal preparation; resource and cost estimating; and techniques for project planning, organizing, and controlling. Prereq: 518, 523, 537 or consent of instructor.

636 Project Management (3) Development and management of engineering projects. Project proposal preparation; resource and cost estimating; and techniques for project planning, organizing, and controlling. Prereq: 518, 523, 537 or consent of instructor.

637 Cost and Engineering Economics (3) Cost and engineering economics. Prereq: 518, 523, 537 or consent of instructor.

639-92-93 Special Topics in Industrial Engineering (1-3, 1-3, 1-3) Individual or group research projects. Prereq: Consent of instructor. May be repeated.

640 Labor Relations (3) Negotiation and administration of labor agreements. Survey of historical, legal, and structural environments that influence collective bargaining processes. Prereq: 537 or consent of instructor.

641 Total Quality Management and Beyond (3) Continu-ous improvement in capabilities, competitiveness, and productivity of organizations. Principles of total quality management; systems theory, analysis, and design; process control; production lines; statistical process control; and other selected topics. Prereq: 537 or consent of instructor.

645 Total Quality Management and Beyond (3) Continu-ous improvement in capabilities, competitiveness, and productivity of organizations. Principles of total quality management; systems theory, analysis, and design; process control; production lines; statistical process control; and other selected topics. Prereq: 537 or consent of instructor.

646 Theory and Practice of Engineering Management (3) Manager's perspective; business definition; management planning and control; performance measurement; process management; quality, productivity, and organizational capabilities. Principles of total quality management; systems theory, analysis, and design; process control; production lines; statistical process control; and other selected topics. Prereq: 537 or consent of instructor.

647 Total Quality Management and Beyond (3) Continu-ous improvement in capabilities, competitiveness, and productivity of organizations. Principles of total quality management; systems theory, analysis, and design; process control; production lines; statistical process control; and other selected topics. Prereq: 537 or consent of instructor.
Information Sciences

(Office of the Vice Chancellor for Academic Affairs)

MAJOR
Information Sciences

DEGREE
M.S.

Elizabeth Aversa, Director

Professors:
Aversa, Elizabeth, Ph.D. .... Drexel
Tencir, Carol, Ph.D. ......... Illinois
Wilson, P. (Emeritus), Ph.D. .... Michigan

Associate Professors:
Fisher, Patricia L., Ph.D. .......... Florida State
Pollard, Richard, Ph.D. ....... Brunel (UK)
Robinson, William C., Ph.D. .......... Illinois

Assistant Professors:
Bilal, Dania, Ph.D. .... Florida State
Raber, Douglas, Ph.D. ........ Indiana
Wang, Peiling, Ph.D. .... Maryland
Watson, Jinx, Ed.D. .... Vanderbilt
Whitney, Gretchen, Ph.D. ........ Michigan

The School of Information Sciences provides a program leading to the preparation of librarians and information professionals for work in all types of libraries and information centers. The program of study includes a graduate curriculum leading to the Master of Science degree. The program is accredited by the American Library Association. A Ph.D. degree program may also be pursued with a major in Communications, concentration in information sciences.

The mission of the school is to educate people to live, work and flourish in an information society through excellence in teaching, research, and public service in Information Sciences. The goals and objectives of the school are:
A. To prepare students to understand the nature of information and the role of the library and other information agencies in the management of information resources, and the facilitation of information transfer. Students will demonstrate:
1. Knowledge of the generation, production, management, dissemination and uses of information.
2. Knowledge of the roles of various organizations/institutions in promoting the flow of information.
3. An understanding of the role of the information professional as mediator between information resources and their users.
4. An understanding of the roles of various tools and technologies in facilitating access to information.
5. An understanding of the structure and content of information resources in various formats and subjects.
6. Knowledge of theoretical and practical evolution of information sciences and technologies and their relationship with other disciplines.
7. Competence in creating, managing and accessing information in a variety of formats.

B. To provide services to the state, region, and nation in association, consulting and continuing education activities which will promote the development and improvement of information systems and services such that the school’s contributions reach beyond its immediate academic programs. The school will provide:
1. Continuing education for information professionals and, on a selective basis, to persons outside the information field.
2. Advisory services to information organizations.
3. Leadership for professional associations.
4. To conduct basic and applied research which promotes the generation of new knowledge, services and technology. The school will encourage:
   1. Research which strengthens its instructional and public service programs.
   2. The use of a variety of research methods.
   3. Sharing the results of its research.
   4. Increased research quality and productivity.

ADMISSION REQUIREMENTS

Applicants to the Information Sciences program must have a minimum undergraduate grade-point average of 3.0 or a satisfactory graduate degree grade-point average for admission as a potential candidate for the MS degree.

The verbal, quantitative and analytical aptitude portions of the Graduate Record Examination (GRE) are required of all applicants unless a graduate degree has been completed prior to application for admission.

Applicants should take the GRE at least one semester in advance of application for admission and are expected to score 1500 points or better.

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

THE MASTER'S DEGREE

The program leading to the Master of Science involves a total of 42 semester hours of graduate courses, 15 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 36 hours must be taken in the School of Information Sciences, allowing up to 6 hours outside the school with a maximum of 6 from outside the University.

Core Curriculum

The core curriculum is a 15 semester hour sequence of five courses required of all students: 490, 520, 530, 560, 580. These courses address the evolving information environment; foundations of information sciences and technologies; information resources selection, acquisition and evaluation; information content representation; Information access and retrieval.

The 15-hour core course prerequisite to all elective courses for students enrolled in the MS degree program. Elective courses may be taken in the final semester of core course work with permission of the advisor and the instructor of each elective course selected.

Individualized Curriculum Approach

Students, in consultation with their advisor, may wish to pursue a curriculum focus to develop an individualized program of study. Graduates of the school have prepared themselves for a variety of careers, including positions as: corporate information specialist, public librarian, records manager/archivist, web page designer, indexer/abstractor, online information retrieval specialist, medical or law librarian, reference librarian, youth services specialist, and many others. Once the core courses have been completed, students are encouraged to take advantage of the individualized curricular approach.

Whatever individualized curriculum is chosen, all students who complete the program receive an M.S. degree accredited by the American Library Association (ALA).

For those pursuing Tennessee State Department of Education licensure as a school library information specialist, stipulated requirements apply. See following section.

Tennessee State Department of Education School Library Information Specialist Requirements

The requirements for the Tennessee State Department of Education School Library Information Specialist Initial Endorsement include the 15-hour core plus 551, 567, 571, 572, 585, 595 (9 hours), and 573. Students must be taken concurrently in the student’s final semester. Students pursuing the endorsement must follow the non-thesis option.

The Tennessee State Department of Education School Library Information Specialist Initial Endorsement is also available to candidates who have earned an ALA-accredited Master’s degree. Students are required to take 24 hours consisting of 551, 571, 572, 587 or 593 (upon approval of the faculty advisor), 595 (9 hours), and 573. Students must be taken concurrently in the student’s final semester.

Additional Program Requirements

Thesis Option

Students electing the thesis option will write a master’s thesis under close supervision of a thesis committee. Six hours of Thesis (590) must be taken within the 42 hours required for graduation. (Students may register for more than 6 hours of 500, but only 6 hours will count toward graduation.)

Students must be registered for IS 590 in the semester they complete and defend their thesis. The oral defense of the thesis (final comprehensive examination) substitutes for the written examination that is taken by non-thesis students. The writing of the master’s thesis serves as the culminating experience.

Non-Thesis Option

Students selecting the non-thesis option must take and pass a written comprehensive examination. A culminating experience is also required which must be completed in one of the student’s last two terms with a grade of B or better (except as noted) selected from the following and approved by the student’s advisor:

587 Information System Design Project
599 Problems in Information Sciences
591 Supervised Readings in Information Sciences
593 Independent Study
594 Graduate Research
FINANCIAL ASSISTANCE OPPORTUNITIES

Employment with the University of Tennessee Libraries may provide a work-study opportunity for selected students who wish to obtain experience in academic librarianship while pursuing the degree. Such students usually work at least 20 hours each week and thus may extend the period required for the degree. Similar opportunities exist with some other libraries and information agencies in the Knoxville area.

Work opportunities in a scientific-technical environment are available through subcontracts with Oak Ridge National Laboratory and the Department of Energy.

A limited number of graduate teaching assistantships are available through the school. Assistantships of this type carry a waiver of tuition and fees as well as a stipend and require that recipients work 10 hours per week in the school.

For application forms and information about financial aid and other information about the M.S. in Information Sciences, write to the Admissions Office, School of Information Sciences, University of Tennessee, 804 Volunteer Blvd., Knoxville, TN 37996-4330

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. program in Information Sciences is available to residents of the states of Arkansas, Georgia, Virginia, or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.
Interdisciplinary Programs

(College of Arts and Sciences)

The College of Arts and Sciences offers a series of interdisciplinary undergraduate
majors and minors through its Interdisciplinary Programs. These programs include African and African-American Studies, American Studies, Ancient Mediterranean Civilizations, Asian Studies, Cinema Studies, Comparative Literature, Environmental Studies, Latin American Studies, Legal Studies, Judaic Studies, Linguistics, Medieval Studies, Urban Studies, and Women’s Studies. Certain courses within these programs are available for graduate credit as listed below. See the Undergraduate Catalog for program descriptions and directors.

African and African-American Studies

GRADUATE COURSES


591 Supervised Readings in Information Sciences (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

592 Seminar in Information Sciences (3-6) Prereq: Consent of advisor. Maximum 6 hrs.

593 Independent Study (3-6) Prerequisite: Consent of advisor. Maximum 6 hrs.

594 Graduate Research Participation (3) Synchronous or asynchronous participation in research under supervision of staff research director whose area coincides with interests of student. Prereq: Consent of advisor and research director. S/N only.

595 Student Teaching in School Library Information Center (8) Planned professional semester: full day school library work and classroom observation activities. S/N only.


590 Problems in Information Sciences (3-6) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

591 Supervised Readings in Information Sciences (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

American Studies

GRADUATE COURSES

423 Geography of American Popular Culture (3) Same as Geography 423.

510 Special Topics (3) May be repeated. Maximum 6 hrs.

Ancient Mediterranean Civilizations

GRADUATE COURSES

510 Special Topics (3) May be repeated. Maximum 6 hrs.

Asian Studies

GRADUATE COURSES

471 Selected Topics in Asian Studies (3) Content varies. May be repeated. Maximum 9 hrs.

510 Special Topics (3) May be repeated. Maximum 6 hrs.

Cinema Studies

GRADUATE COURSES

400 Special Topics (3) May be repeated. Maximum 6 hrs.

420 French Cinema (3) Same as French 420.

421 Topics in Italian Literature and Cinema (3) Same as Italian 421.

433 Modern Art and Film (3) Same as Art Media/Photography 433.

469 Sexuality and Cinema (4) Same as Women’s Studies 469.

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.

402 Latin American Studies Seminar (3) Selected topics. May be repeated. Maximum 6 hrs.

401-02 Special Topics (3-3) May be repeated. Maximum 9 hrs.

Judaic Studies

405 Modern Jewish Thought (3) Same as Religious Studies 405.

425 Early Christian and Byzantine Art, to 1350 (3) Same as Art History 425.

431 Medieval Art of the West, 800-1400 (3) Same as Art History 431.

Latin American Studies

GRADUATE COURSES

510 Special Topics (3) May be repeated. Maximum 6 hrs.

Linguistics

GRADUATE COURSES

400 Topics in Linguistics (3) Content varies. May be repeated. Maximum 6 hrs.

411 Linguistic Anthropology (3) Same as Anthropology 411.

423 The Development of Diachronic and Synchronic Linguistics (3) Development of Western linguistic thought from Hebrews and Greeks through modern times. Readings from Boas, Sapir, Bloomfield, and others. Prereq: 9 hrs of courses required for Linguistics major (300-level or above) or consent of instructor.

425 Introduction to Descriptive Linguistics (3) Same as French 425, German 425, Russian 425, and Spanish 425.

426 Methods of Historical Linguistics (3) Same as German 426, French 426, Russian 426, and Spanish 426.

429 Romance Linguistics (3) Same as French 429 and Spanish 429.

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.
Women's Studies

**GRADUATE COURSES**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>400</td>
<td>Topics in Women's Studies (3) Content varies. May be repeated.</td>
</tr>
<tr>
<td>410</td>
<td>Gender Role Development: Implications for Education and Counseling (3) (Same as Counselor Education and Counseling Psychology 410)</td>
</tr>
<tr>
<td>422</td>
<td>Women Writers in Britain (3) (Same as English 422)</td>
</tr>
<tr>
<td>425</td>
<td>Women's Health (3) (Same as Health 425)</td>
</tr>
<tr>
<td>433</td>
<td>Advanced Editing (3) Sensitivity to language and editing skills. Headline writing, layout, and production. Prereq: Editing 430.</td>
</tr>
<tr>
<td>444</td>
<td>Journalism as Literature (3) Study of writers from the 17th century to modern whose work has endured as both journalism and literature. Emerging genre called literary journalism; means of cultural reporting with personal narrative style. Prereq: Consent of instructor.</td>
</tr>
<tr>
<td>455</td>
<td>Issues in Science Communications (3) Topics vary. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.</td>
</tr>
<tr>
<td>500</td>
<td>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.</td>
</tr>
<tr>
<td>560</td>
<td>Seminar in Visual Communication (3) Behavioral aspects of communication with images. Theories of psychological effect in color, shape, texture, and other design elements. Prereq: Editing 430 or consent of instructor.</td>
</tr>
<tr>
<td>590</td>
<td>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.</td>
</tr>
<tr>
<td>594</td>
<td>Independent Study (1-6) Prereq: Consent of Chair of Women's Studies.</td>
</tr>
</tbody>
</table>

Urban Studies

**GRADUATE COURSES**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>401</td>
<td>The City in the U.S. (3) (Same as Planning 401)</td>
</tr>
<tr>
<td>441</td>
<td>Urban Geography of the United States (3) (Same as Geography 441)</td>
</tr>
<tr>
<td>466</td>
<td>Rhetoric of the Woman's Rights Movement to 1930 (3) (Same as Speech Communication 466)</td>
</tr>
<tr>
<td>469</td>
<td>Sexuality and Cinema (4) Exploration of issues of women's sexuality and gender and cinema from point of view of feminist film criticism. (Same as Cinema Studies 462)</td>
</tr>
</tbody>
</table>

Journalism

(College of Communications)

**MAJOR DEGREES**

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

**MAJOR PROFESSIONAL EMPLOYER**

James A. Crock, Director

Professors:

Adamsom, June N. (Emeritus), M.S. Tennessee
Ashdown, Paul G., Ph.D. ............ Bowling Green
Breyer, Ph.D. ......................... Northwestern Illinois
Cade, Dozier (Emeritus), Ph.D. ........ Iowa
Caudill, C. Edward, Ph.D. ........... North Carolina
Crock, James A., Ph.D. ............... Iowa State
Everett, George A. (Emeritus), Ph.D. .... Iowa

Haskins, Jack B. (Emeritus), Ph.D. .. Minnesota
Leight, B. Kelly (Emeritus), Ph.D. ...... Southern Illinois
Littman, Mark (Chair of Excellence), Ph.D. ...... Northwestern Illinois
Miller, M. Mark, Ph.D. ............... Michigan State
Singletary, Michael W., Ph.D. ...... Southern Illinois
Teeter, Dwight L., Jr., Ph.D. ........ Wisconsin
Tucker, Willis C. (Emeritus), M.S. ....... Kentucky

Associate Professors:

Dimmick, Susan L., Ph.D. .......... Tennessee
Foley, Daniel, M.S. ............... Northwestern
Heller, Robert B., M.A. .......... Syracuse
Morrow, Jerry L., Ph.D. .......... Toledo

Assistant Professor:

White, Candace L., Ph.D. .......... Georgia

The School of Journalism offers a concentration area for the master's with a major in Communications and participates in the interdisciplinary doctoral program. See Communications for additional information.

Public Relations

**GRADUATE COURSES**

412 | Opinion Writing (3) (Same as Journalism 412) |

416 | Issues in Journalistic Writing (3) Topics vary. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. |

470 | Public Relations Campaigns (3) Research, planning and evaluation of major public relations campaigns. Oral and written presentation of public relations project from inception to completion. Extensive out-of-class work. Prereq: Public Relations Principles or equivalent. F, Sp |

516 | Seminar in Public Relations Issues (3) Topics vary. May be repeated. Maximum 6 hrs. |

520 | Press-Government Relations (3) Development of advisory relationship between journalists and government officials. Philosophical and legal basis for open reporting and government. Use of press by candidates and incumbents. (Same as Public Relations 520) F |

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. (Same as Public Relations 526) |

535 | Publications Management (3) Problems in management, production, market analysis, and design. Techniques of writing, editing, and presenting comprehensive articles and other material, regional and specialized magazines. Individual editorial projects. Prereq: 450 or consent of instructor. |

450 | Writing About Science, Technology, and Medicine (3) Writing workshop to analyze examples of successful science writing and writing series for general public based on scientific journals, news conferences, technical meetings, and interviews. Prereq: Consent of instructor. (Same as Information Sciences 450) |

451 | Environmental Reporting (3) Writing for news media on such environmental issues as strip-mining, water pollution, air pollution, allergies, nuclear power, fossil fuel power, and solid wastes. Presentations from and interviews of experts in environmental science and reporting. Examining 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. |

465 | 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 J. Gould, and Richard Selzer. Analysis of literary qualities in quest to understand why some science writing succeeds. Prereq: Consent of instructor. |
Language, Communication, and Humanities Education

(College of Education)

MAJORS

Education .................................................. M.S., Ed.S., Ed.D., Ph.D.

Patricia Davis-Wiley, Leader

Professors:

Christensen, Mark A. (Emeritus), Ph.D. Kansas
Davis-Wiley, Patricia, Ed.D. .................. Houston
Hull, H. N., Ed.S. .................. Peabody
Watkins, J. Paul (Emeritus), M.S. .......... Tennessee

Associate Professor:

Hodge, R. L., Ph.D. ............................... Texas

The Language, Communication, and Humanities Education unit participates in graduate programs leading to degrees, majors, and concentrations in:

- Master of Science
- Education
  - Track 1-art education
  - Track 1-English education
  - Track 1-foreign language/ESL education
- Track 2-art education
- Track 2-secondary teaching

- Educational Specialist
  - English education
  - Foreign language/ESL education

- Doctor of Education
  - Education
    - English/foreign language/ESL education
  - Doctor of Philosophy
    - English/foreign language/ESL education

See Education under Fields of Instruction for full description of all degree requirements.

The unit's mission is the preparation of teachers for instruction in art, foreign language, ESL, English, and secondary reading. The emphasis is on how these disciplines are taught in context of different cultures.

Art Education

GRADUATE COURSES

510 History and Philosophy of Art Education (3) United States from 1800's to present. Prereq: Consent of instructor.

520 Topics in Art Education (3) Issues and topics current to the field of art education. Prereq: Consent of instructor.

530 Production and Critical Analysis of Art (3) Relationship of production and critical analysis of works of art to discipline-based art education.

540 Instructional Materials and Production Related to the Teaching of Art (3) Development and use of instructional aids concerned with all aspects of teaching art: videotapes, audiocassettes, slides, charts, and learning media.

590 Special Topics in Art Education (3-6) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

593 Independent Study (1-3) May be repeated. S/NC or letter grade. E

Language, Communication, and Humanities Education

GRADUATE COURSES

455 Teaching of Foreign Languages, Grades 7-12 (3) Instructional methods, lesson planning, peer-teaching; materials for teaching foreign language and culture; evaluation techniques. Required for certification in modern foreign languages and Latin. Prereq: Completion of 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 to teaching basic reading skills and ways of teaching literature. Sp

461 Developing Reading Skills in Content Areas (3) Techniques for teaching reading and study skills in content areas of school program. Extensive assessment of textbooks. Middle school and high school. E

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

502 Registration for Use of Facilities (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. Required. Maximum 9 hrs. S/NC only. E


507 Teaching Poetry Grades 7-12 (3) Research and theory in application to teaching of poetry. Design of strategies and materials for teaching and writing and reading of poetry. Review of texts and materials. E

508 Teaching Poetry Grades 7-12 (3) Research and theory in application to teaching of poetry. Design of strategies and materials for teaching and writing and reading of poetry. Review of texts and materials. E

509 Teaching Fiction in the Secondary School (3) Teaching of novels and short stories. F

510 Educational Specialist Research and Thesis (3) May be repeated. P/NP only. E

511 Interdisciplinary Aesthetics (3) Discussions, visual and audio presentations concerned with aesthetic considerations of arts of study: geography, history, physics, literature, languages, music, visual arts and drama.

533 Reading in Community College: Research and Theory (3) Analysis of components of effective community college reading programs. Attention to research and theoretical bases. Prereq: Course in reading education or consent of instructor. Su

555 Foreign Language in the Elementary Schools Practicum (3) Experiences designing, implementing and assessing second language instruction in elementary school settings. Prereq: 567 or consent of instructor.

566 English as a Second Language Practicum (3) Experiences designing, implementing and assessing English instruction to non-native English speakers. Required for ESL certification. Prereq: 577 or consent of instructor.

578 Teaching English as a Second Language (3) Instructional methods; utilization of assessment procedures to diagnose English proficiency; materials for non-native speaker in K-12 classroom. Required for Tennessee ESL (K-12) license. Prereq: 578 or consent of instructor. Sp


590 Seminar in Teaching English in Secondary Schools (3) Content varies. Theoretical and practical approaches to teaching English in secondary school. May be repeated. Su

592 Linguistics and the Teaching of English (3) Grammar, usage, semantics, dialectology, history of language, and lexicography. Su

593 Independent Study (1-3) May be repeated. S/NC or letter grade. E

594 Supervised Readings (1-3) May be repeated. S/NC or letter grade. E

595 Special Topics (1-3) May be repeated. S/NC or letter grade. E

597 Teaching Drama Grades 7-13 (3) Strategies and materials for teaching drama and contemporary drama. Review of tests and materials. Sp

598 Developing Speaking and Listening Skills, Grades 7-12 (3) Approaches to conversational, interpersonal and group conversation, public address and criticism. Review of tests and materials. Sp

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

601 Studies in English Education (3) Issues and research in teaching of English. Su

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 school program. Prereq: 500-level courses in reading education or consent of instructor. Su

678 Advanced Studies in English as a Second Language (3) Research, curricula, assessment, trends and issues in English as a second language. Prereq: 578 or consent of instructor.

687 Advanced Studies in Foreign Language Education (3) Research, curricula, assessment, trends and issues in foreign language education. Prereq: 578 or consent of instructor.

699 Internship (1-3) Experiences in application of principles and practices of curriculum development and instructional improvement. Prereq: Program prerequisites and consent of instructor. May be repeated. Maximum 9 hrs. S/NC only. E

693 Independent Study (1-3) May be repeated. S/NC or letter grade. E

694 Supervised Reading (1-3) May be repeated. S/NC or letter grade. E

695 Special Topics (1-3) May be repeated. S/NC or letter grade. E

Large Animal Clinical Sciences

See College of Veterinary Medicine and Comparative and Experimental Medicine
Current information regarding admission, financial aid, course requirements, academic policies, extracurricular activities, and student services is available from the Admissions Office, The University of Tennessee, College of Law, 1505 W. Cumberland Ave., Knoxville, Tennessee 37996-1810. 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 88 semester hours of credit, including all required courses. The required average of 2.0 and that average must be maintained on the work of all six semesters and also for the combined work of the grading periods in which the last 28 credit hours taken in residence were earned. Averages are computed on weighted grades. Grades are on an alphabetical scale from A+ to F. No credit toward the J.D. degree is awarded for grades of D- or F.

Eligible law students may receive up to six (6) semester hours of credit toward the J.D. degree for acceptable performance in upper-level courses that materially contribute to the study of law and which are taken in other departments at The University of Tennessee. Course selection and registration are subject to guidelines approved by the law faculty which include the requirement that any such course be acceptable for credit toward a graduate degree in the department offering the course. Refer to the Law Catalog and Student Handbook for current degree requirements.

Concentration in Business Transactions

Students interested in a concentration in business transactions must complete all of the following law courses:

818 Fundamental Concepts of Income Taxation
826 Introduction to Business Transactions* B77 Business Associations
972 Income Taxation of Business Organizations
940 Land Finance Law
840 Commercial Law
642 Contract Drafting Seminar
533 Reorganization of Enterprises

None of the above courses may be taken on an S/NC basis (with the exception of 826).

*This course is not required for students who have an undergraduate major in accounting, finance, or business administration, who hold the MBA degree, or who are enrolled in the dual J.D.-MBA program.

Waivers may also be granted to students who have acquired the requisite business knowledge through other coursework or through practical experience.

Concentration in Advocacy and Dispute Resolution

Students interested in a concentration in advocacy and dispute resolution must complete all of the following courses:

813 Evidence
815 Introduction to Advocacy and Professional Responsibility
905 Advocacy Clinic
920 Trial Practice
921 Pretrial Litigation

DUAL J.D.-MBA DEGREE PROGRAM

The College of Business Administration and the College of Law offer a coordinated dual degree program leading to the conferral of both the Doctor of Jurisprudence and the Master of Business Administration degrees. A student pursuing the dual program is required to take fewer hours of coursework than would be required if the two degrees were to be earned separately.

Admissions

Applicants for the J.D.-MBA program must make separate application to, and be competitively and independently accepted by, the College of Law for the J.D. degree and The Graduates School and College of Business Administration for the MBA degree, and by the Dual Degree Committee. Students who have been accepted by both colleges may commence studies in the dual program at the beginning of any term subsequent to matriculation in both colleges provided, however, that dual program studies must be started prior to entry into the last 28 hours required for the J.D. degree and the last 16 hours required for the MBA degree.

Curriculum

A dual degree candidate must satisfy the graduation requirements of each college. Dual degree students withdrawing from the dual degree program before completion of both degrees will not receive credit toward graduation from either college for courses in the other 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 MBA degrees will be awarded upon completion of requirements of the dual degree program.

The College of Law will award a maximum of nine (9) semester hours toward the J.D. degree for acceptable performance in approved graduate-level 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.

The College of Business Administration will award credit toward the MBA for acceptable performance in a maximum of 9 semester hours of approved courses offered by the College of Law.

Exempt 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.

Awarding 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 grades. The College of Business Administration will award a grade of Satisfactory for a College of Law course in which the student has earned a C+ grade or higher and a No Credit for any lower grades. 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.P.A degree program may not receive credit towards the J.D. degree for courses taken in other departments of the University except for those taken in conjunction with the dual 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 Arts and Sciences offer a coordinated dual degree program leading to the conformance of both the Doctor of Jurisprudence and Master of Public Administration degrees. In this program, a student may earn the M.P.A. and J.D. degrees in about four years rather than the five years that otherwise would be required. Students pursuing the dual degree program should plan to be enrolled in coursework or an internship for one summer term in addition to taking normal course loads for four academic years.

Admission

Applicants for the J.D.-M.P.A. program must make separate application to, and be independently accepted by, the College of Law for the J.D. degree and the Department of Political Science and The Graduate School for the M.P.A. degree. Applicants must also be accepted by the Dual Degree Committee. All applicants must submit a Law School Admission Test (LSAT) score. An applicant’s LSAT score may be substituted for the Graduate Record Examination (GRE), which is normally required for admission to the M.P.A. program. Application may be made prior to or after matriculation in either the J.D. or the M.P.A. program, but application to the dual program must be made prior to entry into the last 29 semester hours required for the J.D. degree and prior to entry into the last 15 hours required for the M.P.A. degree.

Curriculum

A dual degree candidate must satisfy the requirements for both the J.D. and the M.P.A. degrees, as well as the requirements for the dual program. The College of Law will award a 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 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.

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 all M.P.A. courses in which the student earns a grade of B or higher and a grade of No Credit for any lower grade. The Political Science Department will award a grade of Satisfactory for an approved law course in which the student earns a grade of C+ or higher and a grade of No Credit for any lower grade. The College of Law will award a grade of Satisfactory for a dual degree program must successfully complete 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 systems of the respective college, e.g., numerical grades for law courses, letter grades for graduate courses. Refer to section on Grades for the grading scale acceptable toward meeting degree requirements. Cumulative GPA for law courses only will be carried until graduation, at which time both the graduate and the law cumulatives will be shown on the permanent record.

PROFESSIONAL COURSES

801 Civil Procedure I (6) Binding effect of judgments, selecting proper court (jurisdiction and venue), assuming applicable law, and federal and state practice.


803 Contracts I (3) Basic agreement process and legal protections afforded by contract law. Offer and acceptance, consideration and other bases for enforcing promises; the Statute of Frauds, unenforceability and other controls of promises; introduction to important 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 purposes; remedies; third party beneficiaries; assignment and delegation. Considerable coverage of Article 2 of the Uniform Commercial Code with respect to remedies, anticipatory repudiation, impracticability and good faith.

805 Legal Process I (6) Lawyer-like use of cases and statutes in prediction and prevention, analysis and synthesis of common law decisions; statutory interpretation; fundamentals of expository legal writing and legal research.

806 Legal Process II (3) Continuation of Legal Process I. Formal legal writing, appellate procedure, and oral advocacy.

807 Torts I (3) Intentional torts, defenses and privileges related to intentional torts; negligence: standard of care, professional malpractice, and liability of owners and occupants of land; defenses based on plaintiff's conduct; contributory and comparative negligence, assumption of risk, failure to take precautions, and avoidance of consequences; causation, proximate cause; duty rules; and questions of joint and several or several liability.

808 Torts II (3) Vicarious liability and related concepts; strict liability for dangerous animals and abnormally dangerous activities; products liability; nuisance, defamation and invasion of privacy; economic torts; misrepresentation and interference with contract and prospective opportunities; immunities of those of government, governmental employees, charities and family members, and damages.

809 Criminal Law (3) Substantive aspects of criminal law; general principles applicable to all criminal conduct; specific analysis of particular crimes; defenses to crimes.

810 Property (4) Introductory course treating issues of ownership, possession, and control in the areas of landlord-tenant relations; estates in land and future interests; co-ownership and marital property; real estate sales agreements; landlord-tenant law; breach of contract; recording statutes; servitudes; and selected aspects of nuisance law, eminent domain and zoning.

812 Constitutional Law (4) Fundamental principles of American constitutional law; federalism, separation of powers, equal protection of law, and constitutional protection of other fundamental individual rights.

813 Evidence (4) Rules regulating introduction and exclusion of oral, written and demonstrative evidence at trials and other proceedings, including relevancy, competence, impeachment, hearsay, character, prior testimony, authenticity, and judicial notice. Coreq: 920 for students electing concentration in advocacy.

814 Legal Profession (3) Legal, professional and ethical standards applicable to lawyers. Not open to students who have taken 815.

815 Introduction to Advocacy and Professional Responsibility (3) Theory and morality of advocacy in adversarial system, and legal, ethical, and professional standards applicable to lawyers and especially lawyers as advocates.

818 Fundamental Concepts of Income Taxation (3) Introduction to basic statutory analysis, fundamental principles of federal individual income tax, and pervasive income tax concerns that arise in practice. Federal concept of gross income, pattern of exclusions, exemptions and deductions from gross income used to arrive at
tax base; special treatment of capital gains and losses; and rate structure.


821 Administrative Law (3) Administrative agency decision-making and judicial review of administrative decisions: procedural standards for informal and formal administrative adjudication and rule-making (attention to federal Administrative Procedure Act); constitutional due process standards in administrative settings; and availability, scope and timing of judicial review of agency actions.

822 Legislation (3) Interpretation and drafting of statutes, legislative process, and government power; comparison of judicial views on legislative process with both realities of legislative process and applicable constitutional principles.

826 Introduction to Business Transactions (2) Nontechnical introduction to accounting, finance, and the functional relationships among the various actors in business transactions. Analysis of business transactions with view to needs of business clients. Not available for students with business background.

827 Business Associations (4) Legal problems associated with formation, operation, and dissolution of unincorporated and incorporated business firms; legal rights of duties of firm members and agents; partners, limited partners, and general partners; regulation of public held companies; and corporate shareholders, directors, and officers, with whom members interact in connection with firm's business.

828 Corporate Finance (3) Legal issues arising in conjunction with corporate financial transactions: issuance of debt and various types of equity securities, distributions to shareholders, mergers and other corporate acquisitions. Legal valuation of corporate securities.

830 Securities Regulation (3) Basic structure of federal securities law. Legal problems associated with raising of capital by new and growing enterprises; securities transactions by promoters, officers, directors and other insiders; regulation of public held companies; litigation under Rule 10b-5 and other anti-fraud provisions; and provision of legal and other professional services in connection with securities transactions, recommended prereq or coreq: 827.

833 Representing Enterprises (3-5) Capstone course for concentration in business transactions. Simulated business environment for the planning, drafting, and analysis of business transactions. Transactions vary: formation of new business, acquisition of existing business, development of real estate projects, various financing transactions, and corporate reorganization, Prereq: Completion of all courses for concentration in business transactions.

834 Antitrust (3) Federal antitrust laws; monopolization, price-fixing, group boycotts, and anticompetitive practices generally; government enforcement techniques and private treble damage suits.

840 Commercial Law (4) Basic coverage of most significant provisions of Uniform Commercial Code: security interests in personal property (Art. 9 of U.C.C. and relevant Bankruptcy Code provisions); commercial paper, including checks, notes and other negotiable instruments (Arts. 3 and 4 of U.C.C.); sales of goods, including coverage of portions of Art. 2 of U.C.C. not covered in Contracts.

842 Contract Drafting Seminar (2) Practical fundamentals of drafting contracts of different types of employment arrangements.

843 Debtor-Creditor Law (3) Basic elements of federal bankruptcy law: claims, property of estate, automatic stay, trustee's avoidance powers, assumption and rejection of contracts, priority of distributions, and distinction between liquidation and rehabilitation. Enforcing judgments outside of bankruptcy.

847 Advanced Constitutional Law (2-3) Advanced study of issues in American constitutional law. Specific course offerings vary. Subjects include: constitutional structure of American government, governmental institutions, federalism, separation of governmental powers; relationship between legislative and executive branches, relationship among states and between state and federal government; constitutional amendment process; state constitutional law, Tennessee constitution and differences between state and federal constitutional law; Bill of Rights and 14th Amendment to Constitution; constitutional rights as protected by Bill of Rights of 14th Amendment. Prereq: 812. May be repeated under different topic.

848 Civil Rights Actions (3) Litigation to vindicate constitutional rights in private actions against the government and officials.
LEADERSHIP STUDIES IN EDUCATION

MAJORS

College Student Personnel Education

DEGREES

M.Ed. M.S.

Leadership Studies in Education

Join the Leaders in Education

MAJORS

Leadership Studies in Education

DEGREES

Leadership Studies in Education

Educational administration and supervision

College Student Personnel Specialist in Education

Education Education

Specialist in Education

Eduational administration and supervision

Doctor of Education

Education

Leadership studies (educational administration and supervision; higher education)

Doctor of Philosophy

Education

Eduational administration and supervision; higher education

See Education under Fields of Instruction for full description of all degree requirements.

Leadership Studies unit focuses on the preparation and development of administrative and instructional leaders who will serve in diverse settings of schools and colleges, community and human service agencies, adult and continuing education organizations, and educational units of government and corporate organizations.

The unit offers an alternative approach to residence for the Doctor of Education degree program. This alternative residence involves, among other requirements, a two-year, on-campus, continuous enrollment in Leadership Studies 606, Leadership Forum. Interested students should contact the unit for further information.

The annual admission deadline is March 15 for the Ed.S. and doctoral programs, and November 1 and March 15 for the master's program.

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.

Leadership Studies in Education (College of Education)
Educational Administration and Supervision

GRADUATE COURSES

513 Administrative and Organizational Theory in Education (3) Introduction to theoretical administrative and organizational foundations of management and leadership of educational programs and institutions. F, Su

515 Human Relations and Communication in Administration (3) Development and use of effective interpersonal communication skills and channels, intergroup relations, supportive work climates, personnel motivation, conflict management skills, and role of values, attitudes, and expectations in administration. F, Su

516 Research for School Administrators (3) Descriptive, experimental, and quasi-experimental designs to help students without quantitative backgrounds to read and understand technical professional literature. Introduction to inferential statistics, needs assessments, and evaluation procedures. Sp, Su

529 Politics of Education and Educational Environments (3) School/community relationships in political context of modern, complex society. Administrator and supervisory competencies: political, social, ethical, cultural, and cultural environments in which decisions are made. Prereq: M.S. introductory core or consent of instructor. F, Su

535 Administrative Applications of Micro Computers (3) DOS, word processing, database management, spreadsheet, and computer communications. Review and development of specific administrative applications: scheduling, attendance, student record systems, and accounting. F, Su

544 School Finance and Business Management (3) For prospective building level administrators. Financial and logical management tasks and procedures in individual school setting. Prereq: M.S. introductory core or consent of instructor. F, Su

547 Educational Facility Planning (3) Concepts and skills for development, evaluation, construction, renovation, maintenance, and operation of quality educational environments and facilities. Prereq: M.S. introductory core or consent of instructor. Sp, Su

548 Introductory Supervision and Personnel (3) Basic supervisory and personnel concepts and competencies: building (or micro-organization) level, interviewing, personnel planning, collecting and maintaining employee information, supervision of instructional and non-instructional personnel, 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. Sp, Su

569 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 569 or 588. 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 educational leader. Assimilation of materials and field-based experiences. Culminating project with principal at end of planned course of study. Prereq: 21 hours in educational administration and supervision or consent of instructor. F

590 Special Topics (1-3) May be repeated. E

592 Field Problems in Educational Administration and Supervision (3) Topic to be assigned. May be repeated. SN or letter grade. E

595 Elementary Principals Seminar (1-3) For in-service training of elementary school administrators. Development, 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. SN or letter grade. F, Sp

604 Seminar in Educational Administration and Supervision (1) Current educational issues, problems and research. Requirement: two consecutive semesters during doctoral residency. May be repeated: SN or letter grade. F, Sp

605 Advanced Seminar in Administrative Theory (3) Interdisciplinary seminars. Readings selected by faculty for research and scholarly value from early to current classic theoretical studies and current periodical literature in administrative and organizational theory. Required of Ph.D. students in education. Prereq: Doctoral student in education.

610 Internship in Educational Administration (3) Opportunity for doctoral students and advanced graduate students to gain experience in performance of critical tasks of educational administration under supervision of practitioner and University representative. May be repeated at discretion of student's committee. Maximum 12 hrs. SN only. E

614 Statistical Methods for School Administrators (3) Descriptive and experimental research methods, parametric and non-parametric statistical techniques used in research in educational setting. Prereq: M.S. core or consent of instructor. F, Sp, Su

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. Surveys and school surveys. Conduct of survey. Prereq: Basic statistics and computer skills or consent of instructor. E

629 Seminar in Politics of Education (3) Political theories and practices as they affect operation of public school systems and higher education institutions. Interdisciplinary: analysis of community power structures and special interest groups. Prereq: M.S. core or consent of instructor. F, Sp, Su

646 School Personnel Administration (3) Personnel administration functions for professional and supporting staff in educational organizations. Recruitment, selection, placement, personnel policies, employee issues involved, fringe benefits, collective negotiations, labor relations, staff evaluation, and staff development. Prereq: 548 or consent of instructor. Sp, Su

655 State-Federal Relations in Education (3) Interrelationships of federal, state, and local responsibilities and organization for education by analysis of traditional, legal, fiscal and functional aspects of educational partnership. Funding partnerships: discussion of grant proposal development processes. Sp, Su

656 Legal Foundations of Public Education (3) School law; constitutional foundations as they relate to public education at state and local levels. F, Su

658 Conflict Management (3) Social conflict and its management. Causes of interpersonal, intergroup, and organizational conflict, skills and strategies used to manage conflict, conflict management models associated with different sectors of human activity, and current organizational practices for managing destructive conflict. F

570 Values and Ethics in Educational Leadership (3) Examination of moral and ethical dimensions of work of educational administrators and prospective administrators to deal with dimensions in knowledgeable, reflective and principled ways. (Same as Educational Administration 670.) F, Sp, Su

580 Administration of Complex Organizations (3) Concepts and theoretical formulations to understand, analyze, evaluate, and change complex educational programs and organizations. Prereq: 513 or consent of instructor. Sp, Su

590 Special Topics (1-3) May be repeated. E

Higher Education

GRADUATE COURSES

530 Special Topics (1-3) May be repeated. E

534 Program Evaluation in Education (3) (Same as Education in the Sciences, Mathematics, Research, and Technology 533.)

536 Seminar on Policy Issues in Quality Assurance (3) Exploration of historic and contemporary approaches to definition of and demonstration of quality education and examination of contemporary policy issues related to quality assurance in colleges and universities.

537 Student Assessment in Higher Education (3) Outcome assessment in American higher education: origins of assessment policies, rationales for assessment policy and practice, constructs and outcomes typically assessed, methods for conducting assessment, and uses of assessment data. Philosophy, priorities, and values, recent assessment efforts in higher education.

542 The College Student and the Court (3) Legal precedent affecting student personnel services in public higher education. Student discipline, housing, dress, organization, activities fees, tuition, and related federal regulations.

543 American Higher Education in Transition (3) Historical, philosophical, and organizational perspectives. Functional areas comprising field and major issues.

572 Theory and Practice in Student Personnel Services (3) Theoretical framework of college student personnel services and practical application of theory in student services environment. Applicable administrative theory, human development theory and evaluation assessment techniques.

599 Practicum in College Student Personnel (1-6) Prereq: Consent of instructor. May be repeated. SN only. F

619 Administration and Governance of Higher Education (3) Trends, structure and process of collegiate governance. Development of understanding of administrative theory and practice in higher education. Prereq: 543 or consent of instructor. F

630 Special Topics (1-3) May be repeated. E

640 College and University Law (3) Legal precedent affecting organizations, administration, and finance of higher education. Academic freedom, faculty and student rights, tort liability, academic law, academic due process and affirmative action in employment.

645 Curriculum and Instruction in Undergraduate Higher Education (3) Content and organization of institutional structures and curricular structure in higher education.

650 Fiscal Problems in Higher Education (3) Revenue sources, appropriation processes, budget procedures, cost analysis and financial management in public and independent colleges and universities.

670 Values and Ethics in Educational Leadership (3) (Same as Educational Administration and Supervision 670.)

695 Practicum in Higher Education (1-6) Supervised practicum in selected areas of higher education administration. Prereq: Consent of instructor. May be repeated. SN only. E

698 Seminar in Higher Education (3) Capstone experiences for doctoral students. Examination of major philosophical concepts and policy principles distinctive to American higher education, review of significant current policy reports and documents, exploration of contemporary policy issues, and evaluation of recent and proposed reforms in higher education. Travel to state, regional, and national policy agencies for higher education.
Leadership Studies

GRADUATE COURSES

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

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

503 Problems in Law of Ethics (2-5) May be repeated. Maximum 9 hrs. S/NC only. E

518 Educational Specialist Research and Thesis (3) May be repeated. P/NP only. E

593 Independent Study (1-3) May be repeated. S/NC or letter grade. E

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

606 Leadership Forum (2) Development of research, evaluation, policy analysis skills and critical analysis and evaluation of philosophical principles underlying American education. Continuous enrollment for 2 years, on-campus, for students in Ed.D. alternative residence program. May be repeated. Maximum 12 hrs. S/NC only.

612 Modes of Inquiry in Educational Research (3) Various inquiry approaches to research in education: philosophical, methodological and ethical considerations in research design and use of research findings. (Same as Psycheducational Studies 612.)

693 Independent Study (1-3) May be repeated. S/NC or letter grade. E

Life Sciences

(College of Arts and Sciences)

MAJOR DEGREES

Life Sciences M.S., Ph.D.

W.F. Harris, Chair

The programs leading to the M.S. and Ph.D. degrees in Life Sciences are interdepartmental and intercollegiate and are designed to augment offerings of individual departments in the following concentrations: biotechnology, biology, plant physiology and genetics. Students interested in these areas should contact either the Life Sciences chairperson or the director of the area of interest. Each program is overseen by a committee and may have unique admission requirements.

ADMISSION REQUIREMENTS

1. A Bachelor's degree with a major in a biological, behavioral, or physical science.
2. GRE (general) scores.
3. Three letters of recommendation.
4. 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: (a) years of coursework above the 600 level, 24 semester hours of course 600, a pattern of courses approved by the student's committee, a comprehensive examination, a doctoral dissertation, and a defense of dissertation. Individual programs may have additional requirements.

CONCENTRATIONS

Biotechnology (M.S. only)

The biotechnology program 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 of the biology and biochemistry of cells and molecules; by formal study of cells and of engineering aspects of biotechnology; and by the development of special expertise in areas such as animal embryo manipulation, automated chemical synthesis of macromolecules, bioprocess engineering, bioproducts and biotransformations, liposomes, microscopy and image processing, monoclonal antibodies and hybridoma technology, plant tissue culture, recombinant DNA technology and risk assessment, and modeling. The production of a research thesis or an industrial co-op experience plus an area of specialization will also be an important part of the training experience.

Required courses are Life Sciences 509, 511, 512, 531, 532; Biochemistry and Cellular and Molecular Biology 511; Microbiology 410; Botany 451; Chemical Engineering 475; and Ecology and Evolutionary Biology 507.

Plant Physiology and Genetics

This program provides the opportunity for intensive training and research experience in areas transceeding the usual boundaries of botany, biochemistry, and agricultural plant sciences. It devotes itself to seeking solutions of problems concerning the interactions of physiology and genetics in applied and fundamental aspects of plant science.

Required courses are Life Sciences 510; Botany 521, 522; Biochemistry and Cellular and Molecular Biology 511, 512; Plant and Soil Science 471 or Ecology and Evolutionary Biology 560; Plant and Soil Science 552; Microbiology 410.

GRADUATE COURSES

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

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

509 Biotechnology Seminar (1-3) Topics of importance to biotechnology. May be repeated. Maximum 6 hrs.

510 Special Topics in Life Sciences (1-3) Specializations in biotechnology, cellular and developmental biology; environmental toxicology; ethology; plant, physiology and genetics; and physiology. May be repeated. Maximum 9 hrs.

511 Advanced Cellular Biology (3) Cell structures and functions at molecular and supramolecular level. Membrane, structure, function, and biogenesis; cellular communication; receptors and membrane flow; growth regulation and differentiation; plasma cell structure and function; control

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
Dewhurst, H. Dudley, Ph.D. Texas
Gilbert, Kenneth C., Ph.D. Tennessee
Hake, David A., Ph.D. Tennessee
James, Lawrence R. (Pilot Chair of Excellence), Ph.D. Utah
Keally, A. H. (Emeritus), MBA Pennsylvania
Ladd, Robert T., Ph.D. Georgia
Larsen, John M., Jr. (Emeritus), Ph.D. Purdue
Miller, Alex W. B. Stokely Prof.), Ph.D. Maryland
Noel, C. Warren, Ph.D. Washington
Nooon, Charles E., Ph.D. Michigan
Reese, Don (Emeritus), Ph.D. Iowa
Rush, Michael C., Ph.D. Akron
Russell, Joyce E. A., Ph.D. Akron
Srinivasan, M. M., Ph.D. Northwestern
Stahl, Michael J., Ph.D. Remsen
Van, Joseph C. (Emeritus) W.B. Stokely Prof.), Ph.D. Pennsylvania
Wagoner, George A. (Emeritus), M.S., Indiana
Whitlock, G. H. (Emeritus) (Distinguished Prof.), Ph.D. Tennessee

Associate Professors:

Bowers, Melissa R., Ph.D. Clemson
Edrissinghe, Chanaka P., Ph.D. British Columbia
Fowler, Oscar S., Ph.D. Georgia
Judge, William Q., Ph.D. North Carolina
Maddock, Robert C., Ph.D. Texas

Management 133
Assistant Professor: Clevelan J. Ph.D. Southern California

BUSINESS ADMINISTRATION CONCENTRATIONS

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


Minimum course requirements for management - Three courses from the following: 511, 521, 522, 531, 541, 542, 551, 571, 581, 593, Business Administration 510, 559. Selection must be approved by the Management Department MBA advisor. For forest industries management - 511, Forrestry 560, 565. For environmental management, 581 plus two approved courses from the following list: Ecology and Evolutionary Biology 520, 555; Environmental Engineering 510, 555, 556; Chemical Engineering 581; Economics 677, 678; Agricultural Economics 570; Sociology 560, 665; Law 866, 867; Geography 577. For manufacturing management -- 541, 542, Management Science 526, and an Industrial Engineering/Management Science course approved by designated faculty. Industrial Engineering 524 or Management Science 541 are recommended. Additional courses may be accepted subject to approval by Management Department Chairperson or designated faculty.

Ph.D. Concentration: Management.

Minimum course requirements are: For operations management -- 541 and 542; two semesters of 640 (may be repeated for credit); one additional semester of approved doctoral seminar work. For strategic management -- 510, 611, 612, 613.

MINOR IN ENVIRONMENTAL POLICY

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

GRADUATE COURSES

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

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

511 Organizational Theory: Integrated Structure and Behavior (3) Cases, group projects, discussion; organizational theories, organizational effectiveness, contextual factors of organizations: environment, size, technology; organizational structure configurations, organization design; social influences on organization effectiveness: motivation, leadership, group behavior, intergroup relations, organization change and development.

521 Personnel Administration (3) Personnel functions and human resource management, Community relations, recruiting, selection, training, performance evaluation, wage and salary administration, legal framework as it affects personnel.

531 Management of Technology-Based Organizations (3) Role of technology and innovation in formulation and implementation of strategy: Management of research and development function and coordination with other functions. Management of scientists and engineers.

541 Operations Management (3) Techniques applicable to the design of systems in operations function.

542 Operations Management II (3) Operations planning and control function. Application of models to real-world systems.

551 Management of New Ventures (3) Integration of various functional disciplines and their application to the general management of ventures formed both within larger corporations and independently. Preparation of a venture plan, case analysis.

571 International Management (3) Analysis of environment of international business firms and impact of internal and external factors on managerial decisions.

581 Environmental Management (3) Environmental framework for addressing environmental issues. Most pressing environmental challenges; options compatible with sustained business performance. Cases, field projects, research papers.

593 Directed Independent Study (1-3) Topic of mutual interest. Available only by prearrangement with supervising faculty member. May be repeated. Maximum 6 hrs. S/NC or letter grade.

595 Selected Topics in Current Management Issues (3) In-depth coverage of current issues. Managerial impact of emerging topics. Prereq: Consent of instructor.

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

601 Research Methods (3) Seminar covering breadth of research process as applied to study of strategic management, literature and examples of research proposal.

610 Seminar in Advanced Organization Theory (3) Analysis of functioning of complex organizations. Classical and open systems models, organization growth and change, organizational effectiveness, and design of complex organizations.

611 Seminar in Strategic Management I (3) Analysis of concepts and research in strategic management.

612 Seminar in Strategic Management II (3) Analysis of concepts and research in strategic management.

613 Seminar in Strategic Management III (3) Review and analysis of important books and monographs in strategic management. Understanding evolution of thought and emergence of distinct paradigms.

Management Science

(College of Business Administration)

MAJORS DEGREES

Management Science ..................... M.S., Ph.D.

M. M. Srinivasan, Chairperson

Committee Members:

Bowen, Melissa R., Management; Bozdogan, Sam, Management; Carasso, S., Statistics; Edinberg, Chana F., Management; Fowler, Oscar S., Management; Gilbert, Kenneth C., Management; Leinmota, Mary C., Statistics; Noon, Charles E., Management; Ralston, Bruce A., Geography.

THE MASTER'S PROGRAM

The M.S. program in Management Science is designed as preparation for a career in the application of quantitative techniques for the solution of complex problems. The program's flexibility also makes it appropriate as preparation for doctoral study in Management Science.

Management Science coursework will expose students to both the theoretical and practical elements of management and science.

their application to managerial decision making. In addition to the development of sufficient mathematical maturity for creative use of quantitative skills, the program requires concentrated study in a supporting area.

Supporting areas are available in other departments of the College of Business Administration as well as in computer science, public administration, geography, health, and other areas, subject to approval by the Management Science Committee.

Admission Requirements

The master's program requires three applicant recommendation forms and the GRE or GMAT. Applications are recommended from all majors, but a mathematics background is equivalent to the completion of at least two years of college calculus and proficiency in a computer language is required. The program is designed to be completed in four semesters by full-time students. However, students may start the program in any semester and may pursue an M.S. degree program in Management Science on a part-time basis.

Course Requirements

Hours

Core Requirements: Management Science 531, 532, 581, 593, and 601 or 602. Statistics 563.

Applied specialization area (approved by advisor)

Technical elective: Statistics (500 level or above as approved by advisor)

Electives selected from mathematics, statistics, computer science, business, management science, industrial engineering, or other approved area.

Total: 40

A thesis option is available to qualified students. The Management Science Committee will work closely with the student in tailoring a program to his/her needs. The committee must approve a tentative overall program during the student's first semester and must approve all courses on a semester-by-semester basis.

Recognizing the diverse backgrounds and needs of Management Science M.S. students, the Management Science Committee is prepared to waive some of the above requirements on an individual basis. The total course load will remain 40 hours for all students.

THE DOCTORAL PROGRAM

The Ph.D. program in Management Science is designed to prepare students for research related to the application of mathematical tools to complex decision making. Three primary objectives of the program are:

1. to provide, through management science coursework, a thorough knowledge of common Management Science/Operations Research mathematical models and their uses;
2. to provide sufficient advanced study in a supporting area to qualify the graduate for a joint faculty position in the supporting area and...
管理科学。该候选人可以选择从商业功能领域（会计、金融、营销、管理、运输与物流）或其他学科（例如，计算机科学、林业、生态学和公共行政）中选择。

3. 开发学生通过课程学习、数学统计和计算机科学，以高程度的数学知识来增强职业生涯在管理、研究或教学中的潜力。

入学要求

该计划的博士课程要求提供三份申请推荐表和GRE或GMAT，以供添加到研究生学校的要求中。

课程

至少需要48学时的本科学分。博士课程是要求独家的，而不是为博士生的。该候选人必须在Tennnessee大学的管理学院，至少达到6.0的水平。这两项研究生要求也排除了数学或统计学。学生已经完成了高年级课程，能够以相同成绩的课程为学生授予学分，并用于要求的课程。

研究生课程

500系列

502注册与使用设施（3-15学分），要求该学生在注册期间在任何地点使用大学的设施或课程。可能用于学位要求。必须经过同意。可能导致课程的。当学生在第一年完成课程时，课程可能被标记。必须经过同意。可能导致课程的。

526系统模型与模拟（3学分）

531数学规划和线性规划（3学分）

532概率模型与管理科学（3学分）

533随机模型与管理科学（3学分）

553计算数学与概率分析（3学分）

554管理科学方法（3学分）

593管理科学问题（1-6学分）

600博士研究与论文（3-15学分）

621网络流（3学分）

631整数规划（3学分）

651非线性规划（3学分）

691-92管理科学研讨会（1学分）

主修

市场、物流与运输

（商学院）

博士学位

Richard C. Reizenstein，正任主席

教授：

- Barnaby, D.J., Ph.D. ......... Purdue
- Cadotte, E.R., Ph.D. ......... Ohio State
- Davis, F.W., Jr., Ph.D. ......... Michigan State
- Dier, G.N., DBA ......... Indiana
- Hendrix, F.L. (Emeritus), Ph.D. ......... North Carolina
- Langley, C.J. (Dove Prof.), Jr., Ph.D.... Penn State
- Merton, J.T. (Harry J. Bruce Chair of Excellence), Ph.D. ......... Michigan State
- Mundy, R.A. (Taylor Prof.), Ph.D., Penn State
- Schumann, D.W., Ph.D. ......... Missouri
- Woodruff, R.B. (Proffitt’s Prof.), DBA ......... Indiana

MBA

MBA

- Dabholkar, P.A. (Liaison), Ph.D. ......... Georgia State
- Foggin, J.H. (Liaison), DBA ......... Indiana
- Gardial, S.F., Ph.D. ......... Houston
- Holcomb, M.C., Ph.D. ......... Tennessee
- Reizenstein, R.C., Ph.D. ......... Cornell
- Rentz, J.O., Ph.D. ......... Georgia

Assistant Professors:

- Moon, M.A., Ph.D. ......... North Carolina
- Norek, C.D., Ph.D. ......... Ohio State

业务管理

- Marketing, Logistics and Transportation

- Marketing, Logistics and Transportation

（商学院）

- MAJOR DEGREES

- Marketing Administration (MBA, Ph.D.)

- Richard C. Reizenstein, Acting Head

- Professors:

  - Barnaby, D.J., Ph.D. ......... Purdue
  - Cadotte, E.R., Ph.D. ......... Ohio State
  - Davis, F.W., Jr., Ph.D. ......... Michigan State
  - Dier, G.N., DBA ......... Indiana
  - Hendrix, F.L. (Emeritus), Ph.D. ......... North Carolina
  - Langley, C.J. (Dove Prof.), Jr., Ph.D.... Penn State
  - Merton, J.T. (Harry J. Bruce Chair of Excellence), Ph.D. ......... Michigan State
  - Mundy, R.A. (Taylor Prof.), Ph.D., Penn State
  - Schumann, D.W., Ph.D. ......... Missouri
  - Woodruff, R.B. (Proffitt’s Prof.), DBA ......... Indiana

- Associate Professors:

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  - Foggin, J.H. (Liaison), DBA ......... Indiana
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  - Holcomb, M.C., Ph.D. ......... Tennessee
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  - Rentz, J.O., Ph.D. ......... Georgia

- Assistant Professors:

  - Moon, M.A., Ph.D. ......... North Carolina
  - Norek, C.D., Ph.D. ......... Ohio State

业务管理

- Marketing, Logistics and Transportation

（商学院）

- MAJOR DEGREES

- Marketing Administration (MBA, Ph.D.)

- Richard C. Reizenstein, Acting Head

- Professors:

  - Barnaby, D.J., Ph.D. ......... Purdue
  - Cadotte, E.R., Ph.D. ......... Ohio State
  - Davis, F.W., Jr., Ph.D. ......... Michigan State
  - Dier, G.N., DBA ......... Indiana
  - Hendrix, F.L. (Emeritus), Ph.D. ......... North Carolina
  - Langley, C.J. (Dove Prof.), Jr., Ph.D.... Penn State
  - Merton, J.T. (Harry J. Bruce Chair of Excellence), Ph.D. ......... Michigan State
  - Mundy, R.A. (Taylor Prof.), Ph.D., Penn State
  - Schumann, D.W., Ph.D. ......... Missouri
  - Woodruff, R.B. (Proffitt’s Prof.), DBA ......... Indiana

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  - Foggin, J.H. (Liaison), DBA ......... Indiana
  - Gardial, S.F., Ph.D. ......... Houston
  - Holcomb, M.C., Ph.D. ......... Tennessee
  - Reizenstein, R.C., Ph.D. ......... Cornell
  - Rentz, J.O., Ph.D. ......... Georgia

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  - Norek, C.D., Ph.D. ......... Ohio State

业务管理

- Marketing, Logistics and Transportation

（商学院）

- MAJOR DEGREES

- Marketing Administration (MBA, Ph.D.)

- Richard C. Reizenstein, Acting Head

- Professors:

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  - Davis, F.W., Jr., Ph.D. ......... Michigan State
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  - Hendrix, F.L. (Emeritus), Ph.D. ......... North Carolina
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  - Merton, J.T. (Harry J. Bruce Chair of Excellence), Ph.D. ......... Michigan State
  - Mundy, R.A. (Taylor Prof.), Ph.D., Penn State
  - Schumann, D.W., Ph.D. ......... Missouri
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  - Foggin, J.H. (Liaison), DBA ......... Indiana
  - Gardial, S.F., Ph.D. ......... Houston
  - Holcomb, M.C., Ph.D. ......... Tennessee
  - Reizenstein, R.C., Ph.D. ......... Cornell
  - Rentz, J.O., Ph.D. ......... Georgia

- Assistant Professors:

  - Moon, M.A., Ph.D. ......... North Carolina
  - Norek, C.D., Ph.D. ......... Ohio State
Materials Science and Engineering

Graduate programs are offered leading to the degrees of Master of Science and Doctor of Philosophy in Metallurgical Engineering or Polymer Engineering. Both the metallurgical and polymer programs are flexible and interdisciplinary in nature. Students may be admitted from a wide range of disciplines; these include physics, chemistry, chemical engineering, mechanical engineering, electrical engineering, materials engineering, and engineering science programs. Prospective students should consult materials science and engineering faculty concerning development of individual concentrations or special programs compatible with their backgrounds and goals.

Areas of concentration within the metallurgical engineering program include physical metallurgy, materials processing; welding metallurgy and materials joining; corrosion behavior, failure analysis; and mechanical and physical behavior of materials. Specializations in electronic, ceramic, and composite 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 at least 12 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 up to 12 hours total in related areas.


4. Satisfactory performance on a comprehensive oral examination administered by the faculty committee.

All resident students are required to register for and participate in the graduate seminar in metallurgical engineering or polymer engineering, as appropriate, during each semester in which it is offered. Three hours of MSE 503 or 504, Seminar, graded Satisfactory/No Credit, may be counted toward degree requirements.

Non-Thesis Option
Any candidate may apply for a non-thesis option. Upon acceptance, a supervisory committee of three will be appointed. At least two members of the committee will be from the
facy in the major area, either metallurgical engineering or polymer engineering. The requirements for completion of the non-thesis option are as follows:

1. Completion of a total of 30 hours of graduate coursework. At least 18 of those hours must be in the department, and up to 12 hours may be in related areas. Three hours of MSE 503 or 504, Seminar, graded Satisfactory/No Credit, may be counted toward degree requirements. The polymer engineering major includes specific courses required for the thesis option. The candidate's degree program must be approved by the faculty committee.

2. Satisfactory completion of a culminating experience such as MSE 580 (Critical Review).

3. Satisfactory performance on a comprehensive examination administered by the faculty committee.

THE DOCTORAL PROGRAM

After one year in residence and with the approval of the doctoral committee, a student may proceed directly to the doctoral program without completion of a master's degree.

Departmental requirements for completion of the doctoral degree are:

1. a. For students proceeding directly to the Ph.D. from the baccalaureate degree: 48 graduate course credit hours with at least six hours of 600-level courses. Six hours of MSE 503 or 504, Seminar, graded Satisfactory/No Credit, may be counted toward degree requirements. At least 30 credit hours must be courses taught in the department. The polymer engineering major must include the same courses required for the master's thesis option.

b. For students having a master's degree in Metallurgical Engineering, Polymer Engineering, or Materials Science and Engineering: 18 additional graduate course credits with at least six hours of 600-level courses. Three hours of MSE 503 or 504, Seminar, graded Satisfactory/No Credit, may be counted toward degree requirements. At least 12 credit hours must be courses in the department.

2. Four courses must be completed at least 24 hours of dissertation credits.

3. Satisfactory performance on a comprehensive examination, usually given in two parts, and covering such topics as materials science and engineering, metallurgical or polymer engineering, operations and processes, thermodynamics, technology, mathematics, physics, chemistry, and other related fields.

4. Active participation in graduate seminars conducted by the department. Resident students must register for the appropriate 503 or 504 every semester offered.

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 Polymer Engineering are available to residents of Kentucky, Louisiana, or Tennessee. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

405 Structural Characterization of Materials (3) X-ray diffraction and fluorescence; scanning and transmission electron microscopy; microanalytical techniques.

421 Mechanical Behavior of Materials II (3) Description of stress and strain: linear elastic constitutive equations, isotropic and anisotropic moduli in various materials; yield criteria; brittle fracture; crazing; plastic strain constitutive equations, forming operations and limit criteria. Prereq: Mechanical Behavior of Materials, Mechanics of Materials solid mechanics.

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: 203.

429 Introduction to Ceramic Matrix Composites (3) Characteristics of composites: ceramic matrix composites; macrostructure and materials design; overview of fabrication techniques; microstructural characterization; physical and mechanical property evaluation; current and potential applications. Prereq: Introduction to Materials Science and Engineering and Mechanics of Materials or equivalent and consent of instructor. (Same as Engineering Science 426.)

443 Polymer Processing (3) Rheological measurements: flow through tubes and slits; end effects and extrudate swell; selected application, 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: 203 or equivalent. (Same as Engineering Science 426.)

474 Biomaterials (3) Metals, polymers and ceramics used in orthopaedic, cardiovascular, and dental surgical implant devices; corrosion and degradation problems; polymers, ceramic, and composite materials selection and design. Prereq: 201. Recommended for engineering science and mechanics majors.

475 Fracture-Safe Design (3) (Same as Engineering Science and Mechanics 423.)

484 Introduction to Maintenance and Reliability Engineering (3) (Same as Nuclear Engineering 484, Industrial Engineering 484, and Mechanical Engineering 484.)

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

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses university facilities and for courses taken before degree is completed. May not be used toward degree requirements. May be repeated. SNC only. E

503 Graduate Seminar in Metallurgical Engineering (1) Prereq: Admission to graduate program. May be repeated. SNC only. E

504 Graduate Seminar in Polymer Engineering (1) Prereq: Admission to graduate program. May be repeated. SNC only. E

505 Engineering Analysis (3) (Same as Chemical Engineering 505.)

522 Defects in Crystals (3) Analytical and experimental analysis of defect interactions in solids. Prereq: 421 or consent of instructor.

523 Plastic Deformation of Metals (3) Geometry and mechanisms of single crystal plastic deformation; slip, twinning, and cleavage; dislocation theory; twinning, cleavage, and fracture, loading rate effects; effect of ordering and solid solution alloying; polycrystalline behavior in terms of single crystal deformation mechanisms; texture formation. Prereq: 301, 320 or consent of instructor.

524 Metallurgical Thermodynamics (3) Applications of chemical thermodynamics to metallurgical problems: refining, oxidation, surface treatments, alloy systems. Prereq: 570 or equivalent.

525-26 Welding Metallurgy (3,3) Welding processes; physical metallurgy of welding: phase transformations; heat flow; residual stresses; theories of hot cracking, cold cracking and porosity formation; applications to process utilization.

598 Ceramic Matrix Composites: Material and Mechanics (3) (Same as Engineering Science 598.)

599 Diffusion in Solids (3) Phonon mechanisms and atomic mechanisms of diffusion in solid state. Solution and applications of diffusion equations; random walk problem and mechanisms of diffusion; diffusion in dilute and concentrated alloys. Kirchhoff effect; high diffusivity paths.

530 Phase Transformations in Metallic Materials (3) Thermodynamics of phase equilibrium, 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) Analysis of corrosion processes in terms of possible corrosion mechanisms and Pourbaix diagram. Influences of environmental and mechanical factors contributing to pitting, crevice, fretting, wear, fatigue and stress corrosion. Prereq: 470 or consent of instructor.


541 Fluid Mechanics and Polymer Processing (3) Viscous 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. Prereq: 541.


544 Polymer Solution Thermodynamics and Characterization (3) Theories of solutions, statistical thermodynamics. Characterization, treatment of chromatography, viscoelasticity, light scattering and osmotic pressure. Prereq: Undergraduate physical chemistry.

546 Mechanical Properties of Solid Polymers (3) Types of mechanical behavior: Hookian and rubber elasticity; plastic deformation; fracture; linear viscoelasticity; dynamic mechanical behavior and testing; loss tangent; experimental methods, introduction to mechanical properties of polymeric composites.

549-50 Laboratory Methods in Polymer Engineering (1,2) Basic experimental techniques and instrumentation associated with characterization, x-ray and light scattering, calorimetry, rheometry, mechanical properties of solid polymers, polymer processing operations. Coreq: 540 or consent of instructor. 449-S/NC only.

560 Principles of Ceramic Processing (3) Treatment of ceramic processing, raw materials preparation and characterization, powder synthesis and characterization, sintering, preparation and 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, water glasses, and chelate ceramic glasses. Prereq: 360, Chemistry 371.
Dobbs, D.
Clark, C.E., Ph.D. .............. Louisiana State
Bradley, John S. (Emeritus), Ph.D. ........... Iowa
Baker, G.A., Ph.D. ..................... Cornell
Anderson, D.F., Ph.D. ..................... Chicago
Alikakos, N., Ph.D. ...................... Brown
Alexiades, V., Ph.D. ...................... Delaware

John B. Conway, Head

Professors:
Alexiades, V., Ph.D. ...................... Delaware
Allakos, N.K., Ph.D. ...................... Brown
Anderson, D.F., Ph.D. ...................... Chicago
Baker, G.A., Ph.D. ...................... Cornell
Bradley, John S. (Emeritus), Ph.D. .... Louisiana State
Carruth, J.H. (Emeritus), Ph.D. ........ Louisiana State
Clark, C.E., Ph.D. ...................... Louisiana State
Conway, J.B., Ph.D. ...................... Louisiana State
Davernman, Robert J., Ph.D. ........ Wisconsin
Dobbs, D.E., Ph.D. ...................... Cornell

Mathematics
(College of Arts and Sciences)

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

Applicants must have successfully completed one year of calculus (141-42 or equivalent) and a course in matrix algebra (251 or equivalent).

The following requirements must be met:
1. Complete 30 hours of coursework of which 21 must be at the 500 level. The coursework must include 504, 505, 506, 507, and 6 hours in 509. At most, 6 hours may be taken outside the Department of Mathematics (selected in consultation with the advisor).
2. Pass a final examination upon completion of all coursework.

In exceptional circumstances, part of admission requirement (b) might be satisfied concurrently with coursework. Normally Master of Mathematics degree students will start the program by taking 504 during the summer.

THE MASTER OF SCIENCE PROGRAM

The department offers two options for the Master of Science degree. The first option requires a thesis for which 6 hours must be earned along with 24 additional hours of work in acceptable courses numbered above 400. Of the additional hours, 6 may be in an area outside the department and 15 must be in courses in mathematics numbered above 500.

After one semester of graduate study, a student whose advisory committee gives its approval may choose the non-thesis option, for which 30 hours in courses numbered above 400 are required. Of these, 21 hours (at least 15 of which must be in mathematics) must be in courses numbered above 500. Of the 30 hours, 9 in courses approved by the advisory committee may be taken in fields other than mathematics. For this option it is required that a written final examination be passed and that credit be received for a reading course (598) in which a term paper or project is required.

Concentration in Applied Mathematics

For this concentration, available under the thesis or non-thesis option, the student must complete the following:
2. One hour of Seminar in Applied Mathematics or Seminar in Mathematical Ecology 589.
THE DOCTORAL PROGRAM

For the Ph.D. program in Mathematics, the student must meet the following four requirements in addition to those of The Graduate School:

1. Satisfy either the standard program or the interdisciplinary mathematical ecology concentration. A student intending to work in mathematical ecology may complete either but is strongly encouraged to complete the interdisciplinary mathematical ecology concentration. A student may elect to switch from one to the other provided the constraints of the latter option have not been violated. A student’s status after electing such transfer is determined by the complete history of the student’s earlier mathematics examinations from the standard program and the interdisciplinary mathematical ecology concentration. Descriptions of both programs are given below.

2. Demonstrate proficiency in one foreign language, normally French, German, or Russian. This requirement must be met prior to the examination in the area of specialization. A student’s doctoral committee may require the student to pass a second language examination.

3. Pass an examination in the field of specialization. After the requirements in 1. and 2. have been met, this examination will be given by a committee appointed by the department head. A student may take this examination only twice.

4. Pass a one-year, 600-level sequence in mathematics outside the student’s area of specialization. The sequences selected to fulfill this requirement must be approved by the department head and the student’s doctoral committee. (Such approval may occur after completion of the sequence.)

Requirements 1-4 must be completed no later than the start of a student’s seventh year (as a mathematics graduate student at UT Knoxville).

Standard Program

Demonstrate knowledge in five subjects selected from the list below by passing written examinations in three subjects and by earning grades of B+ or better each semester in the courses associated with two additional subjects.* The three subjects selected for written examinations must be from Groups I, II, III, and at least two groups must be represented in the three written examinations. At least three groups must be represented in the five subjects.


A student’s five subjects may not include both Real Analysis and Applied Linear Analysis or both Mathematical Principles of Fluid Mechanics and Mathematical Principles of Continuum Mechanics. A student may not count examinations in both Ordinary Differential Equations and Partial Differential Equations, but both may be included in a student’s five subjects. With prior approval of the graduate committee, a student may utilize as a Group IV course a year-long graduate-level sequence from outside the Department of Mathematics. At most one such utilization may be made.

A student may take as many written examinations as desired at any time the examinations are given, subject to the following conditions:

a. The examinations to be taken must be approved in advance by the student’s advisory committee.

b. At any one time a student may take at most only the number of examinations necessary to complete the requirements.

c. A student may take a collection of written examinations a maximum of 3 times, but no one failing 4 examinations, counting possible repetitions, will be permitted to take another examination. An exception is that a student who does not have a master’s degree in mathematics and who has been enrolled at a UK graduate program in mathematics no longer than one year may take written examinations at one time during that year without having that setting for the examinations or any incurred failure(s) count toward the limits imposed above.

d. At least two examinations must be taken and at least one must be passed before the start of a student’s fourth year. Three examinations must be passed before the start of a student’s fifth year.

*In lieu of earning a grade of B+ or better each semester in a sequence from Group I, II, or III, a student may demonstrate proficiency in that subject by passing the associated written examination. For this purpose, only one examination is permitted for each of up to two subjects, and this use of a written examination must be declared before the examination is taken so that the limits imposed above do not apply.

Mathematical Ecology Concentration

The student must pass written examinations in three subjects:

2. A subject from Groups I, II, and III of the standard program.
3. A subject represented by a year-long graduate-level sequence from outside the Department of Mathematics. The sequence must be approved in advance by the mathematical ecology faculty and by the departmental graduate committee. At least one member of the mathematical ecology faculty must be involved in the grading of the examination. The examination in this subject may be taken only twice.

The student also must earn grades of B+ or better each semester in the courses associated with the additional two subjects from the groups listed in the standard program. This requirement may not be satisfied with courses from outside the department. At least one of the subjects used to meet this requirement or the written examination subject in 2. must be from Groups I and II.

Except for the privilege of utilizing as a Group IV course a course from outside the department, this concentration is subject to the constraints and privileges specified in the standard program, including the restrictions on related subjects, the conditions a. through d. placed on the taking of written examinations, and the option to pass a written examination in lieu of earning a grade of B+ or better each semester in a sequence from Group I, II or III.

GRADUATE COURSES

400 History of Mathematics

Development of major ideas in mathematics from ancient to modern times and influence of ideas in science, technology, philosophy, art, and other fields. Writing emphasis course: at least one in-class essay examination and 3000 words of writing outside classroom. Prereq: Matrix Algebra I and Introduction to Abstract Mathematics.

401 Mathematics and Microcomputers

Primarily for students seeking certification to teach mathematics at secondary level. Use of microcomputers to study concepts and problems in mathematics. Does not satisfy the major requirements for a B.S. or M.S. in mathematics. Prereq: Calculus I.

404 Applied Vector Calculus

Topics from multivariable calculus; line and surface integrals, divergence theorem and theorems of Gauss and Stokes. Prereq: Calculus III.

405 Models in Biology

Differential and difference equation models of biological systems. May not be counted toward graduate degree. Prereq: Calculus II or Biostatistics.

411 Mathematical Modeling

Construction and analysis of mathematical models used in science and industry. Projects. Prereq: Differential Equations, Calculus III, and Matrix Algebra I.

421 Combinatorics

Introduction to problems of construction and enumeration for discrete structures: sequences, partitions, graphs, finite fields and geometries, experimental design; probability and statistics. Prereq: Probability and Statistics or consent of instructor.

422 Probability I

Random walk, Markov chains and Poisson processes. Other topics as selected by instructor. Prereq: 423.

425 Statistics

Derivation of standard statistical distributions; independence of sample 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


435 Partial Differential Equations I


443 Complex Variables I

Theory of functions of complex variables; residue theorem, contour integrals. Prereq: Calculus III. Recommended prereq: 300- or 400-level mathematics course.

444 Complex Variables II

Applications of complex variables to steady-state temperatures, electrostatics, and fluid flow. Prereq: 443.

445-46 Advanced Calculus II (3,3) Theory of sequences, series, differentiation, and integration. Riemann integration of functions of one or more variables. Prereq: Calculus III and Introduction to Abstract Mathematics, or consent of instructor.

447-48 Honors: Advanced Calculus II (3,3) Honors version of 445-46. Prereq: Calculus III and Introduction to Abstract Mathematics, or consent of instructor.

453 Matrix Algebra II (3) Matrix theory including Jordan canonical form. Prereq: Matrix Algebra I.
**Mathematics**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>510</td>
<td>Applied Mathematics Laboratory (1) Computer applications in applied mathematics: software packages for matrix analysis, symbolic computation, and solution of differential equations. Corre: 511 or 512. May be repeated.</td>
<td>Corre: Consent of instructor.</td>
<td>5</td>
</tr>
<tr>
<td>511-52</td>
<td>Methods in Applied Mathematics (3,3) Fundamentals and techniques associated with discrete and continuous models of physical, engineering, and biological systems; difference equations, networks, graphs, optimization, time series analysis, qualitative analysis of differential and delay-differential equations, and other topics.</td>
<td>Corre: 510, 445-446, or, 447, and 443.</td>
<td>5</td>
</tr>
<tr>
<td>513-14</td>
<td>Mathematical Principles of Fluid Mechanics (3,3) Equations of motion, incompressible and compressible potential flows, shock waves, viscous flows, Navier-Stokes equations, Euler equations, Corre: 431, 435, and 445-446 or 404, or consent of instructor.</td>
<td>Corre: Consent of instructor.</td>
<td>5</td>
</tr>
<tr>
<td>515-16</td>
<td>Analytical Applied Mathematics (3,3) Analysis of advanced techniques in context for applied problems: dimensional analysis and scaling, perturbation theory, variational approaches, transform theory, wave phenomena and conservation laws, stability and bifurcation, distributions, integrals equations. Corre: 446 or 448, 453, and either 511-12 or both 431 and 435.</td>
<td>Corre: Consent of instructor.</td>
<td>5</td>
</tr>
<tr>
<td>517-18</td>
<td>Mathematical Methods in Physics (3,3) (Same as Physics 571-72).</td>
<td>Corre: Consent of instructor.</td>
<td>5</td>
</tr>
<tr>
<td>519</td>
<td>Seminar in Applied Mathematics (1-3) May be repeated. Maximum 12 hrs.</td>
<td>Corre: Consent of instructor.</td>
<td>3</td>
</tr>
<tr>
<td>521-22</td>
<td>Enumerative Combinatorics (3,3) Sieve methods, recursion, and permutation groups applied to enumeration of discrete structures. Incidence algebras and combinatorics of partially ordered sets.</td>
<td>Corre: Consent of instructor.</td>
<td>3</td>
</tr>
<tr>
<td>522-24</td>
<td>Probability (3,3) Pertinent facts from probability theory, definition of abstract probability spaces, Kolmogorov's existence theorem; series of independent random variables and laws of large numbers; general theory of distributions of random vectors and their characteristic functions; weak convergence concept, weak compactness and Levy's continuity theorem in Euclidean spaces; infinitely divisible distributions and central limit problems; semigroup and convolution properties of conditional expectation, martingales, Doob's martingale and optional stopping theorems.</td>
<td>Corre: 445-446. Recommended prerequisite: 523.</td>
<td>5</td>
</tr>
<tr>
<td>525-26</td>
<td>Statistics (3,3) Pertinent facts from probability theory; formulation of statistical models; sufficiency, Neyman-Pearson lemma, exponential families, Bayesian models, methods of estimation and optimality theory; uniform minimum variance unbiased estimators, asymptotic efficiency and optimality; the confidence procedures and hypothesis testing; optimal tests and confidence intervals; asymptotic theory; robust tests; topics from decision theory.</td>
<td>Corre: 445-446. Recommended prerequisite: 523.</td>
<td>5</td>
</tr>
<tr>
<td>527-28</td>
<td>Stochastic Modeling (3) Models in probability applied to real world situations: queueing theory; branching processes; Monte Carlo simulation.</td>
<td>Corre: 445-446 or consent of instructor.</td>
<td>3</td>
</tr>
<tr>
<td>534</td>
<td>Calculus of Variations (3) Necessary conditions for extremals, Euler's equation, broken extremals, Weierstrass-Erdmann conditions, conjugate points, multiple integrals.</td>
<td>Corre: 431.</td>
<td>3</td>
</tr>
<tr>
<td>535-36</td>
<td>Partial Differential Equations (3,3) First order equations, classification of equations and properties of solutions, hyperbolic, parabolic, and elliptic equations.</td>
<td>Corre: 445-446 and 231 or consent of instructor.</td>
<td>3</td>
</tr>
<tr>
<td>537-38</td>
<td>Mathematical Principles of Continuum Mechanics (3,3) Conservation principles, equations of equilibrium and motion for fluids and elastic solids, constitutive relations and stress, convecting flows, shock waves, plasma, magnetic field, stability, and bifurcation.</td>
<td>Corre: 431, 435, 445 or 446, or consent of instructor.</td>
<td>3</td>
</tr>
<tr>
<td>539</td>
<td>Seminar in Differential Equations (1-3) Prereq: Consent of instructor. May be repeated. Maximum 12hrs.</td>
<td>Corre: Consent of instructor.</td>
<td>3</td>
</tr>
<tr>
<td>543-44</td>
<td>Complex Analysis (3,3) Theory of complex functions: Cauchy's theorem, Laurent series, maximum modulus principle, conformal mapping, analytic continuation, Riemann mapping theorem, harmonic functions, and Poisson integrals.</td>
<td>Corre: 445-446.</td>
<td>3</td>
</tr>
<tr>
<td>547-48</td>
<td>Applied Linear Algebra (3,3) Banach and Hilbert spaces, linear operators and spectral theory with applications to integral and differential equations, optimization, numerical analysis, and quantum mechanics.</td>
<td>Corre: 445-446.</td>
<td>3</td>
</tr>
<tr>
<td>549</td>
<td>Seminar in Analysis (1-3) May be repeated. Maximum 12 hrs.</td>
<td>Corre: Consent of instructor or 535 and programming ability.</td>
<td>3</td>
</tr>
<tr>
<td>555-56</td>
<td>Number Theory (3,3) Introduction to algebraic number theory.</td>
<td>Corre: 445-446 or consent of instructor.</td>
<td>3</td>
</tr>
<tr>
<td>559</td>
<td>Seminar in Algebra (1-3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.</td>
<td>Corre: Consent of instructor or 535 and programming ability.</td>
<td>3</td>
</tr>
<tr>
<td>561-52</td>
<td>Modern Algebra (3,3) Groups, rings, modules and linear algebra.</td>
<td>Corre: 445-446 or consent of instructor.</td>
<td>3</td>
</tr>
<tr>
<td>563</td>
<td>Linear Programming (3) Theory and applications.</td>
<td>Corre: Consent of instructor or 535 and programming ability.</td>
<td>3</td>
</tr>
<tr>
<td>567-68</td>
<td>Differential Geometry (3,3) Classical differential geometry in two and higher dimensions: curves and surfaces in Euclidean space, Gauss map, curvature, Gauss-Bonet theorem, hyperbolic geometry, Metric theory and Riemannian metrics; connections, geodesics, Jacobi fields, Lie bracket, Differential forms and moving frames.</td>
<td>Corre: 445-446 or consent of instructor.</td>
<td>3</td>
</tr>
<tr>
<td>569</td>
<td>Seminar in Topology (1-3) May be repeated. Maximum 12 hrs.</td>
<td>Corre: Consent of instructor or 535 and programming ability.</td>
<td>3</td>
</tr>
<tr>
<td>574</td>
<td>Finite Element Methods (3) Finite element techniques for solution of boundary and initial-boundary value problems developed from the Green's functions and variational principles.</td>
<td>Corre: 445-446, 453, 471-72.</td>
<td>3</td>
</tr>
<tr>
<td>575</td>
<td>Matrix Theory and Techniques in Numerical Analysis (3) Advanced topics in iterative and direct methods for solving large systems of linear equations; sparse matrix analysis, relationship to modern computer architectures.</td>
<td>Corre: 445-446, 453, 471-72.</td>
<td>3</td>
</tr>
<tr>
<td>576</td>
<td>Optimization (3) Major topics in optimization with problems developed from real-world applications including linear and nonlinear constrained and unconstrained optimization with analysis of major algorithms and utilization of appropriate software.</td>
<td>Corre: Numerical Algorithms, 453, 445-46.</td>
<td>3</td>
</tr>
</tbody>
</table>

*Note: Course codes 510-578 are available only for students in the Master of Mathematics program.*
659 Seminar in Algebra (1-3) Prerequisite: Consent of instructor. May be repeated with consent of department. Maximum 12 hrs.


663-64 Algebraic Topology (3,3) Homology, cohomology, and homotopy theories; duality and Hurewicz isomorphism theorem. Prerequisite: 581-82 and 1 yr. of abstract algebra. 456-S64 581-82. May be repeated with consent of department. Maximum 12 hrs.

667-68 Advanced Differential Geometry (3,3) Selected topics from Riemannian geometry and analysis on manifolds. Lie groups, metric geometry, spectrum of Laplacian, Hodge Theory, variational problems, curvature and topology of manifolds. Prerequisite: 567-68 or consent of instructor. May be repeated with consent of department. Maximum 12 hrs.

669 Seminar in Topology (3) May be repeated with consent of department. Maximum 12 hrs.


679 Seminar in Numerical Mathematics (1-3) May be repeated with consent of department. Maximum 12 hrs.

681-82 Advanced Mathematical Ecology (3,3) Selected topics in theoretical and applied mathematical ecology: population, community, ecosystem ecology and applied topics such as demography, ecotoxicology, epidemiology, environmental change, and resource management. Prerequisite: 581-82. May be repeated. (See also Ecology and Evolutionary Biology 581-82.)

Mechanical and Aerospace Engineering and Engineering Science

MAJOR DEGREES

Aerospace Engineering M.S., Ph.D.
Mechanical Engineering M.S., Ph.D.

D. W. Darling, Head

Professors:

Amar, B. (UTSI), Ph.D., M. D. Armlid, R. V., Ph.D., Mamikin, A. J., Ph.D., VPI
Baker, A. J., Ph.D., New York
Carley, T. G. (Liaison), PE., Ph.D., Illinois
Cantors, J. E. (UTSI), Ph.D., Georgia Tech
Collins, F. G. (UTSI), PE., Ph.D., California
Crawford, R. A. (Emeritus) (UTSI), Ph.D.
Darling, D. W., Ph.D., Illinois
Edmondson, A. J., PE., Ph.D., Texas A&M
Flando, G. A (UTSI), Ph.D., Cal Tech
Forrester, J. H., PE., Ph.D., Iowa State
Forty, J. W. (Emeritus), Ph.D., Iowa State
Frankel, J. I., Ph.D., VPI
Garrison, G. W. (UTSI), Ph.D., NC State
Hodgson, J. W. (Fisher Prof.), PE., Ph.D., Georgia Tech
Holland, R. W. (Emeritus), PE., Ph.D., Tennessee
Jendrucko, R. J., PE., Ph.D., Virginia
Johnston, W. S., PE., Ph.D., Clemson
Keeler, D. R. (UTSI), Ph.D., Florida
Keyhani, M. (Liaison), Ph.D., Ohio State
Kim, K. H., Ph.D., NC State
Krause, R. J., Ph.D., Oklahoma
Landos, J. D., PE., Ph.D., Lehigh
Lee, C. W. (Emeritus), Ph.D., Illinois
Liston, H., Jr. (Emeritus), PE., M.E.
McAteer, R. J. (UTSI), PE., Ph.D., Florida
McCay, T. D. (UTSI), PE., Ph.D., Auburn
McCoy, R. L. (Emeritus), PE., M.S.
Milligan, M. W., PE., Ph.D., Tennessee
Newman, M. K. (Emeritus) (UTSI), PE., Ph.D., Virginia
Peters, C. E. (Emeritus) (UTSI), D.A.S.
Ph. H. (Emeritus), PE., Ph.D., Illinois
Pitts, D. R. (Emeritus) (UTSI), PE., Georgia Tech
Remenyik, J. (Emeritus), Ph.D., Johns Hopkins
Schultz, R. J. (UTSI), Ph.D., Pennsylvania
Scott, W. E. (Emeritus), Ph.D., Johns Hopkins
Shahrokhi, F. (UTSI), Ph.D., Oklahoma
Shobe, L. R. (Emeritus), PE., M.S.
Snyder, W. T., Ph.D., Northwestern
Smith, G. V., PE., Ph.D., Pennsylvania
Soliman, O., PE., Ph.D., Tennessee
Speckhart, F. H. (IBM Prof.), PE., Ph.D., Georgia Tech
Stair, W. K. (Emeritus), M.S., Tennessee
Steinhoff, J. S. (UTSI), Ph.D., Chicago
Stoneking, J. E., PE., Ph.D., Illinois
Vardik, A. D. (UTSI), Ph.D., Pennsylvania
Wasserman, J. P., PE., Ph.D., Cincinnati
Weisman, Y. J., Ph.D., Rensselaer
Wilkerson, H. J., PE., Ph.D., Tennessee
Wilson, C. L. (Emeritus), Ph.D., Purdue
Wu, J. M. (Emeritus), Ph.D., Cal Tech
Wu, J. Z. (UTSI), Ph.D., Beijing Institute
Young, R. L. (Emeritus) (UTSI), PE., Ph.D., Northwestern

Associate Professors:

Boulet, J. A. M., Ph.D., Stanford
Cezeaux, J. L., Ph.D., Rensselaer
Engels, R. C. (UTSI), Ph.D., VPI
Hamel, W. R., Ph.D., Pennsylvania
Hopkins, J. A. (UTSI), Ph.D., Tennessee
Iannelli, G. S., Ph.D., Trenton
Kawiec, G., Ph.D., West Virginia
Mathes, A., PE., Ph.D., Illinois
M一回事, C. D., Ph.D., Tennessee
Moulden, T. H. (UTSI), Ph.D., Pennsylvania
Nguyen, K., Ph.D., Colorado
Venkatsswaran, S. (UTSI), Ph.D., Penn State
Yui, Y., Ph.D., California

Assistant Professors:

Lynne, J., M.D., Ph.D., NC State
Poncle, D. C., Ph.D., PE., Georgia Tech

Graduate programs leading to the degrees of Master of Science and Doctor of Philosophy are available with majors in Mechanical Engineering, Aerospace Engineering, and Engineering Science. Changing from one of these programs to another requires depart-
In the Department of Mechanical and Aerospace Engineering and Engineering Science, the student's graduate advisory committee must include a professor who is a member of the Department of Aerospace Engineering, Engineering Science, and at least one member from a department other than the Department of Mechanical and Aerospace Engineering and Engineering Science; however, at least one member of the student's graduate advisory committee must be on the faculty of the Department of Mechanical and Aerospace Engineering and Engineering Science.

**The Master's Program**

In both Mechanical Engineering and Aerospace Engineering, three M.S. options are offered. Option I requires a thesis, while options II and III do not. Option I is the normal program for recent graduates. Options II and III provide (a) graduate students with significant professional work experience and (b) graduate co-op students the opportunity to focus their programs in special areas through either greater coursework or selected engineering problems.

Credit requirements for these three options are summarized below.

<table>
<thead>
<tr>
<th>Course Areas</th>
<th>Hours Required</th>
<th>Option I</th>
<th>II</th>
<th>III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option I</td>
<td></td>
<td>18</td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>Coursework</td>
<td>24</td>
<td>30</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Courses in department</td>
<td>(500 level or above) (minimum)</td>
<td>12</td>
<td>18</td>
<td>12</td>
</tr>
<tr>
<td>Mathematics</td>
<td></td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Engineering courses</td>
<td></td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Thesis</td>
<td></td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Problems credit (590)</td>
<td></td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

All three program options require participation in the departmental graduate seminars program, and passing a final examination on all work submitted for the degree. Option II final examination will cover all coursework. Option III final examination will cover the selected engineering problems.

The thesis option, Option I, requires submission and defense of a written thesis that demonstrates the ability to conduct and report an independent investigation.

The problems option, Option III, requires a formal report to be written for each selected engineering problem.

In Engineering Science, two M.S. options are offered: Option I requires a thesis, while Option II does not. The Option II 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 30 hours is required. Credit requirements for these two options are summarized below.

<table>
<thead>
<tr>
<th>Course Areas</th>
<th>Hours Required</th>
<th>Option I</th>
<th>II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option I</td>
<td></td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Coursework</td>
<td>24</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Mathematics</td>
<td>6</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Engineering courses* (Major concentration may include but is not restricted to courses offered by the Department.)</td>
<td>12</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Related courses (May include additional courses in mathematics, computer science, or the physical and life sciences as well as engineering courses.)</td>
<td>6</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Thesis</td>
<td></td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

*Engineering courses under Option II may include advanced laboratory work or special problem work, for example, MAES 581 or analogous courses in other departments.

Both program options require participation in the departmental graduate seminars program, and passing a final examination on all work submitted for the degree.

**The Doctoral Program**

All students must complete a minimum of 72 semester hours beyond the Bachelor's degree, exclusive of credit for the master's thesis. These shall include a minimum of 24 semester hours in Doctoral Research and Dissertation and a minimum of 48 semester hours in other courses.

In Mechanical Engineering or Aerospace Engineering, the courses must include:

1. A minimum of 12 semester hours of graduate credit in mathematics in courses numbered 400 or above with a minimum of 6 semester hours numbered 500 or above.
2. A minimum of 24 semester hours in the department in courses numbered 500 and above, with at least 12 of these semester hours in the major. A minimum of 3 semester hours of courses is required at the 600 level. These are exclusive of thesis, problems, or dissertation credit. The student's advisory committee can approve the student's petition to replace one 600-level course with one or more 500-level courses(s) that are more appropriate.

In Engineering Science, the courses must include:

1. A minimum of 24 semester hours in engineering graduate courses, exclusive of thesis and dissertation credit. These courses will normally be numbered 500 and above, with at least 9 semester hours of 600-level courses, which constitute one or two areas of concentration selected by the student. The number of courses in this group to be taken will depend on the program selected by the student and the approval of his/her advisory committee.
2. A minimum of 12 semester hours in mathematics or computer science in courses numbered 400 and above, exclusive of a first course in ordinary differential equations.

Additional requirements for all students include:

1. Participation in the departmental seminar program.
2. Meet all departmental examination requirements, which include passing a written and oral comprehensive examination.
3. Presentation of a dissertation proposal to the student's advisory committee and approval of that proposal by that committee.

**Academic Common Market**

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The Ph. D. program in Aerospace Engineering is available to residents of the states of Arkansas, Kentucky, and Tennessee. The M.S. in Aerospace Engineering is available to residents of Kentucky. The Ph. D. program in Engineering Science is available to residents of the states of Florida (concentration in biomedical engineering only). Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.
GRADUATE CREDIT FOR UNDERGRADUATE COURSES

Students majoring in Mechanical Engineering or Aerospace Engineering may not normally use more than one 400-level engineering course to meet their advanced degree requirements. For students majoring in Engineering Science, four hundred-level courses in engineering may be used for graduate credit at the discretion of the advising committee. However, at least two-thirds of minimum required credit hours in a master’s degree program must be at or above the 500-level. With approval of advisor, students majoring in the Department of Mechanical and Aerospace Engineering and Engineering Science may take senior (400-level) courses in the Department for graduate credit. Such students should consult with instructors regarding prerequisites for undergraduate courses.

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 bodies for desired characteristics. Potential flow theory, viscous effects, compressibility effects, Subsonic, transonic, and supersonic airfoil. Prereq: 570, F

424 Astronautics (3) Propulsion, trajectories, guidance, control, and atmospheric reentry of space vehicles. Prereq: Compressible Flow or consent of instructor. Sp

425 Propulsion (3) Principles of propulsion devices; turbojet, ramjet and rocket engines. Prereq: 351, F

426 Introduction to Aerospace Design (3) Design process, synthesis, safety, reliability, patents, product liability, economic analysis, optimization, design standards, design studies. Individual design reports. Prereq: 351, 370, 383. Coreq: Mechanical Engineering 344, F

428 Aerospace System Design (4) Synthesis and design of complete aerospace system, economic and technical aspects. Participation in team design effort, formal presentations and design report. Prereq: 425, 426, Sp

449 Aerospace Engineering Laboratory (3) Designing, conducting, and reporting results of experimental exercises. Test statistical analysis, design optimization and computer program application. Prereq: 355, 356, 3 labs. F

511 Inviscid Flow (3) Kinematics and dynamics of inviscid fluids; potential flow about body, conformal mapping. Prereq: 422 or Mechanical Engineering 531, Mathematics 425 or equivalent.

513 Experimental Mechanics (3) Experimental techniques with laboratory experiments: representational experiments: hot wire anemometry and turbulence measurements, flow visualization, wind tunnel experiments, water tunnel experiments, rocket cosmonauts 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 aerodynamic principles to air vehicles to provide estimates of performance, stability, and control characteristics for subsonic to hypersonic speeds. Relations among thrust, drag, lift and altitude, propulsion systems, vehicle performance characteristics, and trajectory optimization. Prereq: 422; 515 for 516.

521-22 Aerodynamics of Compressible Fluids (3,3) One-dimensional internal and external flow; waves, small perturbation theory, slender body theory; similarity rules; method of characteristics. Prereq: 422 for 521; 521 for 522.

525 Hypersonic Flow (3) Slender body flow; similarity; Newtonian theory, blunt body flow; viscous interactions, free molecule and rarefied gas flow. Prereq: 512.

527-28 Aerospace Ground Test Facilities (3,3) Atmospheric models and similarity considerations; aerodynamic test facilities; continuing and intermittent wind tunnels and ballistic ranges; propulsion test facilities or air breathing and rocket engines; space environment and space vehicle test facilities. Prereq: 512 and 521, Mechanical Engineering 513 and 522.

529 Rarefied Gasdynamics (3) Binary elastic collisions; kinetic flow theory; regimes; Boltzmann and moments equations; transfer equation, gas-surface interactions; slip boundary conditions, free molecules, slip and transition flow. Monte Carlo simulation; experimental techniques; introduction to hypersonic real gas flows. Prereq: 522, Mechanical Engineering 522.

531 Magnetohydrodynamics (3) Electromagnetic field theory; ohmic heating; thermophysical and thermodynamic properties of gases; applications of field theories and applications. Prereq: 422 and Mathematics 471.

532 Introduction to Turbulence (3) Macroscopic effects, analogies, statistical treatment, correlation functions, energy spectra, diffusion; application of turbulent jets and pipe flow. Prereq: 511-12.

534 Atmospheric Entry (3) Reentry trajectories; lift and drag during reentry; vehicle motion and stability during reentry; aerodynamic heating and heat protection systems. Prereq: 522. Recommended prereq: 512.

538 Transonic Flow (3) Nature of flow at transonic speeds; small disturbance theory; shock wave properties; shock-free flows; strong viscous interaction phenomena; solution techniques. Prereq: 522.


554 Aerospace Vehicle Stability and Control (3) Static and dynamic longitudinal directional and lateral stability and control. Coupled modes. Motion with free and fixed flight control surfaces. Automatic control systems. Prereq: 423, 531.


561 Fundamentals of Aeroacoustics (3) Generation, propagation and absorption of sound in gaseous and moving media. Prereq: Consent of instructor.

564 Spacecraft Attitude Dynamics and Control (3) Rotational attitude dynamics of space vehicles. Gyroscopic systems; passive and active attitude control devices. Linear control theory and attitude stabilization. Prereq: 551, Mathematics 471.

574 Space Engineering: Satellite Technology (3) Satellites and rockets (orbit, launch vehicles and launching), spacecraft structure, power systems, attitude control systems, telemetry/trafficking command and communication systems, spacecraft testing, reliability, and application of satellites (communication, weather, Earth observation, and Earth applications). Prereq: 426, Mathematics 471, 404.

595 Selected Engineering Problems (2-6) Enrollment limited to students in problems program. Prereq: Consent of advisor.

599 Special Topics in Aerospace Engineering (1-3) May be repeated. Maximum 6 hrs.


632 Magnetohydrodynamics II (3) Alfvén and shock waves, exact solution for magnetohydrodynamic channel flow, one-dimensional model of channel flow, experimental application of magnetohydrodynamics, propulsion and power generation. Prereq: 631 and Mathematics 562.


646 Theory of Turbulence (3) As Same Engineering Science and Mathematics 645.

651-52 Advanced Aerodynamics (3,3) Subsonic, transonic, supersonic, and hypersonic flows treated in general and unified manner with combined viscous/ideal effects. Relationships among various regimes of fluid flows. Fluid dynamical assumptions, limitations of approximations and consequences. Foundations of gas dynamics, applications to airplane, rocket, ground testing and jet propulsion. Discussion of special topics according to interest of students. Prereq: 511, 522.


690 Advanced Topics in Aerospace Engineering (3) Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

Engineering Science

GRADUATE COURSES

423 Fracture Safe Design (3) Critical review of variables controlling fracture toughness: part II flaw geometry, temperature, loading rate, section size, material, characterization of fracture toughness by stress intensity factors, strain energy release rates, J integral, COD data, transition temperature tests; use of fracture toughness data in design. Prereq: 521 and Materials Science and Engineering 201; (Same as Materials Science and Engineering 475.) 3 hrs or 2 hrs and 1 lab.

426 Fundamental Principles of Composite Materials (3) (Same as Materials Science 472.)

429 Introduction to Ceramic Matrix Composites (3) (Same as Materials Science and Engineering 429.)

433 Dynamic Systems (3) Three dimensional dynamics of particles and rigid bodies; gyroscopes; variable mass systems; central force motion; Lagrange's equations; stability; transfer functions. Prereq: Dynamics.

435 Engineering Acoustics (3) Concepts of acoustics, measures of sound and their units; noise generation and transmission, noise control principles and application, materials and procedures for noise abatement. Prereq: Senior standing or consent of instructor.

442 Fluid Mechanics II (3) Integral forms of linear and angular momentum equations and applications to pumps and turbines; performance; boundary layer theory; conservation equations; internal one-dimensional incompressible and compressible flows; potential flow; methods of flow measurement; laboratory. Prereq: Fluid Mechanics I, Differential Equations I, Calculus III. Sp

461 Experimental Stress Analysis (3) Theory, techniques, and instrumentation of resistance strain gauges; theory and techniques of brittle coating method; introduction to other strain measuring devices. Prereq: 201, Electrical and Computer Engineering 301. 2 hrs and 1 lab.

465 Dynamic Data Acquisition (3) Use and calibration of instrumentation for measuring and recording dynamic events; Fourier analysis; transfer function analysis, digital signal processing, transduction, experimental parameter estimation with applications to modal vibration analysis. Prereq: Circuits and Electrical Engineering 301.
541 Advanced Topics in Fluid Mechanics and Convective Heat Transfer (3) Convective momentum, heat and mass transfer; boundary layer analysis, stability, transition, turbulence, closure models; Navier-Stokes equations.

545 Theory of Turbulence (3) Mathematical descriptions of turbulence; isotropic turbulence, energy spectra, Kolmogorov's hypothesis, large and small eddy structure for turbulence, turbulent diffusion by continuous movement; applications to turbomachinery, wakes, pipe flow, and boundary layers. Pre requisite: Mechanical and Aerospace Engineering and Science 542. (Same as Aerospace Engineering and Science 542.)

567 Computational Mechanics Seminar (1) Current developments in computational fluid thermal/structural mechanics. For doctoral thesis students only. May be repeated.

61 Advanced Topics in Engineering Mechanics (3) Advanced topics in engineering mechanics, group or individually. Consent of instructor. May be repeated with consent of department.

Mechanical Engineering

NOTE: Not all the courses listed below are available at both the UT Knoxville and the UTSI campuses.

GRADUATE COURSES


455 Introduction to Test Design (2) Engineering economy, optimization, design for automation, reliability, patents and product liability; design of mechanical engineering solid mechanics systems. Participation in team design effort; design report. Pre requisite: Dynamics and Vibrations of Machines. F.

465 Introduction to Thermal Design (2) Engineering economy, optimization, design for automation, reliability, patents and product liability; design of mechanical engineering thermal-fluid systems. Participation in team design effort; design report. Prerequisite: 332, 344. F.


467 Machine Design (4) Design of complete machine; documentation, complete specifications, design calculations, working drawings, and cost analysis. Written and oral report. Prerequisite: 455, 466. Sp.

471 Refrigeration and Air Conditioning (3) Vapor compression and absorption cycles; heat pump systems; psychrometric processes; air washers; cooling towers; steam turbines; air pollution; building heating transmission. Prerequisite: 332, 344.

475 Thermodynamic Engineering (3) Thermodynamic equilibrium, turbomachinery, heat exchangers, combustion and systems analysis and design, second law and economic analysis. Prerequisite: 332, 344. F.

479 Thermal Engineering Design (4) Design of complete thermal-fluid system, economic, technical and optimization aspects. Participation in team design effort, formal presentations and design report. Prerequisite: 456, 475. Sp.

481 Internal Combustion Engines (3) Thermochemical reaction in internal combustion engines, propulsion engines, combustion, detonation, equilibrium, dissociation. Analysis of internal combustion engines using ideal and real fluids. Prerequisite: 332, 344.
582 Rocket Propulsion II (3) Solid propellant rocket performance, homogeneous and heterogeneous propellant chemistry and combustion system performance, thermodynamics of rocket engines, an introduction to nuclear and electric propulsion; electrical resistance and electric field (ion) engine performance, magnetohydrodynamic thrusters, traveling wave thrusters, propulsions systems. Prereq: Consent of instructor.

584-65 Turbomachinery Systems I, II (3, 3) Ideal cycle analysis of turbine engines, real cycle analysis, component performance analysis, component design and systems integration (including gas turbines, compressors, turbines), flow through theory, turbine engine component matching, transient operation, surge and rotating stall, engine control systems, structural considerations. Prereq: First year graduate standing and consent of instructor.


599 Selected Engineering Problems (2-6) Enrollment limited to students in the capstone program. Prereq: Consent of advisor. May be repeated. S/N only.

610 Advanced Topics in Fluid Mechanics and Heat Transfer (3) Advanced theory and application of fluid mechanics and heat transfer: natural convection, laminar and turbulent flows, high speed and nonequilibrium flows, advanced boundary layer theory, combustion, turbulence, vortex breakdown, vorticity, exchange theory and design. May be repeated. Maximum: 9 hrs. Prereq: Consent of instructor.

613 Advanced Radiation Heat Transfer (3) Radiation heat transfer in absorbing, emitting and scattering media; interaction of thermal radiation with conduction and convection heat transfer. Prereq: 511, 512.

621 Advanced Topics in Solid Mechanics (3) Advanced theory and applications in mechanics, dynamic, vibrations, and strength of materials. Prereq: Consent of instructor. May be repeated.

642 Advanced Topics in Thermodynamics (3) Comparison of macroscopic and microscopic approach: equilibrium of pure substances, metastable states; non-equilibrium thermodynamics. Prereq: Consent of instructor.


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

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


550 Numerical Heat and Mass Transfer (3) Discrete modeling of Navier-Stokes equations and energy equation via control volume, method of lines for discretization of convective term, iterative solution algorithms for pressure-linked equations modeling forced and buoyancy driven flows. Prereq: Undergraduate fluid mechanics and heat transfer.


553 Computational Solid Mechanics (3) Finite element analysis techniques in structural mechanics and elasticity, nonlinearities. Two and three-dimensional formulations; boundary elements; numerical quadrature methods for domain discretization. Equation solution: substructuring, skyline solvers, matrix iteration techniques. Applications in beams, plates and shells. Computer programs used to solve rigid body, compressible fluid, solid and electromagnetic field problems. Networked station environment (CAD, graphics, solid models, data base management). Prereq: 551.

559 Computational Mechanics Laboratory (1) Utilization of networked mini-computer/enginering work station environment for conducting computational mechanics experiments. May be taken for credit with each of courses 551, 552, 553, and 557. Coreq: 551.

576 Expert Systems in Engineering (3) (Same as Nuclear Engineering 576)

577 Neural Networks in Engineering (3) (Same as Nuclear Engineering 577)

578 Seminar (1) All phases of mechanical and aerospace engineering and science reports on current research at UTK and UTIIS. May be repeated. S/N only.

600 Research and Dissertation (3-15) P/NP only. E
651-52 Advanced Topics in Computational Fluid Dynamics (3,3) Approximation theory; analysis of accuracy, convergence, and stability for smooth and nonsmooth solutions; shock, artificial dissipation; two- and three-dimensional, compressible viscous and inviscid flows; potential, Euler and complete Navier-Stokes solutions; mixed subsonic-supersonic flows. Algorithm construction: finite difference, finite element, approximate factorization, flux vector splitting, finite volume; generalized coordinate and adaptive grid; steady flows including second-order turbulence closure. Thin layer and parabolic Navier-Stokes equations; multi-dimensional, turbulent and reacting flows. Computer project. Prereq: 552.

653-54 Advanced Topics in Computational Solid Mechanics (3,3) Fracture mechanics, singularity solutions; non-linear constitutive problems; variable stiffness, initial strain and initial stress methods; plasticity, creep; unified creep-plasticity theory; geometrically non-linear problems, large deflection, stability; shell structures; analysis of accuracy, convergence; adaptive grids. Prereq: 553.

671 Advanced Topics in Applied Artificial Intelligence (3) (Same as Nuclear Engineering 671.)

Medical Biology
See College of Veterinary Medicine and Comparative and Experimental Medicine

Metallurgical Engineering
See Materials Science and Engineering

Microbiology
(College of Arts and Sciences and College of Veterinary Medicine)

MAJOR

DEGREES

Microbiology.........................M.S., Ph.D.
Veterinary Medicine..................D.V.M.

Robert Moore, Head

Professors:
Beck, Raymond W. (Emeritus), Ph.D.
Wisconsin
Becker, Jeffrey M., Ph.D...............Cincinnati
Brian, D. A., Ph.D., D.V.M...........Michigan State
Monte, T. C., Ph.D...................Maryland
Moore, R. N., Ph.D...................Texas
Riggsby, W. Stuart, Ph.D.............Yale
Rouse, B. T., Ph.D...................Georgetown
Savage, Dwayne C., Ph.D............California
Sayler, Gary S., Ph.D..................Idaho
Stacey, G. (Lialon), Ph.D............Texas
White, D. C. (Distinguished Scientist), Ph.D. ..................Rockefeller
Woodward, J. M. (Emeritus), Ph.D. .......Kansas

Associate Professor:
Hacker, David, Ph.D. ...............Michigan State

Assistant Professors:
Wilhelm, Steve, Ph.D. ..............Western Ontario
Zaghouani, Habib, Ph.D. ............Paris

The Department of Microbiology offers both the M.S. and Ph.D. Students have the option of selecting from a variety of graduate research programs. For a departmental brochure, contact the department head.

ADMISSION REQUIREMENTS

Students are expected to have completed an undergraduate program with a 3.0 or better GPA on a 4.0 system. Included in the undergraduate course credits should be (1) a full year of general biological science, (2) one year of calculus, (3) two years of chemistry, including one year of organic, (4) one year of physics, and (5) an introductory course in microbiology. In many cases, deficiencies in requirements may be removed by taking appropriate courses during the first year of graduate study. The department also requires the general portion of the Graduate Record Examination. A satisfactory score on each part is 550 or higher with rare exceptions. Three letters of recommendation should be submitted by current or former faculty members.

Each new graduate student meets with an advisory committee chaired by the departmental advisor to plan a program of study for the first one or two semesters until a research advisor is selected. All first-year students participate in a laboratory rotation program during the first semester of study. This program allows the student to adjust smoothly to the research programs of the department, to develop a background of research procedures and concepts, and to facilitate the selection of a research professor. Usually the student selects a research professor toward the end of the laboratory rotation period. The major professor assists in the selection of and carrying out of a suitable research program and in the naming of a thesis dissertation committee.

THE MASTER'S PROGRAM

The program leading to the M.S. is designed to provide the student with basic knowledge, to permit the acquisition of technical competence in the fundamentals of research, and to encourage creative and independent thinking. Two to three calendar years are usually needed for the course of study that has the following requirements: (1) 30 hours including 6 thesis credits; (2) a 3.0 GPA in all courses taken; (3) 30 hours of credit have been earned in courses graded on the A-F system; (4) a 3.0 GPA in courses taken in the department; (5) presentation of a research thesis and its oral defense.

THE DOCTORAL PROGRAM

The program leading to the Ph.D. is designed to develop the student's ability to pursue independent and original research in microbiology and allied fields, to teach both oral and written communication of the results of research to the scientific community, and to train effective teachers. Students may enter the program after receiving either a bachelor's or master's degree. Students who enter with a bachelor's degree usually receive the Ph.D. after four or five years; those with the master's degree usually take three or four years to complete the degree. Departmental requirements are: (1) a 3.0 GPA in all courses taken for graduate credit after 12 hours of credit have been earned in courses graded on the A-F scale; (2) a 3.0 GPA in courses taken in the department; (3) satisfactory performance in at least one specialty area, teaching assistant; (4) one semester of physical chemistry; (5) one course in statistics; (6) two semesters of biochemistry or molecular biology; (7) satisfactory performance in a comprehensive examination that must be attempted before the end of the fifth semester in the program and passed before admission to candidacy; and (8) the presentation of a research dissertation and its oral defense.

GRADUATE COURSES

410 Bacterial Physiology (3) Modern concepts of structure and function of bacterial cell. Prereq: Introduction to Microbiology.

411 Bacterial Genetics (3) Transmission and expression of genetic information by bacteria. Prereq: Introduction to Microbiology. Sp

420 Medical Microbiology Laboratory (3) Laboratory exercises in medically important areas of microbiology: microorganisms, pathogenesis and immunology. Prereq: Introduction to Microbiology Lab, 430. Coreq: 420. Sp

430 Immunology (3) Principles of inflammation and immunity; immunoglobulin structure and theories of formation and diversity; common diseases, cell cooperation and recognition in immune mechanisms; soluble factors. Prereq: General Genetics. F


470 Microbial Ecology (3) Physiological diversity and taxis of microbes in natural and simulated ecosystems. Functional role of microorganisms in natural and simulated ecosystems. Prereq: 310. F

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

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

575 Applied Microbiology and Bioengineering (3) (Same as Chemical Engineering 575, Environmental Engineering 576, and Agricultural Engineering 587.)

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

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

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

596 General Seminar (1) Lectures and seminars by invited speakers, faculty, and graduate students. May be repeated. Maximum 18 hrs. S/NC only; E

596 Laboratory Rotation (1) Familiarization with research areas in department through series of rotations in laboratories of individual faculty members. May be repeated. Maximum 3 hrs. S/NC only.

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

601 Journal Club in Microbial Physiology (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/NC only; E

602 Journal Club in Microbial Pathogenesis (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/NC only; E

603 Journal Club in Immunology (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/NC only; E

604 Journal Club in Virology (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/NC only; E
Modern Foreign Languages and Literatures

(Majors: College of Arts and Sciences)

**MAJORS**

French.................................................M.A.
German..................................................M.A.
Spanish.................................................M.A.
Modern Foreign Languages................Ph.D.

Susan Martin, Head

Professors:
Barrette, Paul E., Ph.D. .................California
Brady, Patrick (Shumway Chair of Excellence), D.U.P.
Campion, Edmund J., Ph.D. ............Yale
Cobb, Carl W. (Emeritus), Ph.D. ....Tulane
DiPuccio, Denise M., Ph.D. ............Kansas
Elliot, Jacqueline C. (Emeritus), M.A. ....Illinois
Falen, James E. (Emeritus), Ph.D. ....Pennsylvania
Fiene, Donald M. (Emeritus), Ph.D. ....Indiana
Handelman, Michael H., Ph.D. ....Florida State
Hefflin, William H., Ph.D. ..............Florida State
Hodges, Carolyn R., Ph.D. ............Chicago
Irving, Thomas B. (Emeritus), Ph.D. ....Princeton
Kratz, Henry (Emeritus), Ph.D. ....Ohio State
Levy, Karen D., Ph.D. ...............Kentucky
Maurino, Ferdinando D. (Emeritus), Ph.D. ....Columbia
Meior, C. J., Ph.D. ..................Chicago
Osborne, J. C. (Emeritus), Ph.D. ........Northwestern
Pinsky, Clare (Emeritus), Ph.D. ....California
Ritzenhoff, Ursula C. (Emeritus), Ph.D. ........Connecticut
Rivera-Rodas, Oscar, Ph.D. ...........California
Romier, John B. (Liaison), Ph.D. ....Vanderbilt
Vazquez-Bigl, A. M. (Emeritus), Ph.D. ....Philadelphia
Wallace, Albert H. (Emeritus), Ph.D. ....North Carolina

Washburn, Yulan M., Ph.D. .........North Carolina

**Associate Professors:**
Beauvoir, Margaret, Ph.D. ............Texas
Brizio, Flavia, Ph.D. ...............Washington
Cree, Bryant, Ph.D. ...............California
DiMaria, Salvatore, Ph.D. ............Wisconsin
Duncan, Cynthia K. (Liaison), Ph.D. ....Illinois
Helmold, Christine (Liaison), Ph.D. ....Wisconsin
Lauckner, Nancy A. (Liaison), Ph.D. ....Wisconsin
Lee, David E., Ph.D. .................Stanford
Nakuma, Constancio, Ph.D. ..........Sorbonne
Pervukhina, Natalia K., Ph.D. .........Bryn Mawr
Young, Dolly, Ph.D. ..............Texas

**Assistant Professors:**
Blackwell, Stephen H., Ph.D. ........Indiana
Essel, Les, Ph.D. ...................Brown
Hoenig, Peter, Ph.D. .............Pennsylvania
Kaplan, Gregory, Ph.D. ..........Pennsylvania
LaCure, Jon, Ph.D. .................Indiana
McAlpin, Mary K., Ph.D. ........Columbia
Ohnesorg, Stefan, Ph.D. ..........McGill
Silvaffito, Eudice, Ph.D. ....North Carolina
Williams, Jinko, Ph.D. ..........Ohio State

The Department of Modern Foreign Languages and Literatures offers graduate programs leading to the Master of Arts degree with majors in French, German and Spanish, and the Doctor of Philosophy degree with a major in Modern Foreign Languages. Inquiries should be addressed to the head of the department.

**THE MASTER’S PROGRAMS**

**French**

**Thesis Option:**
1. Completion of a minimum of 24 semester hours in coursework plus at least 6 hours in course 500 Thesis. French 501 is required. A maximum of 6 hours may be taken at the 400 level, the rest at the 500 level, and under certain conditions the student may take 600-level seminars. If the student chooses to have a minor (such as Italian or Portuguese), at least 24 hours (including 6 hours of thesis) must be taken in the major, 6 in the minor.
2. A thesis with a minimum of 6 semester hours in course 500.
3. A written examination covering the coursework and selected items from a master reading list.
4. A final oral examination covering the thesis.

**Non-Thesis Option:**
1. Completion of at least 30 semester hours, with a maximum of 9 at the 400 level, the rest at the 500 level, including French 501. Under certain conditions, the student may take 600-level seminars. If the student chooses to have a minor (such as Italian or Portuguese), at least 24 hours must be taken in the major, 6 in the minor.
2. Three term papers that have been accepted by the student’s advisory committee.
3. A written examination covering the coursework and selected items from a master reading list.
4. A final oral examination covering the thesis.

**German**

**Thesis Option:**
The minimum requirements are 24 semester hours of coursework and 6 hours of Thesis 500. German 510 and 519-20 are required, as are three courses on German literature or culture, one of which may be at the 400 level. In addition, students must take three further courses, one of which may be chosen from 411-12 or 485. All graduate teaching assistants should take 512, and other candidates may take 512 or any other course above 500. A maximum of three 400-level courses may be counted toward the 24 semester hours of course credit. All M.A. candidates must sit for a standardized language examination, such as the Zentrale Mittelstufenprüfung. Students who are interested in future Ph.D. level study are strongly advised to choose the thesis option.

**Non-Thesis Option:**
The minimum requirements are 30 semester hours of coursework, including at least one 600-level course, for which a seminar paper is required. German 510 and 519-20 are required, as are three courses on German literature or culture, one of which may be at the 400 level. In addition, students must take three further courses, only one of which may be chosen from 411-12 or 485. All graduate teaching assistants should take 512, and other candidates may take 512 or any other 500-level course. A maximum of three 400-level courses may be counted toward the 24 semester hours of coursework. A common written exam over the designated reading list is required, as is a standardized language exam, such as the Zentrale Mittelstufenprüfung. Each non-thesis M.A. candidate will have a committee of three faculty members in German to whom the student will submit a dossier consisting of the seminar paper and one paper previously submitted in a graduate course. The length and type of the papers is described in greater detail in the Manual for Graduate Students in German.

**Spanish**

**Thesis Option:**
1. Completion of a minimum of 24 semester hours in coursework plus at least 6 hours in course 500 Thesis. Spanish 501 is required. A maximum of 6 hours may be taken at the 400 level, the rest at the 500 level, and under certain conditions the student may take 600-level seminars. If the student chooses to have a minor (such as Italian or Portuguese), at least 24 hours (including 6 hours of thesis) must be taken in the major, 6 in the minor.
2. A thesis with a minimum of 6 semester hours in course 500.
3. A written examination covering the coursework and selected items from a master reading list.
4. A final oral examination covering the thesis.

**Non-Thesis Option:**
1. Completion of at least 30 semester hours, with a maximum of 9 at the 400 level, the rest at the 500 level, including Spanish 501. Under certain conditions, the student may take 600-level seminars. If the student chooses to have a minor (such as Italian or Portuguese), at least 24 hours must be taken in the major, 6 in the minor.
2. Three term papers that have been accepted by the student’s advisory committee.
3. A written examination covering the coursework and selected items from a master's reading list.

THE DOCTORAL PROGRAM

The Ph.D. in Modern Foreign Languages requires advanced training in a major language and either a second language or applied linguistics.

Admission Requirements

Applicants must have completed a B.A. in either French, German, or Spanish to be accepted into this program. Both graduates of institutions in the United States and those with undergraduate degrees from institutions outside the United States must have a grade point average of at least 3.0. Consideration will also be given to applicants who do not have an undergraduate degree in one of the three foreign languages but do have the equivalent of an undergraduate major in one of them.

Degree Requirements

Candidates must complete a minimum of 63 semester hours of coursework beyond the bachelor's degree in addition to 24 hours of doctoral research and dissertation. For candidates with French or Spanish as a first concentration, two tracks are available.

The coursework for Track I must be distributed as follows: at least 39 hours in the first concentration; at least 18 hours in the second concentration; and at least 6 hours in a cognate field.

The coursework for Track II must be distributed in this way: at least 45 hours in the first concentration; at least 12 hours in the second concentration; and at least 6 hours in a cognate field. Because Track II students will have taken 12 graduate hours instead of 18 hours in the second concentration, they will normally not be eligible to teach that field at institutions which follow SACS guidelines for college foreign language teaching.

The coursework for all concentrations must be distributed as follows:

1. First Concentration: German. A minimum of 39 hours of German courses beyond the bachelor's degree, distributed as follows: 400 level: A maximum of 6 hours of 400-level classes taken for the M.A. may be applied.

500 level: A minimum of 21 hours must be taken. These must include German 512, 519, 520, and 560. Thesis hours are excluded. If 512 is used as part of a second concentration in applied linguistics, another course must be substituted in the first concentration.

600 level: A minimum of 12 hours must be taken, exclusive of dissertation hours.

First Concentration: French or Spanish. A minimum of either 39 (Track I) or 45 (Track II) hours of French or Spanish courses beyond the bachelor's degree, distributed as follows:

400 level: A maximum of 6 hours of 400-level classes taken for the M.A. may be applied.

500 level: A minimum of 21 (Track I) or 27 (Track II) hours must be taken. These must include French 512, 516, 584 or Spanish 512 and 550. Thesis hours are excluded. If 512 is used as part of a second concentration in applied linguistics, another course must be substituted in the first concentration.

600 level: A minimum of 12 hours must be taken, exclusive of dissertation hours.

2. Second Concentration. A minimum of 18 (German or Track I) or 12 (Track II) hours beyond the bachelor's degree, taken in the field of applied linguistics or in a second language, either French, German, Italian, Portuguese (Track II only), Russian, or Spanish. For Track I and German, 12 of these hours must be at the 500 level or above. For Track II, 3 of these hours must be at the 500 level or above.

French students choosing applied linguistics must take French 421 or 429; 425; 512; and 9 (Track I) or 3 (Track II) hours of appropriate electives in English or French. German students choosing applied linguistics must take German 425, 435, 510, or 512, 5 hours of German linguistics, such as 426, 436, 631, or 632, and 6 hours of linguistics electives in English or German. Spanish students must take Spanish 421 or 429; 425; 512; and 9 (Track I) or 3 (Track II) hours of appropriate electives in English or Spanish. The student's graduate advisor must approve the electives chosen.

3. Cognate Field. Six hours in graduate coursework numbered 400 and above in a field outside the department or language family of the first concentration but related to the student's principal area of research. Students choosing applied linguistics as a second concentration are strongly urged to take their cognate work in a second language.

4. Additional requirements: For any languages taken as a first or second concentration, a student must demonstrate competence by taking a test. The test will include reading, writing, listening, and speaking, and should be completed by the time the student reaches 40 hours of study beyond the bachelor's degree. Standardized examinations that may be used for this purpose include applicable portions of either the National Teachers Examination, the MLA Examination for Teachers and Advanced Students, or the proficiency standards of the United States Foreign Service Institute (FSI).

If a student has not chosen a third language as his or her cognate area, basic competence (determined by a reading examination with translation into English administered by the department) in a third language is required. If the student's first and second languages are Romance languages, the third language should be chosen from another language family.

For students choosing applied linguistics as an area of second concentration, reading competence in a second language is required. Competence will be determined by translation of a text from the foreign language into English, the test to be administered by the department. A comprehensive examination on the language and literature of the first and second concentrations must be passed before the student may be admitted to candidacy. The candidate is required to defend his/her dissertation in an oral examination. Central emphasis is put on the doctoral dissertation as a final test of the candidate's scholarly qualifications.

Graduate Teaching Assistants with a second concentration in a language must have the opportunity and will be strongly encouraged to instruct in the languages of both their first and second concentration, subject to staffing needs.

Doctoral students are strongly encouraged to reside and study abroad and will be assisted in identifying potential sources of financial support (e.g., Fulbright, McClure, Rotary fellowships).

ACADEMIC COMMON MARKET

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

Asian Languages

GRADUATE COURSES

431 Readings in Chinese Literature (3) Prereq: Mastery of Intermediate-level Japanese or consent of instructor. 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 poetry from writers from Lyon and members of Philad. Prereq: 300-level literature course.


413 French Literature of the 18th Century (3) Major works of Enlightenment. Prereq: 300-level literature course.


416 Survey of Francophone Literature (3) Examination of French literature outside metropolitan France, particularly African and Caribbean. Prereq: 300-level literature course.

420 French Cinema (3) French cinema from earliest days through New Wave directors. Prereq: 300-level literature course. May apply toward major.

421 Phonetics (3) Foundation in science of phonetics. Practical exercises and individual performance. Laboratory training highly recommended. Prereq: 300-level literature course.

422 Advanced Grammar (3) Improving one’s written French by studying basic and more refined structures of French language. Writing creative free-style compositions. Prereq: Intermediate Composition and Conversation or equivalent.

423-24 Advanced Conversation (1,1) Informal conversa- tion with native speaker on contemporary topics. Stresses in-class activities rather than outside preparation. Prereq: Intermediate Composition and Conversation or French for Business. 2 hrs weekly.

425 Introduction to Descriptive Linguistics (3) Theory and practice of techniques of linguistic analysis in subfields of phonetics, morphology, syntax, semantics, pragmatics and historical linguistics; discussion of relevance to learning and teaching of foreign languages and to study of literary texts. Recommended

German

GRADUATE COURSES

331-32 Elements of German for Upper-Division and Graduate Students (3,3) Elements of language, elementary and advanced readings, and a final 10,000 word translation project. Open to graduate students preparing for language examinations, and upper-division students desiring reading knowledge of the language. Not credit for students having completed 101-02 or 167. 332 may be repeated. Maximum 6 hrs. Undergraduate credit only. 411-12 Advanced Conversation and Composition (3,3) Prereq: 311-12 or equivalent or consent of department. 415 Special Topics (3) Topics vary. May be repeated. Maximum 6 hrs. 420 Selected Topics in German Literature from 1750 to the Present (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) SSame as Linguistics 425. 426 Modern Methods of Historical Linguistics (3) Phonetics, distinctive feature analysis, sound change types, nature of sound change, principles of reconstruction, and fundamental assumptions about language change through time. Survey of non-phonological linguistic change in 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). 436 History of the German Language (3) Development of German language from Indo-European through Proto-Germanic, Old High German, Middle High German to New High German. Internal and external linguistic history of German speech. Prereq: 6 hrs of upper division German language courses (excluding courses in translation or graduate reading courses). (Same as Linguistics 436.) 485 Business German (3) Survey of German used in fields of business, government, administration, and economics. Prereq: 6 hrs of upper division German excluding courses in translation and graduate reading courses. 500 Thesis (1-15) P/NP only. E 502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E 510 German Phonetics and Advanced Grammar (3) Advanced work in phonetics, pronunciation, and selected topics in German grammar. For teachers and prospective teachers. Prereq: Consent of instructor. 512 Teaching a Foreign Language (3) Practical application of methods for teaching and evaluating basic language skills and foreign language skills, and cultural knowledge through seminars, demonstrations, peer teaching, and observation of foreign language classes. Required of all M.A. and Ph.D. students holding GTA's, except those whose previous training or experience warrants their being excused by department. 519 Bibliographical Methods (1) Bibliographical methods, major reference works and bibliographical problems in language and literature. 520 Pre-seminar (2) Advanced training in use of bibliographical and reference tools; illustrative problems; paper preparation. 541 Medieval German Language and Literature (3) Introduction to Middle High German. 550 Studies in German Literature (3) Content varies. May be repeated. Maximum 6 hrs. 552 German Enlightenment, Rococo, and Sturm und Drang (3) Content varies. May be repeated. Maximum 6 hrs. 553 German Classicism and Romanticism (3) Content varies. May be repeated. Maximum 6 hrs. 554 German Realism and Naturalism (3) Content varies. May be repeated. Maximum 6 hrs. 555 Modern German Language 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. 558 German Literary Theory and Criticism (3) 561-62 Directed Readings in German Language and Literature (3,3) 591 Foreign Study (1-15) See College of Arts and Sciences. 592 Off-Campus Study (1-15) See College of Arts and Sciences. 593 Independent Study (1-15) See College of Arts and Sciences. Letter grade or S/NC. 595-96 Directed Readings (3,3)
Italian

GRADUATE COURSES

401 Dante and Medieval Culture (3) Introduction to significance of this great Italian writer. Prereq: 212 or consent of instructor.
402 Petrarach and Boccaccio (3) Prereq: 212 or consent of instructor.
403 Literature of the Rinascimento (3) From Pulci to Tasso, Quattrocento and Cinquecento. Prereq: 212 or consent of instructor.
405 Modern Italian Poetry (3) From Pascoli to Montale. Prereq: Italian 212 or consent of instructor.
406 The Modern Italian Novel (3) From Manzoni to Camillo. Prereq: 212 or consent of instructor.
409 Directed Readings (3)
410 Italian Theatre (3) Survey of Italian theatre from Renaissance to present. Prereq: Intermediate Italian or consent of instructor.

421 Topics in Italian Literature and Cinema (3) Italian literature and cinema from 1830 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 1830. Films in Italian with English subtitles. May be repeated. Maximum 6 hrs. (Same as Cinema Studies 421.)
425 Introduction to Descriptive Linguistics (3) (Same as French 425, German 425, Russian 425, and Linguistics 425.)
426 Methods of Historical Linguistics (3) (Same as German 426, French 426, Spanish 426, and Linguistics 426.)

Portuguese

GRADUATE COURSES

400 Portuguese for Speakers of Another Romance Language (3) Accelerated class for beginning students of Portuguese with strong background in another Romance language. Introduction to grammar, reading, and culture of Portugal and Brazil. Prereq: 3 hours at 300-level in another Romance language or equivalent.
431-32 Topics in the Literature & Language of Portuguese-speaking World (3,3) Outstanding works of literature and culture from Portuguese countries. Topics may vary. Prereq: At least one course at this level or the equivalent. May be repeated. Maximum 12 hrs.
591 Foreign Study (1-15) See College of Arts and Sciences.
592 Off-Campus Study (1-15) See College of Arts and Sciences.
593 Independent Study (1-15) See College of Arts and Sciences.

Spanish

GRADUATE COURSES

421 Phonetics (3) Prereq: Intermediate Conversation and Composition or consent of instructor.
422 Advanced Grammar (3) Finer points of grammatical structures. Required for all majors. Available to non-native speakers only. Prereq: Intermediate Composition and Grammar and minimum of 9 hrs of upper division Spanish.
423 Advanced Conversation (3) Develops speaking skills to advanced level through wide range of activities. Available to non-native speakers only. Prereq: Intermediate Composition and Conversation, or Spanish for Business or consent of instructor.
424 Advanced Composition (3) Develops writing skills to advanced level through compositions on assigned topics. Available to non-native speakers only. Prereq: 422 or consent of instructor.
425 Introduction to Descriptive Linguistics (3) (Same as French 425, German 425, Russian 425, and Linguistics 425.)
426 Methods of Historical Linguistics (3) (Same as German 426, French 426, Russian 426, and Linguistics 426.)
429 Romance Linguistics (3) (Same as French 429 and Linguistics 429.)
430 History of Spanish Language (3) Evolution of Spanish language from its origin to present: major differences between Hispanic-American and Iberian Spanish. Prereq: Intermediate Composition and Grammar.
431 Spanish Civilization (3) Major social, political, and cultural achievements of Spanish people from origins of their civilization until today. Prereq: Aspects of Spanish and Spanish-American Literature or equivalent.
436-37 Survey of Spanish Literature (3,3) Spanish literature from 18th and 19th centuries. Prereq: Aspects of Spanish and Spanish-American Literature or equivalent. May be repeated with consent of department. Maximum 6 hrs.
450 Hispanic Drama (3) Close reading and analysis of representative works by selected dramatists of each period, either Spanish or Spanish-American. Topics vary. Prereq: Aspects of Spanish and Spanish-American Literature or equivalent. May be repeated with consent of department. Maximum 6 hrs.
451 Hispanic Prose (3) Close reading and analysis of representative works by selected novelists, essayists or short story writers of 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.
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.
461 Special Topics (3) Aspect of Spanish 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 cultures and major social and political institutions. Prereq: Aspects of Spanish and Spanish-American Literature or equivalent.
473-74 Survey of Spanish American Literature (3,3) Survey of Latin American literature from pre-Columbian to late 19th century. Prereq: Aspects of Spanish and Spanish-American Literature or equivalent.
479 Social Protest Literature of Latin America (3) Analysis of literature as means of unmasking social ills that have traditionally beset Latin America. Indigenous, Black literature, women writers, role of writer in Latin American society. Prereq: Aspects of Spanish and Spanish American Literature or equivalent.

470 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.
512 Teaching a Foreign Language (3) Practical application of methods for teaching and evaluating basic language skills and cultural aspects through seminars, demonstrations, peer teaching, and observation of foreign language classes. Required of all M.A. and Ph.D. students holding Graduate Teaching Assistantships, except those whose previous training or experience warrants their being excused by department.
522 Advanced Communication Skills for Teachers and Other Professionals (3) Advancement of oral and written proficiency in Spanish through extensive use of authentic contemporary materials; class lectures and discussions; oral and written presentations and reports. Especially recommended for graduate students, teachers, and other professionals seeking to maintain or enhance high level communicative competency.
531 Old Spanish (3) Evolution of Spanish language from its origins through 15th century.
532 Golden Age Prose (3) Wide range of prose fiction in Spain during 16th and 17th centuries: Moisés, Pizarro, sentimental, pastoral and exemplary novels, and dialogues.
534 Don Quixote (3)
535 Golden Age Poetry (3) Barroso, Fray Luis de León, San Juan de la Cruz, Lope de Vega, Quevedo, and Góngora.
537 Golden Age Drama (3) Major dramatists of period: Lope de Vega, Tirso de Molina, Farinelli, Galán de Castro, Calderón de la Barca, Moreto, and Rojas Zorrilla.
540 Eighteenth- and Nineteenth-Century Spanish Literature (3) Major works from 18th- and 19th-century Spain. Content varies with regard to theme, genre or literary movement.
542 20th-Century Spanish Literature: Generation of '98 through Civil War (3) Principal achievements and representative directions in literature of Spain through Civil War years.
543 20th-Century Spanish Literature: Post-Civil War through Present (3) Principal achievements and representative directions in literature of Spain from post-Civil War period to present.
550 Techniques of Literary Analysis and Research Methods (3) Theoretical and critical essays on various techniques of literary analysis. Exploration of bibliographical and research materials.
551 Special Topics in Spanish or Spanish American Literature (3) May be repeated. Maximum 6 hrs.
552 Directed Readings (3)
561 Spanish American Colonial Literature (3) From pre-Columbian era through 18th century. Reading and analysis of selected works from Colonial Spanish American period and their Continental sources. Indigenous texts and authors.
562 Nineteenth-Century Spanish American Literature (3) From early nineteenth century to 1880. Content varies with regard to genre, theme, literary movements, or other.
Music

College of Arts and Sciences

MAJOR DEGREES

Music                        M.M.

Wayne Bailey, Head

Professors:

Bailey, Wayne, D.M.A.  Colorado
Ball, Charles H. (Emeritus), Ph.D.  Peabody
Bitzas, George C., M.M.  Converse
Brock, John P. (Liaison), M.M.  Alabama
Coker, J., M.A.  Sam Houston
Combs, F., M.A.  Missouri
DeVine, George F. (Emeritus).  Columbia
Dorn, W. (Emeritus).  M.A.
Frid, Herbert W. (Emeritus).
Ph.D.  North Carolina
Hofford, A. G. (Emeritus), M.M.  Northwestern
Jacobs, K. A., D.M.A.  Texas
Julian, W. J (Emeritus), Ph.D.  Northwestern
McClelland, D. K., M.A.  Columbia
MacMurray, W. S., M.M.  Wisconsin
Meacham, John J. (Emeritus), M.M.  Northwestern
Moore, M. C., Ph.D.  Michigan
Northcutt, K. A., D.M.A.  Yale
Pederson, D. M., Ph.D.  Iowa State
Sousa, G., Ph.D.  Ohio State

Starr, W. J. (Emeritus), M.M.  Eastman
Stutzerberger, D. R., D.M.A.  Maryland
Tips, A. W., Ph.D.  Michigan

Associate Professors:

Adams, Fay, M.M.  Tennessee
Boling, M. E., M.M.  Tennessee
Brown, Donald R., Hs.D.  Indiana
Brunell, D. E., D.M.  Colorado
Davis, Dolly C., M.M.  Tennessee
Dubek, T. S., D.M.A.  Yale
Hough, Don, M.M.  Tennessee
Leach, C. F., M.M.  New Mexico
Searle, S. M., M.M.  Tennessee
Spel, G. R., M.M.  Indiana
Zelmanovich, Matus, M.A.  Lvov

Assistant Professors:

Baldwin, Wesley, M.M.  New England
Batey, A. L., D.M.A.  South Carolina
Binder, S. L., D.M.  Florida State
Freeman, Carroll, M.P.A.  Oklahoma City
Gay, Jr., L. C., Ph.D.  Columbia
Hawthorne, W., Ph.D.  Cincinnati
Murphy, B. A., Ph.D.  Ohio State
Romines, J. J., M.M.  Northwestern
Schallert, G. T., D.A.  Northern Colorado
Smith, C. M.  SUNY-Fredonia
Wentzel, A. N., M.M.  Southern California

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

Applicants must have completed an undergraduate degree that is approximately equivalent in music requirements to degrees conferred by UT Knoxville, with a major appropriate to the applicant's prospective area of concentration on the master's level.

Applicants who plan to pursue the concentration in performance or music education are required to audition for the appropriate area faculty. Applicants for admission to the program in composition must submit scores and tape recordings of representative works.

Applicants for the concentration in jazz must audition in jazz improvisation and jazz piano proficiency and interview with members of the faculty in this area. Other applicants are required to have an interview with members of the faculty of the prospective area of concentration.

All entering master's degree students are required to take Diagnostic Examinations in music theory, ear-training, and music history/literature. These examinations are given by the Department of Music at the beginning of each semester.

THE MASTER'S PROGRAM

A minimum of 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 bibliography, music history/literature, and music theory and allow for elective courses. Specific curricula are available from the department.

concentrations require a written and oral final examination.

A thesis is required of students in composition, musicology, and music theory. A graduate recital or performance project is given in lieu of thesis by students with concentrations in performance, pedagogy, jazz, accompanying, choral conducting, and instrumental conducting.

The concentration in music education is designed for persons who hold a Bachelor's degree in Music or Music Education and certification to teach music in the public schools. Both thesis and non-thesis options are available.

Music Education

GRADUATE COURSES

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

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

510 Foundations of Music Education (3) Historical, philosophical and aesthetic bases. Prereq: Consent of instructor.

520 Research in Music Education (3) Definition of research problems, data collection and analysis, and research report writing. Application of knowledge of research techniques to analyses of existing research literature in music education. Prereq: Consent of instructor.

530 Advanced Band Literature and Conducting (3) Reading, conducting, and interpreting band scores suitable for school, college, and community bands. Contemporary and standard band literature. Prereq: Consent of instructor.


570 Studies in Multicultural Music Education (3) Study of music literature, art forms, and custom of cultures appropriate for students in K-8. Strategies and techniques for teaching music at this level.

571 Musical Repertoire Laboratory (1) Performance of music from various cultures: production of musical scores appropriate for students in grades K-8. Singing, dancing, acting, costumes, set design, traditional and non-traditional instrumental ensembles. Limited to students majoring or concentrating in art, dance or theater. Prereq or coreq: 570. May be repeated. Maximum 2 hrs.

580 Seminar in Music Education (3) Class investigation and individual reporting of pertinent topics and issues in music education. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

590 Special Topics in Music Education (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

593 Special Problems in Music Education (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

Music Ensemble

GRADUATE COURSES

503 Small Jazz Ensemble (1) May be repeated. Maximum 12 hrs.

504 Jazz Ensemble (1) May be repeated.
Music Instrumental

GRADUATE COURSES

490 Instrumental Conducting (3) Development of knowledge and skills in instrumental conducting, study of various periods and composers and relationships of different styles to conductor’s art; musical analysis and practice in conducting. Prereq: Music Education 320 or equivalent.

580 Band History and Literature I (3) Antiquity to 1900.

581 Band History and Literature II (3) 1900 to present.

583 Recitative for Instrumental Conductors (1) Problems in conducting recitatives. Prereq: Consent of instructor. S/N/NC only.

584 Practicum for Instrumental Conductors (1) Intern experience in field other than area of major interest. S/N/NC only.

590 Advanced Instrumental Conducting (2) Physical techniques of conducting, study and analysis of scores, rehearsal techniques, attention to individual problems. Requires applied music fee. Prereq: Consent of instructor. May be repeated. Maximum 8 hrs.

595 Instrumental Conducting Performance (1) Preparation and judged performance of band or orchestral work(s). Prereq: Consent of instructor.

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 (3,3) From 1750 to middle 19th century; 430—Middle 19th century to present.

450-70 The Organ and Its Literature I (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.
550 Percussion (1-4)
551 Accompanying and Coaching (1-4)
555 Voice (1-4)
560 Violin (1-4)
565 Viola (1-4)
570 Cello (1-4)
575 String Bass (1-4)
576 Electric Bass (1-4)
579 Guitar (1-4)
580 Piano (1-4)
585 Harpsichord (1-4)
590 Organ (1-4)
584 Composition (1-3)
595 Composition with Electronic Media (1-3)
599 Improvisation (1-4)

Music Theory

GRADUATE COURSES

430-44 Counterpoint I, II (3, 3) Study of species counterpoint in modal and tonal styles, works of Palestrina and J.S. Bach. Prereq: 220, 440. Writing of contrapuntal forms of 18th century and fugue; analysis of works from 18th through 20th centuries. Prereq: 430.

450 Choral Arranging (2) Analysis of scores and writing of arrangements for choirs. Prereq: Theory IV or consent of instructor.

510 Musical Styles (3) Elements of design and their role in definition of musical styles. Prereq: Consent of instructor.

520 Analytical Techniques (3) Analytical techniques, contemporary approaches, tonal and atonal music. Prereq: Consent of instructor.

530 Music Theory Pedagogy (3) Techniques, methods, and materials involved in college-level theory programs. Use of technology and review of existing software. Prereq: Consent of instructor.

540 Computer Music Transcription (3) Projects in notation, playback, and publication of music incorporating elements of word processing, graphic design, sequencing, and page layout. Study of MIDI protocol as applied to computer music workstation design. No credit toward M.M. concentration in Music Theory with technology emphasis. Prereq: Consent of instructor.

550 Computer Projects (3) High-level programming languages used to design and implement computer-managed instruction; Internet development tools; writing of documentation for computer projects. Prereq: 540 or equivalent.

560 Technology in Music Research (3) Use of technology for research projects in music analysis or pedagogy: development and execution of research project. Prereq: 550.

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

Music Voice

GRADUATE COURSES

410-20 Song Literature I, II (2, 2) Songs in English, French, Italian, Russian, Scandianvan, Czechoslovakian, British, and American art songs. Graduate credit not available for students in vocal performance.

425 Functional Diction for Singers (3) Comprehnsive survey of singing techniques in six languages: English, French, German, Italian, Latin and Spanish. Basic instruction in International Phonetic Alphabet; development of basic diction skills; overview of diction styles and traditions in each language; survey of diction resources and reference materials. Does not fulfill deficiency requirements for graduate students in voice or accompanying.

510 Vocal Literature Seminar (3) Topics vary. May be repeated. Maximum 6 hrs.

520 Music Theatre Performance Techniques (3) Improvisation, movement, and basic techniques for dramatic vocal performance. Prereq: Vocal major or consent of instructor. May be repeated for credit. Maximum 2 hrs.

530 Opera Performance (2) Prereq: Consent of instructor. May be repeated. Maximum 4 hrs.

540 Opera Production (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

550-60 Advanced Vocal Pedagogy I, II (2, 2) Study of vocal production, examination of different methods. Prereq: Consent of instructor. May be repeated.

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) Development of choral rehearsal skills. Prereq: Consent of instructor.

594 Project in Choral Conducting Performance (1-3) Prereq: Consent of instructor. May be repeated.

595 Choral Conducting Seminar (3) Open to continuing education students. Prereq: 590 or consent of instructor. May be repeated.

Nuclear Engineering

MAJOR (College of Engineering)

DEGREES

Nuclear Engineering M.S., Ph.D.

H. L. Dodds, Head

Professors:

Dodds, H. L., PE, Ph.D. .................................. Tennessee Mihalczko, J. T., Ph.D. .................................. Texas Miller, L. F., PE, Ph.D. .................................. Texas Mynatt, F. R., Ph.D. .................................. Tennessee Shannon, T. E., Ph.D. .................................. Tennessee Uhrig, R. .............................................. (Distinguished Prof.), Ph. D. .................................. California Upsadyaya, B. R., Ph.D. ................................. California

Associate Professors:


The Department of Nuclear Engineering offers programs leading to the Master of Science and Doctor of Philosophy degrees. Students may elect a traditional nuclear engineering M.S. or Ph.D. program (focusing on fusion energy or fusion energy) or a radiological engineering concentration at the master's level.

The radiological engineering concentration prepares students for careers in the radiation safety field (health physics). The program is designed for graduates of undergraduate programs in engineering, physics, biology and chemistry.

All entering students must have, as a minimum, competency in mathematics through ordinary differential equations, competency in atomic and nuclear physics, and competency consistent with a course in introductory nuclear engineering. If these competencies do not exist, the student must take appropriate courses for undergraduate credit. The department head is the contact for all interested students, both those with nuclear engineering degrees and those from other disciplines.

THE MASTER'S PROGRAM

A graduate program leading to the Master of Science is available to graduates of recognized undergraduate curricula in engineering and physics. Each applicant will be advised as to the necessary prerequisite courses before he/ she enters the program.

The student must complete 24 semester hours of coursework approved by the student's advisory committee that includes the following:

1. A major consisting of a minimum of 12 semester hours in graduate courses in nuclear engineering. This must include at least one of the following sequences: 511, 512, 551, 552, 571, 572.

2. A minor of 6 semester hours of elective courses in mathematics, statistics or computer science.

3. Six semester hours in either nuclear engineering or a related field.

The M.S. candidate must also demonstrate research or design capability. This requirement may be satisfied by a thesis project or engineering practice projects as described below:

Thesis - The student performs independent research on a topic approved by the graduate committee. He/she submits a thesis on this research. The student then must pass an oral examination on the thesis and all graduate coursework. The student must enroll for six semester hours of NE 500 (Thesis).

Engineering Practice - The student performs independent research on two to four separate topics approved by his/her graduate committee. Each project is similar to a thesis project but smaller in scope. He/She submits a report, in thesis format, on each project. The student must then pass an oral examination on his/her engineering practice reports and all graduate coursework. The student must enroll for six semester hours of NE 598 (Nuclear Engineering Practice).

THE DOCTORAL PROGRAM

Students in the field of nuclear engineering desiring to study for the Doctor of Philosophy must have a Bachelor of Science or Master of Science from a recognized university, with a major in engineering or physics. All candidates will be required to demonstrate general competence in a comprehensive examination in the areas of engineering science, mathematics, physics, and nuclear engineering.

Specific course requirements for the Ph.D. in Nuclear Engineering include:

1. A minimum of 48 semester hours beyond the Bachelor's degree, exclusive of credit for...
Nursing
(College of Nursing)

MAJOR

Nursing........................................M.S.N.,Ph.D.

Joan L. Creasia, Dean
Martha Alligood, Director of M.S.N. Program
Sandra Thomas, Director of Ph.D. Program

Professors:
Alligood, Martha R., Ph.D............. New York
Creasia, Joan L., Ph.D. ................. Maryland
Droppleman, Patricia G., Ph.D. .......... Tennessee
Farr, Glen, Pharm.D. ...................... Tennessee
Groer, Maureen, Ph.D. .................. Illinois
Mozingo, Johnie N., Ph.D. .............. Walden
Pierce, Joan U., Ph.D. ................... Utah
Seavor, Carol, Ed.D. ..................... Massachusetts
Thomas, Sandra P., Ph.D. .............. Tennessee

Associate Professors:
Bowen, Sheila, Ph.D. ..................... Tennessee
Davis, Mitzi, Ph.D. ....................... Tennessee
Ellison, Kathy Jo, Ph.D. ................. Alabama (Birmingham)
Fenske, Mildred M., Ph.D. ............. Vanderbilt
Hall, Joanne, Ph.D. ....................... San Francisco
McGuire, Sandra, Ed.D. .................. Tennessee
Modrinc-McCarthy, Mary Anne, Ph.D. ... Tennessee
Smith, Helen, Ph.D. ..................... Maryland
Wallace, Debra C., Ph.D. ............... South Carolina

Assistant Professors:
Brown, Allie J., M.S.N. .......... Alabama (Birmingham)
Brown, Mary Lynn, Ph.D. ............ Tennessee
Conlon, Kathleen P., M.S.N. ...... SUNY (Buffalo)
Evans, Ginger W., M.S.N. ............. Tennessee
Fox, Marie X., M.S.N. ................. Tennessee
Grace, Pamela, Ph.D. .................. Tennessee
Helton, Sally M., M.S.N. ............... Texas Women's
Kollar, Mary, Ph.D. ..................... Tennessee
Nalle, Maureen, Ph.D. ................. Tennessee
Pierce, Margaret, M.S.N. .......... Tennessee
Pullen, Lisa, Ph.D. ...................... Mississippi State

THE MASTER'S PROGRAM

The College of Nursing offers the Master of Science in Nursing degree with concentrations in adult health nursing, family nurse practitioner, mental health nursing, nursing administration, and nursing of women and children. The program is accredited by the National League for Nursing Accrediting Commission and is unconditionally approved by the Tennessee Board of Nursing.

The purpose of the Master's program in nursing is to prepare leaders, managers, and practitioners who facilitate clients' achievement of optimal health in the dynamic health care system. The program prepares advanced practice nurses for a career in adult health nursing, nursing of women and children, and mental health nursing as well as role preparation as nurse practitioners, clinical nurse specialists or nursing administrators. Advanced practice nursing involves the delivery of care, management of resources, inter-disciplinary collaboration, and application of technology, information systems, knowledge, and critical thinking.

Admission Requirements
1. Meet requirements for admission to The Graduate School.
2. Achieve a score of 500 or above on the verbal and on the quantitative portions of the Graduate Record Examination.
3. Achieve a TOEFL score of 550 or above if native language is not English.
4. Hold a Bachelor's degree in Nursing (BSN) from a National League for Nursing accredited program.
   a. Hold or be eligible for licensure to practice nursing in Tennessee.
   b. Have an undergraduate GPA of 3.0 or higher on a 4-point scale, or a GPA of 3.3 for courses in the undergraduate major.
   c. Have completed a health assessment and physiology course within the past five years.
   OR
   Hold a bachelor's degree in a discipline other than nursing (master's entry student or RN) from an accredited college or university.
      a. Have a cumulative undergraduate GPA of at least 3.0 on a 4-point scale.
      b. Have satisfactorily completed the following prerequisite courses: chemistry (8 hrs); microbiology (including lab); anatomy and physiology (8-16 hrs); nutrition (covering lifespan in health and illness); behavioral sciences (12 hrs in sociology, anthropology, growth and development, and at least one general psychology course); undergraduate research course or equivalent prior to enrollment in graduate research course.
   5. New students normally are admitted to the program only at the beginning of fall semester. However, under special circumstances and on a space available basis, a B.S.N. graduate may be admitted at the beginning of spring or summer term in a temporary non-degree status. Applications from full-time BSN and master's entry students for fall admission must be received by February 1. Part-time and post-master's applications must be received by October 1.

Special Requirements
1. Each student must hold professional liability insurance.
2. Registered nurses must be licensed to practice nursing in Tennessee.
3. Each student must present proof of hepatitis B vaccination and tubella and tubella immunization or sufficient titer for immunity; TB status.
4. Each student must present evidence of current 2-person CPR certification.
5. Non-registered nurse students must have completed courses in chemistry, nutrition, microbiology, anatomy, and physiology plus 12 semester hours of behavioral science courses.
6. Contact student services for more detailed information about the application process: Student Services/MSN Program, UTK College of Nursing, 1200 Volunteer Blvd., Knoxville, TN 37996; phone: 423 974-7606.

Thesis and Non-Thesis Options
The thesis option is available for interested students and is especially encouraged for those who are considering pursuit of doctoral degrees sometime in the future. Students who choose the non-thesis option must register for 590 Nursing Project or 582 Supervised Research.

Program Requirements
All students must complete a minimum of 36 semester hours distributed as follows:

Core (9 credits)
503 Health Promotion in Advanced Practice Nursing
510 Theoretical Foundations of Nursing
520 Advanced Practice Nursing and Health Delivery Systems

Advanced Practice Core (9 credits)*
504 Advanced Health/Physical Assessment
505 Advanced Clinical Pharmacology
515 Advanced Pathophysiology for Nursing Practice

Research (9-12 credits)
301 Nursing Research: Methods, Design & Analysis
500 Thesis
580 Nursing Project
582 Supervised Research

Concentration (12-17 credits)—Choose one
530-531 Adult Health Nursing
550-551 Nursing of Women and Children
560-561 Mental Health Nursing
570-571 Family Nurse Practitioner I,II,III
590-591 Nursing Administration I,II

Elective (6 credits)—Required for students in nursing administration concentration only.

*Not required for nursing administration concentration.

Students who enter the program as non-RNs must complete the following undergraduate nursing courses in addition to meeting the requirements listed above:

301 Clinical Pharmacology
302 Introductory Professional Nursing
304 Nursing Assessment and Health Promotion
306 Health Deviation Concepts I
316 Health Deviation Concepts II
330 Nursing of Adults
414 Community Mental Health Nursing
415 Family/Community Health Nursing
431 Nursing of Children

Registered nurses whose bachelor's degrees are not in nursing must have completed courses in chemistry, nutrition, microbiology, anatomy, and physiology plus 12 semester hours of behavioral science courses. They must also complete 305, 332, 405, and 433 and complete or successfully challenge the following:

301 Clinical Pharmacology
304 Nursing Assessment and Health Promotion
306 Health Deviation Concepts I
316 Health Deviation Concepts II
330 Nursing of Adults
401 Family Health Nursing
411 Psychosocial Long Term Nursing
431 Nursing of Children
Nursing

A total of 16-18 credits can be obtained by successful completion of the NLN Nursing Mobility Profile Examination. See undergraduate catalog for other challenge options. RNs who are in the process of completing a BSN at UT Knoxville with the intent of enrolling in the MSN program follow the same plan with the addition of 313.

Final Examination Requirements:
All students must successfully complete a final examination as required by The Graduate School. For thesis students, the examination will consist of an oral defense of the thesis as well as other written or oral questions designed to measure student mastery of the entire program of study. For non-thesis students, the written examination will cover the entire program of study and, at the discretion of the student's committee, be followed by an oral examination.

Special Policies
1. If the clinical performance of any student for any course is found to be unsatisfactory, the student will receive a grade of "F" for the course.
2. If a student achieves a final grade of "D" or "F" for any required undergraduate or graduate nursing course, he or she will not be permitted to repeat the course and will be required to withdraw from the program.
3. If the clinical performance of any student is characterized by unethical, unprofessional or unsafe behavior, or behavior that places the client in jeopardy, the student will be required to withdraw from the program.

THE DOCTORAL PROGRAM

The College of Nursing offers a doctoral program leading to the Doctor of Philosophy degree with a major in Nursing. This is a unified program offered jointly with The University of Tennessee, Knoxville, College of Nursing. Students may complete all or part of the program at either site. The dissertation must be completed in its entirety at one site.

The doctoral program prepares nursing scholars capable of integrating research, theory, and practice into their roles as researchers, educators, and/or administrators. Specifically, the graduate of this program should be able to:
1. Analyze, test, refine, extend, and expand the theoretical basis of nursing practice.
2. Conduct nursing research that generates knowledge and advances nursing as a discipline.
3. Provide leadership as nurse researchers, educators, and/or administrators in current and emerging health care settings.
4. Collaborate with members of other disciplines in health-related research of mutual concern.
5. Analyze, develop, and recommend health care policy at various levels.

Admission Requirements
1. Meet requirements for admission to The Graduate School.
2. Hold a master's degree in nursing from a program accredited by the National League for Nursing. Some outstanding applicants who are prepared at the bachelor's level in nursing may be considered. In such cases, graduate level courses in nursing theory, concentration specialty, and/or research will be integrated into the formal program of doctoral degree requirements.
3. Have a minimum cumulative graduate grade-point average of 3.3 on a 4.0 scale for previous college work.
4. Have a combined score of at least 1000 on the verbal and quantitative sections of the Graduate Record Examination.
5. Have successfully completed a basic statistics course and graduate nursing theory and research courses prior to enrollment in nursing doctoral level courses.
6. Have TOEFL scores of at least 550 if native language is not English.
7. Complete Graduate Program Data Form, College of Nursing.
8.Submit Graduate School Rating Forms from three college level instructors and/or nurses and administrators who have supervised applicant's professional work.
9. Submit a sample of scholarly writing (e.g., thesis, published paper).
10. Submit an essay describing personal and professional aspirations.
11. Submit Graduate Application for Admission, academic transcript(s), Graduate Record Examination scores, and, if required, TOEFL scores to the Graduate School. Submit three Graduate School Rating Forms, sample of scholarly writing, and Graduate Program Data Form with essay to the Director of the PhD program prior to November 1 of the year prior to fall admission.
12. Schedule a personal interview with the College of Nursing PhD Student Admissions Committee prior to March 15 of the year preceding Fall admission. International applicants may be interviewed by telephone or teleconferencing at the discretion of the admissions committee.

Program Requirements
The following courses are required for all students:

500 Thesis (1-15) P/NP only. E
1. Graduate Seminar in Public Health (3) Principles of health protection, promotion, and innovative strategies for achieving wellness of individuals, families, groups, and communities.
3. Research Practicum (3) 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/N only. E
4. Directed Research (1-15) 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/N only. E
5. Nursing Practicum (3) Nursing Research Seminar (3) Research Practicum (3) 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/N only. E
6. Health Promotion in Advanced Practice Nursing (3) Principles of health promotion, education, and innovative strategies for achieving wellness of individuals, families, groups, and communities.

Minors in Gerontology

Graduate students in the College of Nursing may pursue a specialized minor in gerontology. This interdisciplinary minor for seniors offers an opportunity for combined study and research in aging. The graduate student may select one of the approved specializations and complete the coursework required for the minor. The minor must be approved by the Graduate Council in advance of enrollment. The minimum requirements for the minor are:

1. A maximum of 6 graduate hours taken before acceptance into the doctoral program may be applied toward the minor.
2. Minimum grades of B in all nursing doctoral courses and a 3.0 cumulative GPA are required for continuation in the program.

MINOR IN GERONTOLOGY

Graduate students in the College of Nursing may pursue a specialized minor in gerontology. This interdisciplinary minor for seniors offers an opportunity for combined study and research in aging. The graduate student may select one of the approved specializations and complete the coursework required for the minor. The minor must be approved by the Graduate Council in advance of enrollment. The minimum requirements for the minor are:

1. A maximum of 6 graduate hours taken before acceptance into the doctoral program may be applied toward the minor.
2. Minimum grades of B in all nursing doctoral courses and a 3.0 cumulative GPA are required for continuation in the program.

ACADEMIC COMMON MARKET

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

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E
501 Nursing Research: Methods, Design, and Analysis (3) Basic principles of research process in application to clinical questions; critical evaluation of nursing and health-related research. Prereq: 510, graduate level statistics. F, Sp
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May be used toward degree requirements. May be repeated. S/N only. E
503 Health Promotion in Advanced Practice Nursing (3) Principles of health protection, promotion, and innovative strategies for achieving wellness of individuals, families, groups, and communities.
504 Advanced Health/Physical Assessment (3) Development of advanced clinical reasoning and assessment skills to determine client health status and needs. Application of physiological, pathophysiological, and psychosocial concepts with implications for advanced practice nursing. (Same as Public Health 509, Exercise Science 509, Nutrition 509, Social Work 509.)
505 Advanced Clinical Pharmacology (3) Pharmacological agents utilized to treat common, recurrent health problems: indications, contraindications, side and interactive effects of commonly prescribed drugs. Prereq: 301 or equivalent or consent of instructor. F
506 Graduate Seminar in Public Health (3) Principles of health protection, promotion, and innovative strategies for achieving wellness of individuals, families, groups, and communities.
507 Graduate Seminar in Public Health (3) Principles of health protection, promotion, and innovative strategies for achieving wellness of individuals, families, groups, and communities.
508 Research Practicum (3) 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/N only. E
509 Graduate Seminar in Public Health (3) Principles of health protection, promotion, and innovative strategies for achieving wellness of individuals, families, groups, and communities.
510 Theoretical Foundations of Nursing (3) Historical evolution of nursing science; nursing's metaparadigm and selected philosophies, conceptual models, and theories as structures which guide critical thinking in analysis, reasoning, and decision making for advanced practice nursing. F, Sp
511 Statistical Applications to Nursing Research (3) Descriptive and inferential statistics; statistical concepts and applications to clinical settings and their applications to advanced practice nursing.
515 Advanced Pathophysiology of Nursing Practice (3) Advanced physiologic and pathophysiologic concepts,
561 Mental Health Nursing II (6) Continuation of 560. Advanced practice nursing in community settings for families and groups with actual and potential mental health problems. Prereq: 560. Didactic (2) and practicum (4). F

562 Educational Principles and Strategies (3) Exploration and analyses of selected education, curriculum; teaching-learning, measurement, and evaluation principles and theories as applied to instruction of undergraduate nursing students, staff development, and patient education. Prereq: Consent of instructor. S

570 Family Nurse Practitioner I (4) Application of advanced health/physical assessment and diagnostic reasoning in nursing management and primary care of infants and their families. Prereq: Consent of instructor. S

571 Family Nurse Practitioner II (4) Continuation of 570. Nursing management and primary care of infants and their families in all developmental life stages. Prereq: Consent of instructor. S

572 Family Nurse Practitioner III (4) Continuation of 571. Nursing management of infants and children in all developmental life stages; role refinement and exploration of major issues of family nurse practitioner clinical experience in variety of settings. Prereq: 540, 515. Didactic (2) and practicum (2). F

573 Special Topics (1-3) Topic determined by faculty and student interest. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

580 Nursing Project (3) Student-initiated scholarly project with faculty supervision. Review and critical evaluation of literature in specified area of interest. Prereq: consent of instructor. Culminating in "state of the practice" paper. Prereq: Consent of instructor, first course in concentration. Su,F

582 Supervised Research (3) Supervised research culminating in scholarly project. Prereq: 580. Experiential learning of research process. Participation in ongoing faculty research project completed as specified portion of project under faculty guidance. Prereq: Consent of instructor, 510, 510. May be repeated. Maximum 6 hrs. E

583 Directed Clinical Practice (1-9) Additional opportunities for advanced nursing practice. Objectives to be developed collaboratively by student and faculty. Prereq: Enrollment for completion of graduate level courses in clinical nursing. Prereq or coreq: 501, 520, 550, 550. Didactic (3) and practicum (6). Sp

585 Seminar in Gerontology (1) (Same as Human Ecology 585, Exercise Science 585, Public Health 585, Psychology 585, Sociology 585.)

590 Nursing Administration I (6) Exploration, analysis and application of selected organizational, management, and leadership theories and financial principles to delivery of nursing services. Structure, functions, organization, behaviors, and adaptive processes of health care organizations. Prereq: 504. Didactic (3) and practicum (6). Sp

591 Nursing Administration II (6) Continuation of 590. Utilization of human and financial resources, conflict resolution, and organizational development with application to mid-level and top-level nursing administration positions. Prereq: 550, 2 hrs and 4 labs. F

593 Independent Study (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

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

609 Research Practicum (1-3) Supervised individual or group research experience under guidance of faculty. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs. SNC or letter grade. E

610 Nursing Research Seminar (2) Critical Analysis and synthesis of literature in selected focus areas within nursing research. Prereq: Admission to doctoral program in nursing. Consent of instructor. Sp

611 Advanced Nursing Seminar (2) Exploration of historical and current issues of interest to doctory-prepared nurses. F

612 Health and Nursing Policy/Planning (3) Policies affecting nursing education and practice; health policies and political processes; interactions between health professionals, consumer groups, and government in health policy development and health planning activities. E

613 Nursing Management of Complex Systems (3) Contemporary organizational and management theories and techniques needed for effective administrative leadership in nursing education, practice, research, and entrepreneurial settings. E

614 Nursing Preceptorship (3) Individually-designed preceptor, field, or internship experiences in variety of administrative, educational, research, or clinical practice settings. Prereq: 501, 602. F

615 Nursing Management of Complex Systems: Academic Institutions (3) Organizational structure and dynamics of leadership in nursing education; application of management and nursing theories in academic, faculty practice models, research and publication issues, promotion and tenure, faculty governance, and administrative responsibilities and strategies. Prereq: 585 or equivalent. Sp

620 Directed Research (3) Exploration of theoretical considerations and research methodologies in nursing research with completion of study under faculty guidance. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.Sp

Nutrition (College of Human Ecology)

MAJORS

DEGREES

Human Ecology ........................................Ph.D.

Nutrition ........................................M.S.,M.S-M.P.H.

Michael B. Zemel, Head

Professors:

Beachem, Roy E. (Emeritus), Ph.D. .............. Kansas State

Carmuth, Berty, Ph.D. .................................. Missouri

Namey, T. C., M.D., M.D. ......................... Washington (St. Louis)

Sachan, Dileep S., Ph.D. ............................ Illinois

Skinner, Jean D., Ph.D. .............................. Oregon State

Smith, John T. (Emeritus), Ph.D. .............. Missouri

Zemel, Michael (Liaison), Ph.D. .......... Wisconsin

Associate Professors:

Bailey, James W., Ph.D. ....................... Iowa State

Middendorf, D. M., (Emeritus) .................... Alabama

Haughton, B., Ed.D. ..... Columbia

Kartlad, Michael, Ph.D. ............................. Loyola

Moussa, Naima, Ph.D. .............................. Paris

Whelan, Jay, Ph.D. .................................... Penn State

Zemel, Paula, Ph.D. ................................. Wayne State

Assistant Professors:

Bittle, Joyce (Memphis), Ph.D. .............. Tennessee

Chenchick, Judith (Memphis), M.S. .......... Wisconsin

Nutrition 157
The Master of Science program is available in Nutrition, with a concentration in nutrition science or public health nutrition. A graduate degree combined with a Dietetic Internship (D.I.) beyond the baccalaureate degree qualifies the graduate to apply for the Registration Exam and become a Registered Dietitian (R.D.). Students may request more information from the department about the D.I. program. Students may also select an interdisciplinary minor in gerontology. The program is accredited by the American Dietetic Association.

ADMISSION REQUIREMENTS
A final file for review includes the Graduate School application file, completed departmental application form, Graduate Record Examination (GRE) scores for the general section, and three Graduate School Rating Forms completed by individuals who can attest to the applicant's potential for graduate education. Forms may be obtained from the Departmental Office, 229 Jessie Harris Building, University of Tennessee, Knoxville, 37996-1900. Forms may also be obtained from the Department's website at http://nutrition.utm.edu.

Admission into the graduate program in the department is contingent on the completion of undergraduate courses that give the necessary background for success in the graduate program. Required undergraduate courses include: general and organic chemistry, biological chemistry/biochemistry, physiology, statistics and advanced nutrition. Admission to the Ph.D. program in Human Ecology with a concentration in Nutrition Science requires a master's degree. Applicants to all programs with related experience may be given preference.

THE MASTER'S PROGRAM
Students may choose a thesis or non-thesis option in Nutrition. Attendance at Nutrition 540 is required every semester.

Thesis Option: The program consists of a minimum of 33 hours with at least 16 hours of coursework in the department. NTR 511, 512, 540, 541, and 3 hours of graduate level statistics are required. Students in public health nutrition must take NTR 511, 512, 513, 514, 515, 516, 517, 540, 541, and the minor in public health. Six hours of Thesis 500, and 6 hours outside the department are required. A minimum of 22 hours at the 500 or 600 level is required.

An oral comprehensive examination is required upon completion of the thesis.

Non-Thesis Option: The program consists of a minimum of 30 hours with at least 20 hours of coursework in the department. NTR 511, 512, 540, 541, 2 hours from 542-544 and 3 hours of graduate level statistics are required. Students in public health nutrition must take NTR 511, 512, 513, 514, 515, and the minor in public health. Six hours in one area outside the department are required. A minimum of 24 hours at the 500 and 600 level is required.

A written comprehensive examination is required for completion of the program.

DUAL M.S.-M.P.H. PROGRAM
The College of Human Ecology offers a coordinated dual program leading to the conferral of both the Master of Science with a major in Nutrition (public health nutrition concentration) and the Master of Public Health. The dual program allows students to complete both degrees in less time than would be required to earn both degrees independently.

The program is designed to meet the needs of students who are interested in the benefits of majors in both nutrition and public health. Therefore, it accommodates the interests of students who: 1) plan to enter public health nutrition and want to acquire the knowledge and skills of the nutritionist and public health professional; 2) plan to enter in nutrition and want to acquire the knowledge and skills and the perspective of the public health professional; or 3) plan to enter in both public health and want to acquire the knowledge, skills, and perspective of the nutritionist.

Admission Requirements
Applicants for the M.S.-M.P.H. program must make separate application to, and be competitively and independently accepted by, the Department of Nutrition for the M.S. and the Public Health Academic Program committee.

Students who have been accepted by both departments may apply for approval to pursue the dual program anytime prior to, or after matriculation in either or both departments. Such approval will be granted, provided that dual program students be started prior to entry into the fourth semester of the M.S. and M.P.H. programs.

Curriculum
A dual degree candidate must satisfy the requirements for both the M.S. (public health nutrition concentration) and the M.P.H. degrees, as well as the requirements for the dual program. All candidates for the dual degree must successfully complete Health and Society (PH 555), two credits of Seminar in Public Health (PH 509), and a minimum of 60 credits. The Department of Nutrition will award a maximum of 36 semester hours of credit toward the M.S. degree and a maximum of approved graduate level course work toward the Department of Health and Safety Sciences. The Department of Health and Safety Sciences will award a maximum of 11 semester hours of credit toward the M.P.H. degree for successful completion of approved courses offered in the Department of Nutrition. All courses for which such cross-credit is awarded must be approved by the Public Health Academic program Committee and the student's graduate committee. A single block field experience (or public health internship) is required of all students and the analytical field paper incorporates public health nutrition and the student's public health concentration.

Dual degree students who withdraw from the program before completion of the requirements for both degrees will not receive credit towards the M.S. or M.P.H. degrees for courses taken in the other program, except as such courses qualify for credit without regard to the dual program.

Approved Dual Credit
M.S. courses to be counted toward the M.P.H. program must include 10 semester hours of Field Study in Community Nutrition (NTR 515) and 1 semester hour of Graduate Seminar in Public Health (NTR 508). M.P.H. courses to be counted toward the M.S. include Public Health Administration (PH 520),

Biostatistics (PH 530), and Epidemiology (PH 540).

THE PH.D. CONCENTRATION
The nutrition science concentration enables students to study the science of nutrition from the cellular level to the application of nutritional principles by people in a changing environment. The doctoral program emphasizes human nutrition, experimental nutrition, and intermediary metabolism. Cognate areas may include anthropology, biochemistry, chemistry, communications, education, food technology, human development, physiology, public health, sociology, statistics, and/or toxicology.

Minimum requirements include: 16. Sixteen hours in nutrition including 4 hours at the 600 level (exclusive of dissertation); 2. NTR 511, 512, 541, and 2 hours from either 542-544; 3. Four hours of NTR 540, attendance required every semester; 4. Six hours of statistics; 5. Six hours in a cognate area; 6. Nine hours at the 600 level; 7. Seven students without college teaching experience are required to take the fall semester teaching seminar for GTAs and NTR 548 comprising a faculty-supervised problem in college teaching.

GRADUATE COURSES
500 Thesis (1-15) 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
500 Culture, Food, and Nutrition (3) Food-related behavior of individuals and groups in United States. Sociocultural, economic, and technological influences. Nutrition and food surveys, public policy. Prereq: Advanced Nutrition or consent of instructor. F,A
609 Graduate Seminar in Public Health (1) (Same as Public Health 509, Exercise Science 509, Nursing 509 and Social Work 509.)
511 Advanced Physiological Chemistry (4) Bioenergetics, flux control and hormonal interactions. Prereq: Advanced Nutrition or equivalent. F
513 Community Nutrition (3) Orientation to community, nutrition and growth 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) Pernonal participation in and analysis of a state or regional community nutrition program. Location of in-depth study to be selected in consultation with instructor. Prereq: 513, 514 and consent of instructor. S/NC 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 adulthood; nutritional requirements, dietary intakes; affects of nutrition on biological aging. Prereq: Advanced Nutrition or consent of instructor. Su

521 Physiological Basis for Diet and Disease (2) Altered nutrient needs as result of metabolic changes that occur in selected disease states. Prereq: Nutrition in Disease or consent of instructor. Sp

522 Nutrition Counseling (2) Individual eating habits and disorders, evaluation strategies for effectiveness of helping process. Prereq: Nutrition in Disease or consent of instructor. F/A

524 Nutrition Education: Principles, Implementation, and Evaluation (3) Conceptual models, principles, application, and evaluation models in nutrition education research. Prereq: 508 or consent of instructor. F

540 Seminar in Nutrition (1) May be repeated. S/N only. E

541 Research Methods (1) Basic principles of planning, conducting, and interpreting nutrition and food services systems administration research. Prereq: 5 or coreq 541. Sp

542 Advanced Experimental Nutrition (2) Application of research principles to individual project using experimental animals. Prereq or coreg 541. Sp

544 Survey Methods in Food and Nutrition (2) Application of survey research methods to nutrition projects; assessment of food consumption, nutrient intake, nutritional status, sociocultural-economic parameters, food production and service. Prereq or coreg 541. Sp

547 Field Experience (3-9) Experience in food-related industry or agency under supervision of faculty member. Prereq: Consent of Instructor. S/N only. E

548 Directed Study in Nutrition (1-3) Advanced study in nutrition. Prereq: Consent of Instructor. May be repeated. Maximum 6 hrs. E

549 Special Topics (1-3) Recent advances in nutrition or food systems administration. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

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

600 Advanced Topics in Nutrition Science (3-15) Comprehensive individual study and group discussion of topics related to current problems in nutrition. Prereq: 512 or consent of instructor. Maximum 6 hrs. E

603 Current Trends in Food and Sociocultural Change (2) Critical evaluation of research. Prereq: 508 or consent of instructor. F/A

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 ornamental plants. Prereq: 220, 330, 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 management: development, ecology, physiology, soil fertility, and grass nutrition, climatic influences on grass culture: physiology of clipping and watering management; design, construction, and management of golf courses, and physiological influences of pest infestation and control measures. Prereq: 340 or consent of instructor. 3 hrs and 1 lab. Sp

450 Specialty Landscape Construction (3) Methods of design, materials, and construction techniques for specialized components of landscape industry. Irrigation systems, outdoor lighting, garden ponds and water features. Prereq: Basic Landscape Construction. F

451 Plant Tissue Culture (3) (Same as Botany 451.)

460 Professional Practices in Landscape Construction and Management (2) Professionalism, salesmanship, proposals, bidding, estimating, specification, and contract management in landscape services industry. Interaction with industry representatives through special presentations. Prereq: 350 or consent of instructor. F

480 Advanced Landscape Design (3) Comprehensive application of landscape design skills to variety of projects experiences: landscape planning and analysis, design, construction, estimating, and materials estimating. Prereq: Fundamentals of Landscape Design and Supplemental Landscape Design Graphs. 3-4 hr lab. Sp

485 Computer Aided Landscape Design (3) Computer Aided Design (CAD) related to landscape design and construction. Site planning and construction of related landscape plans and 3-D drawings. Operating systems and use of AutoCad and LANDCADD software. Prereq: Fundamentals of Landscape Design, Microcomputer Applications to Problem Solving or consent of instructor. 3 hr lab. F

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

501 Special Topics in Ornamental Horticulture and Landscape Design (1-3) Topics to be assigned. May be repeated. Maximum 6 hrs. Prereq: Consent of instructor. E

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses University facilities and /or faculty time before degree is completed. May not be used toward degree requirements. Prereq: 500 or consent of instructor. E

503 Non-Thesis Project (1-2) Library, field, or laboratory project under supervision of faculty member. Not for thesis candidates. May be repeated. Maximum 4 hrs. E

507 Professional Development Seminar (1) (Same as Agriculture 507, Animal Science 507, Biosystems Engineering 507, Food Science and Technology 507, and Plant and Soil Sciences 507) S/N only. F

4. Preparation of a publication-ready, written or oral thesis.

Thesis Option:
1. Satisfactory preparation of a written thesis proposal and its oral defense to the student’s committee, prior to enrolling on 500.
2. Successful completion of 30 hours of graduate credit, which must include 4 hours of 503. At least 14 of these hours must be at the 500 level or above.

Non-Thesis Option:
1. Successful completion of 34 hours of graduate credit, which must include 2-4 hours of 503. At least 22 of these hours must be at the 500 level or above.
2. Completion of a project and preparation of a written report summarizing the project.
3. Passing written and oral examinations covering the project and coursework.
509 Scientific Communication (1) (Same as Agriculture 509, Animal Science 509, Food Science and Technology 509, and Plant and Soil Sciences 509.)

511 Plant Disease Fungi (4) (Same as Entomology and Plant Pathology 510.)

521 Flowering Physiology (1) General phenomenology, photoperiodism, thermoperiodism, interactions of external factors, juvenileity, and hormonal regulation. Prereq: Introductory Plant Physiology or equivalent. 3 hrs weekly for 5 weeks. Sp, A

522 Stress Physiology (1) Introduction to abiotic plant stress physiology: drought, flooding, salinity, light, pollutants, other stresses. Prereq: Introductory Plant Physiology or equivalent. 3 hrs weekly for 5 weeks. Sp, A

523 DNA Analysis (1) Practical experience in isolating Genomic DNA from plants and fungi, amplification of DNA using PCR, gel electrophoresis. Prereq: Introductory Plant Physiology or equivalent. 3 hrs weekly for 5 weeks. Sp, A

524 Plant Gel Electrophoresis (1) Practical experience in isolating and determining protein concentrations, PAGE of proteins including total proteins and assays for specific enzymes (isoenzyme) analyses. Prereq: 6 hrs biological/ botanical sciences, 6 hrs chemistry, consent of instructor. 1 hr and 4 labs weekly for 5 weeks. Sp, A

525 Plant Microtechnique (1) Practical training in scanning electron microscopy for investigating aspects of plant development, histochemistry and pathologic structures in common ornamental and crop species. Prereq: 6 hrs biological botanical sciences and consent of instructor. 1 hr and 4 labs weekly for 5 weeks. Sp, A

526 Public Horticulture (1) Use of plants for public education, enrichment, and human well being. Professional practice and development, discussion of selected reading from field. F

590 Seminar (1) Presentations and discussion of topics. May be repeated. Maximum 2 hrs. E

592 Internship (1-2) Application of horticulture and design principles and practices in supervised, professional setting, approved by department. S/NC or letter grade. E

599 Problems in Ornamental Horticulture and Landscape Design (1-3) Independent study. Current topic related to technology and science. May be repeated. Maximum 6 hrs. E

Pathology
See College of Veterinary Medicine and Comparative Experimental Medicine

Philosophy
(College of Arts and Sciences)

MAJOR

DEGREES

Philosophy ............................................ M.A., Ph.D.

Kathleen Bohstedt, Head

Professors:

Aquilina, Richard E., Ph.D. ............. Northwestern
Cebik, L. B., Ph.D. ............................. Nebraska
Cohen, Sheldon M., Ph.D. ............. Northwestern
Davis, John W. (Emeritus), Ph.D. ...... Emory
Edwards, Rem B. (Emeritus), Ph.D. .... Emory
Graber, Glenn C., Ph.D. ............... Michigan
Kaplan, Jonathan, Ph.D. ............... Stanford
Kathleen Bohstedt, Head

Associate Professors:

Bennett, James O., Ph.D. .............. Tulane
Bonstedt, Kathleen Emmett (Liaison), Ph.D. ........ Ohio State
Brice, John E., Ph.D. ..................... Ohio State
Markle, Martha Lee, Ph.D. .......... Tennessee

Assistant Professor:

Hamlin, H. Phillips, Ph.D. ............. Georgia
Kaplan, Jonathan, Ph.D. ............... Stanford

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 a concentration in medical ethics and in religious studies. The Ph.D. program also offers 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 the M.A. with a thesis are 30 hours, including 6 hours in Philosophy 500. Of these 30 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 pass a final written examination on all work offered for the degree. An additional oral examination may be required. As a part of the Master's degree, and in addition to a final comprehensive examination, a culminating (capstone) experience is expected. Examples of culminating experiences include presenting a paper at a refereed national or regional philosophy conference, or presenting a paper at a departmental colloquium.

THE DOCTORAL PROGRAM

Students must hold an M.A. with a major in Philosophy or an equivalent degree when entering the Ph.D. program. Twenty-seven hours of coursework beyond the M.A. is required, of which 6 hours will be in courses numbered above 800. See the Philosophy Department Graduate Student Procedures for specific course requirements. Students must demonstrate a reading knowledge of core foreign language, normally a living language in which there exists a significant body of philosophical literature. In special circumstances relating to the area of dissertation research, the Graduate Committee may approve a language not satisfying these conditions. This may be done by passing the doctoral language examination given by the appropriate department, if available, or by passing French 302 or German 332 with a B or better. Bi- or multilingual (normally, foreign) students whose native language (other than English) is one in which there is a significant body of philosophical literature are exempted from the foreign language requirement.

Students receiving the Ph.D. with concentration in medical ethics are also exempted.

CONCENTRATIONS

Medical Ethics
The department has an M.A. and Ph.D. program of graduate study with a concentration in medical ethics. Detailed information concerning the program may be obtained from either the Director of Graduate Study in Philosophy or the Director of the Medical Ethics Program.

Religious Studies
The department has an M.A. program of graduate study with a concentration in religious studies. Details concerning the program may be obtained from the Director of Graduate Studies in the Department of Religious Studies.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT 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, Delaware, or West Virginia; Kentucky or Texas (concentration in medical ethics only); the M.A. and Ph.D. programs to residents of Louisiana or Mississippi, or Virginia (concentration in medical ethics only); and the M.A. program to residents of Oklahoma (concentration in medical ethics only). Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

400 Special Topics (3) May be repeated when topic varies. Maximum 6 hrs.

411 Modern Religious Philosophies (3) (Same as Religious Studies 411.)

412 Classical Indian Systems of Philosophy: The Moksha Tradition (3) (Same as Religious Studies 412.)

420 Topics in History of Philosophy (3) Figures or movements from antiquity through mid-twentieth century. Prereq: 6 hrs of philosophy or consent of instructor. May be repeated when topic varies. Maximum 9 hrs.

435 Intermediate Formal Logic (3) Metatheory of formal logic and philosophy of logic. Prereq: Consent of instructor.

446 Contemporary Ethical Theory (3) Topics in meta-ethics or ethics. Prereq: 6 hrs of philosophy or consent of instructor.

446 Theoretical Issues in Medical Ethics (3) Prereq: 240 or 345 or consent of instructor.

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. May be repeated when topic varies. Maximum 6 hrs.

479 Studies in Recent Continental Philosophy (3) Selected thinkers or topics: existentialism, phenomenology, hermeneutics, structuralism, post-structuralism. Prereq: 6 hrs of philosophy or consent of instructor. May be repeated when topic varies. Maximum 6 hrs.

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

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

510 Philosophical Research (3) Paper workshop (writing, revising papers, getting papers ready for publication). Does not count toward hours required for degree. May be repeated. S/N only.

ACADEMY COMMON MARKET

S/NC only.
Physics and Astronomy

(College of Arts and Sciences)

MAJOR

PHYSICS

DEGREES

M.S., Ph.D.

Lee Riedinger, Head

Graduate programs leading to the Master of Science and Doctor of Philosophy are offered in a number of concentration areas: astrophysics, atomic and low temperature physics, biophysics, chemical physics, condensed matter and surface physics, elementary particle physics, geophysics, geophysics (Master's only), health physics (Master's only), molecular spectroscopy, nuclear physics, and theoretical physics.

Departmental graduate programs leading to the M.S. and Ph.D. are also available at The University of Tennessee Space Institute, Tullahoma, where opportunities for study and research are available in quantum optics and laser physics, atomic and molecular spectroscopy, fluid physics, and theoretical physics. For additional information, contact the department head.

ADMISSION REQUIREMENTS

A student who enrolls in The Graduate School with the intention of attaining an advanced degree in Physics will have completed an undergraduate major in Physics or its equivalent. Physics 311-12, 321, 361, 431-32, 421, 461, and 411-12 constitute the minimum courses prerequisite to graduate study.

A student who intends to present Physics as a graduate minor will have completed an undergraduate minor in Physics or its equivalent. Physics 311 and 431-32 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.

The department offers an M.S. thesis program with a concentration in geophysics. Program requirements are: 12 hours from Physics 531-32, 541-42, 571-72; a minimum of 12 additional hours in geophysics, geophysics, and/or physics, as approved by the student's committee; and the presentation of an acceptable thesis, 6 hours of Physics 500, and the passing of an oral examination on course material and thesis.
Non-Thesis Option

This program is designed primarily for students intending to teach in colleges or universities on the elementary or intermediate level, or for students specifically intending to work toward a Ph.D. Students seeking the non-thesis option must apply to the department's graduate committee for permission to enroll under this program. The requirements are the satisfactory completion of 30 hours of coursework composed of 18 semester hours from Physics 511-12, 521-22, 531-32, 541-42, and 571-72; 6 semester hours in a minor field; and 6 semester hours from other courses numbered above 400 (preferably of advanced laboratory nature.) At least 20 hours must be taken at the 500 level or above. In addition, the candidate must pass a written examination administered by his/her committee.

THE DOCTORAL PROGRAM

All students are expected to take Physics 521-22, 531-32, 541-42, 551-72, and 611. Physics 601-02 are normally required of students specializing in atomic physics; Physics 621-22 of students in nuclear physics; Physics 626-27 of students in elementary particle physics (and/or Physics 613-14 for students specializing in theoretical high-energy physics); Physics 671-72 of students in condensed matter and surface physics; and Physics 681-82 of students specializing in molecular spectroscopy. Students specializing in chemical physics may substitute Chemistry 572 for Physics 551, and should complete at least 6 semester hours from Chemistry 580, 670.

The courses Physics 531-32, 571-72, 521-22, 541-42 constitute the core curriculum. They are the usual basis for the departmental comprehensive examination which is normally taken by a well-prepared student after two years of graduate study.

The dissertation topic will be chosen with reference to one of the fields in which research facilities can be made available either at the University of Tennessee laboratories in Oak Ridge or at the Oak Ridge National Laboratory, Oak Ridge, Tennessee; or at other research facilities used by the University faculty.

Astronomy

GRADUATE COURSES

411 Astrophysics (3) Development of analytical physical models of galactic structure of universe, stellar and interstellar matter, and extragalaxies. Topical and interdisciplinary, consideration of quasars, pulsars, black holes and current developments in field. Acceptable for major credit in physics. Prereq: Physics 231 and consent of instructor.

490 Special Topics in Astronomy (1-3) Topics of current interest in astronomy and astrophysics. Acceptable for graduate credit in physics with consent of department. May be repeated with consent of instructor. Maximum 9 hrs.

Physics

GRADUATE COURSES


421 Modern Optics (4) Transmission of light in uniform, isotropic media; reflection and transmission at interfaces; mathematics of wave motion and interference effects. Rudiments of Fourier optics and holography. Prereq: 431 or Introduction to Microscopic Science. Students in Physics and Mathematics Majors or Honors: Fundamentals of Physics for Majors or Fundamentals of Physics: Wave Motion, Optics. and Modern Physics. Prereq and consent of instructor. 5 hrs and 3 labs.

431-32 Electricity and Magnetism (3,3) Electrostatics, magnetostatics, coupled electric and magnetic fields, Maxwell’s Equations, electromagnetic waves and radiation. Prereq: Honors Fundamentals of Physics for Majors or Fundamentals of Physics: Wave Motion, Optics, and Modern Physics. Prereq and consent of instructor. 5 hrs and 3 labs.

461-52 Modern Physics Laboratory (3,4) Introduction to fundamental and modern techniques in experimental physics, and to theory and practice of measurement and data analysis. Selected experiments in nuclear, atomic, molecular and solid state physics, and modern optics. Prereq: Electronics Laboratory Theory and either Fundamentals of Physics: Modern Physics or equivalent. Prereq: 462. Advanced experiments and experimental techniques in modern physics; experimental team work. Thorough quantum mechanical interpretation of results and preparation of scientific reports. Prereq: 461. 5 hrs lab per week.

490 Senior Seminar (1-3) Topic of current interest. May be repeated with consent of department. Maximum 6 hrs.

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

501 Graduate Research Participation (3) Advanced research techniques under supervision of staff research director whose research area coincides with interests of student. Open to all graduate students in good standing. Prereq: Consent of department and research director. May be repeated with consent of department. Maximum 18 hrs. S/NC only. E

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

505 Physics of Fluids (3) Fluid mechanics, overview of fluid mechanics and associated computational techniques; general description of laminar and turbulent flows; sonic, supersonic and hypersonic flows; continuum, transition and free-molecular flow; Navier-Stokes flow and sonic and supersonic expansion flows; rarefaction and nonreacting flowfields; shock-tube physics; and introduction to 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 converters, image dissector, streak cameras, and fast-focusing cameras; high-vacuum systems including cryogenic-based devices; data acquisition techniques including synchronous detection, digital electronics and micro-computer data acquisition and registration methods.

507 Contemporary Optics (3) Topics in geometrical, physical, Fourier, and nonlinear optics and introductory laser physics. Extensive laboratory work that includes use of conceptual 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, lasers; cavity; quantum theory; analysis of various lasers and laser types; mode-locking, Q-switching and frequency stabilization; specific laser types: semiconductor and solid-state, excimer, copper vapor and dye lasers.

511-12 Theoretical Physics (3,3) Classical theoretical physics, limited prerequisite Physics 312, 432, advanced calculus, differential equations, and vector analysis.


532 Advanced Classical Mechanics (3) Canonical transformations, Hamilton-Jacobi theory and action-angle variables, KAM-theorem and Hamiltonian chaos, dissipative chaos; relativistic kinematics, Minkowski spacetime, relativistic scattering and threshold processes. Prereq: 531.


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 College of Arts and Sciences.

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

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

594 Special Problems (3) Especially assigned theoretical or experimental work on problems not covered in other courses. May be repeated. Maximum 9 hrs. E

599 Seminars (1-3) Mechanics; Radiation; D. Heat and Thermodynamics; E. Electricity and Magnetism; F. Modern Physics. May be repeated with consent of department. Maximum 18 hrs. E

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

601-02 Advanced Atomic Physics (3,3) Atomic structure, Dirac equation for one-electron, quantum-mechanical, non-relativistic, atomic dynamics, correlation, electron-electron, electron-nucleus, electron-nuclear, electron-nucleon, atomic ionization, Bethe-Salpeter equation, Thomas-Fermi method, angular momentum theory, atoms in external fields, interaction with radiation, oscil-
605 Laser Spectroscopy (3) Applications of lasers to spectroscopy of atomic and molecular systems; absorption, laser-induced fluorescence, and Raman spectroscopy; molecular and atomic coherence, quantum beats, resonance fluorescence, photon echoes, self-induced transparency; saturation and Doppler-free spectroscopy; laser cooling and trapping. Prereq: 521, 541.

606 Nonlinear Optics (3) Nonlinear optical susceptibilities, wave propagation in nonlenses, frequency and phase conjugation, parametric amplification and oscillation, stimulated Raman processes, two- and multi-photon processes, four-wave mixing and phase conjugation, transient coherent optical effects and free induction decay, optical breakdown and nonlinear effects in plasmas. Prereq: 522.

610 Quantum Optics (3) Quantum theory of emission and absorption of radiation; frequency-dependent susceptibility; coherence theory; field quantization and coherent photon states; interaction of radiation with atoms; photon optics, curved and higher-order coherence; atomic scattering phenomena. Prereq: 511.

611 Advanced Quantum Mechanics & Field Theory (3) Second quantization, quantization of electromagnetic field, emission, absorption, and scattering of light, birefringence, pair production and annihilation, quantum field theory methods in condensed matter physics and quantum optics. Topics vary according to instructor. Prereq: 522 and 542 or equivalent. Prereq or coreq: 561 or consent of instructor.

612 Advanced Topics in Quantum Field Theory (3) Renormalization, Lamb shift, anomalous magnetic moments, gauge theories, electroweak theory, quantum chromodynamics, group theory, advanced 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.

613-14 Quantum Field Theory (3,3) Modern formulation of quantum field theory and its applications: second quantization of free and interacting fields; field quantization; elementary particle processes in QED, perturbative methods; higher order processes and renormalization; path integrals; general quantization of gauge fields; applications in QED and SU(2)xU(1) theory; quantum chromodynamics (QCD); the fate of QGUTS (grand unified theories); TOE's (theories of everything, including quantum gravity). Prereq: 522 or consent of instructor.

621-22 Nuclear Structure (3,3) General properties of nuclei; two-body scattering problems; saturation and symmetry; properties of nuclear forces; theory of light nuclear spectroscopy; special nuclear models; theory of nuclear reactions; theory of beta-decay. Prereq: 517-72.

626-27 Elementary Particle Physics (3,3) Survey in elementary particle physics covering experimental methods, conservation laws, invariance principles, and models of interactions. 627-Advanced topics: quark models, electroweak interactions, and unification of elementary forces. Prereq: 522.

641 Advanced Topics in Classical Theory (3) To meet special needs of students. Advanced dynamics and hydrodynamics, electromagnetic theory, statistical mechanics, or theory of non-equilibrium processes. Prereqs 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, assembly of atomic and molecular structure and valence theory, theory of radiation, electric and magnetic susceptibilities, high energy processes, scattering and collisions processes, or theory of fields. Prereq: 522. May be repeated with consent of department. Maximum 9 hrs.


651 Collision Interactions (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 Engineering 663.)

711-72 Advanced Solid State Physics (3,3) Lattice dynamics, phonons, Brillouin zones, heat capacity, energy band structure of solids, cohesive energy, work function, crystal oscillator strengths, effective mass approximation, De-para- and ferro-magnetism; neutron diffraction, Fermi surface. Superconductivity, Phonon and electron scattering from phonons, electrons, and defects. Excitations, polarons, surface states, F-centers, dislocations, and other defects. Prereq: 555 or equivalent, or consent of instructor.

Planning

(College of Arts and Sciences)

MAJOR

DEGREE

Planning ............................................. M.S.P.

Directors

David A. Patterson, Director

Professors

Johnson, David A., Ph.D. ..................... Cornell University, Kenneth B. (Emeritus).

Ph.D. ..................... North Carolina University, Prochaska, J. M. (Emeritus), M.U.P. ............... Michigan State University

Shouse, Walter L. (Emeritus), M.G.P. .................. Harvard University, Spencer, James A. (Liaison), M.G.P. Ohio State University

Associate Professors

Bowen, George E., M.A. .... George Washington University, Patterson, David, D.B.A. ..................... Indiana University, Bowyer, A. University of Illinois, Zanetta, Maria C., Ph.D. ....................... University of Missouri (Kansas City)

Assistant Professors

Anderson, Annette, M.P.A. ....................... Missouri University, Shupp, Terese, M.S.P. ..................... Tennessee State University, Zanetta, Maria C., Ph.D. ....................... Ohio State University

The Graduate School of Planning offers a program of studies leading to the professional degree of Master of Science in Planning. The degree is the normal route for entry into professional positions in urban and regional planning 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 (AICP), this requirement provides an additional capstone experience as well as preparation for meeting AICP professional certification requirements. Student academic progress is monitored by the faculty. A student failing to maintain an acceptable grade-point average may be placed on probation or dismissed from the program.

MINOR IN ENVIRONMENTAL POLICY

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

401 The City in the U.S. (3) Development and character of U.S. cities. Contemporary issues and selected case studies. (Same as Urban Studies 401.)

402 Survey of Planning (3) History of city development and planning; U.S. experience in urban and other levels of planning. State of the art, process, comprehensive plan, implementation devices. Planning issues in society. Not for credit for M.S.P. degree.


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


502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when university facilities and equipment are used for a thesis or project before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only, E

510 Fundamentals of Planning (2) Histo-y of planning, structure and development of urban areas: operations of contemporary planning agencies and issues.

511 Graphic and Oral Communications in Planning (1)

512 Community Planning Process (1) Planning process, policy processes and development process. Field reconnaissance of study community and development of approaches for assessing community.

515 Theory of Planning (2) Analysis of nature and objectives of planning process; role of planner and planning function in political decision-making. Prereq: 510 or consent of instructor.

520 Planning Research Methods (3) Overall structuring of social science research in planning practice; familiarity with structure of planning literature information sources; systematic retrieval of information, and use of information in making decisions in planning.

521 Information Systems and Networks in Planning (3) Use and impact of computer-based information systems and global networks in planning and public management. Development of practical skills in design of planning decision support systems, databases, Internet based tools and geographic information systems (GIS). Prereq: Basic experience with computer software or hardware or consent of instructor.

523 Statistics for Planners (3) Application of statistical techniques. Intuitive explanations and practical applications. Computer analysis to explore concepts.


530 Policy and Land Use Analysis (4) Basic methods of policy analysis and planning. Concept and framework for land use planning. Population, employment, and economic base studies, and forecasting techniques. Coreq: 520 or consent of instructor.

531 Urban and Regional Analysis (3) Past, present and possible future patterns of urban and regional structures drawing on contemporary theories, models, and empirical research.

532 Planning Methods (4) Preparation of comprehensive plans for urban areas and regions. Development of baseline data and forecasts, formulation of alternative plans and strategies, and development of plan implementation programs. Extensive laboratory experience. Prereq: 510, 512, 520, 530 and 531 or consent of instructor.

537 Planning and Transportation (3) (Same as Civil Engineering 537.)

538 Urban and Site Design (3-6) Principles of design of residential subdivisions and some components of physical community and shopping centers, institutional complexes, central business districts. Problems of reviewing alternative designs against each other or written regulations. Extensive laboratory experience.

539 Planning for Historic Preservation (3) Planning for preservation, restoration, and conservation of historic buildings, areas and sites as related to comprehensive planning process. National, state, and local government role in preservation, designation of sites, legislative needs, financing and administrative organizations.

540 Legal Aspects of Planning (3) legal basis for planning and guiding community development. Legal tools of planning. Prereq: 510 or consent of instructor.

541 Cultural Resources Planning (3) Cultural characteristics creating identity and spirit of place; role in environmental planning and land use planning; use in protection of natural environment and cultural heritage. Cultural components of National Environmental Policy Act and case studies.

545 Planning and Property Development (3) Process of urban physical growth and change; functioning of private sector real estate development and its relationship to planning. Partnership roles of public and private sectors in urban development and redevelopment. Prereq: 510 or consent of instructor.

547 Negotiation (1) Methods, strategies, techniques and skills useful to planners in mediation, negotiation, and dispute resolution concerning urban planning and development.

548 Tourism Planning (3) Planning of tourist resources and programs within a geographic region. Tourism planning models. Relationships among tourists, tourism development and planning of tourist attractions and services. Application of techniques in selected area.

549 Local Fiscal Planning and Capital Improvements (3) Fiscal planning and capital improvements programming in plan implementation. Tax and expenditure limitations, infrastructure financing, munici pal bond market, alternative revenue sources: development fees, exactions, intergovernmental aid. Evaluation of fiscal policies.


551 State and Regional Planning (3) Theory and practice of planning at state, sub-state, and metropolitan levels.

552 Development Planning in the Third World (3) Seminar in urban and regional development in Third World nations. Population growth, settlement patterns, economic development, land framework of integrated resource management. (Same as Ecology and Evolutionary Biology 552.)

555 Environmental Planning (3) Role of planners and planning in maintenance of balance between natural and built environment. (Same as Ecology and Evolutionary Biology 555.)

560 Strategic Planning & Policy Development (3) Models of strategic planning and process of policy development in application of technological approaches, program evaluation and impact assessment.

570 Plan Implementation Process (1) Interactive community and governmental dynamics in plan implementation. Dynamics of change, conflict, resolution and consensus building.

590 Practicum (3) Prereq: Consent of instructor. S/NC or letter grade.

591 Special Topics (1-3) Prereq: Consent of instructor.

592 Readings in Planning (1-3) Prereq: Consent of instructor. May be repeated.

593 Problems in Planning (1-3) Prereq: Consent of instructor.
conducting research, the student must develop a detailed written research proposal that shall be approved by the student's committee. Upon completion of the thesis, this committee will also conduct the final oral examination that integrates the thesis and coursework.

Six hours of 500 Thesis are required. In addition to the thesis hours, a minimum of 24 hours of graduate coursework is required. At least 14 of these hours must be taken in courses numbered 501 and above. The student must take at least 12 of the 24 hours in Plant and Soil Sciences courses, excluding Thesis 500. The student's committee may require additional coursework beyond the 24 hours if the student's progress or background indicates a need or deficiency. All students pursuing the M.S. degree must take the following courses: 509 Scientific Communication (1 hr); 503 Seminar (1 hr); 511 Soil-Plant Relations (3 hrs). The student must also present an exit seminar to the Department over the research project.

All students pursuing a concentration in soil science must also take at least three of the following courses: 522, 513, 514, and 516. All students a concentration in plant breeding and genetics or in crop physiology and ecology must take two of the following courses: 532, 551, and 583.

A student who has started a degree under the thesis option is not eligible to transfer to the non-thesis option after the end of the first semester of graduate studies or after receiving a graduate assistantship stipend for more than one semester. A student who has started under the non-thesis option may transfer to the thesis option upon approval of a potential major professor and the department head.

Non-Thesis Option
A student desiring the non-thesis option should declare this intention at the beginning of the first semester of graduate studies, and must declare it before the beginning of the second semester. In lieu of a thesis, students are required to complete three 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.

A graduate advisory committee will be assembled at the beginning of the student's program. The committee consists of the major professor, who acts as chair of the committee, and at least two other faculty members. This committee approves the student's plan of study and the participation and report on research activity from 593. In addition, this committee administers and evaluates a comprehensive written examination that serves to integrate the student's coursework.

In addition to three hours of 593, a minimum of 30 hours of thesis or coursework is required. At least 20 hours of thesis or coursework must be taken in courses numbered 501 and above. The student must also take at least 12 of the 30 hours in Plant and Soil Sciences courses, excluding Thesis 500. The student's committee may require additional coursework beyond the 30 hours if the student's progress or background indicates a need or deficiency. All students must take the following courses: 509 Scientific Communication (1 hr); 503 Seminar (1 hr); 511 Soil-Plant Relations (3 hrs).

All students pursuing a concentration in plant breeding and genetics or in crop physiology and ecology must take two of the following courses: 532, 551, and 583. All students pursuing a concentration in plant breeding and genetics or in crop physiology and ecology must take two of the following courses: 532, 551, and 583.

**THE DOCTORAL PROGRAM**
A minimum of 72 hours beyond the Bachelor's degree, exclusive of credit for Thesis 500, is required. Of this number, 24 hours must be Doctoral Research and Dissertation 600. A minimum of 26 hours must be completed in courses numbered above 500 exclusive of doctoral research and dissertation, of which 6 must be in courses numbered above 500. A minimum of 9 hours of graduate coursework taken during the doctoral program must be outside the department in one or more cognate areas.

The student and the major professor identify a doctoral committee composed of at least four faculty members holding the rank of assistant professor or above, three of whom, including the chair, must be approved by the Graduate Council to direct doctoral research. At least one member must be from outside the department. The student preparing a dissertation must approve all coursework applied toward the degree, certify the student's mastery of the major field and any cognate fields, direct the research, and recommend the dissertation for approval and acceptance by The Graduate School.

**GRADUATE COURSES**
412 Soil Genesis and Classification (3) Soil genesis and classification; formation, examination and description of morphological and historical soil development; soil formation processes; soils classification. 3 weekend field trips. Prereq: Soil Science. 2 hrs and 1 lab. F, Sp.
413 Environmental Soil Chemistry (3) Composition and chemical properties of soils and processes that govern fate and behavior of chemicals in soil environment; clay mineralogy, soil organic matter; mineral weathering and stability; aqueous precipitation; surface chemistry; ion exchange, adsorption and molecular retention; oxidation-reduction; and soil acidity, alkalinity and salinity. Prereq: Soil Science and Introduction to Organic and Biochemistry or Organic Chemistry or equivalent. F.
414 Soil, Land Use, and the Environment (3) Soil as environmental component and soil properties affecting land use. Soil as resource in development and management; consideration of nontraditional aspects of soil fertility, crop land use, soil survey and resource data in land use, recognition and prevention of soil pollution. Prereq: Soil Science or consent of instructor. Sp, A.
421 Physiology and Ecology in Agroecosystems (3) Plant physiology and ecology applied to crop production and management. Plant physiology and ecology principles related to crop production practices from seedling to harvesting and handling of interaction of environment, production and sustainable agroecosystems. Prereq: Crop Science. 2 hrs and 12-hr lab. F.
432 Bioclimatology (3) Solar energy budget; interactions between global, regional and local climates and biological systems: quantification of macro- and micro-climates; ecosystems: wetlands and their modification; automated weather station data collection and analyses; biological responses to climatic change and regional differences; effects on biological systems. Prereq: 1 yr physical or biological science, junior standing. Sp.
433 Agricultural Pesticides (3) Regulation of pesticide development, manufacture, transportation, marketing, and use. Structure, use, mode of action, degradation, and environmental impact of pesticides used in agriculture, forestry and related areas. Prereq: 1 yr biological sciences and 1 semester chemistry. 2 hrs and 1 lab. Sp.
434 Fruit and Vegetable Crops (3) Principles of production systems to counter environmental stresses and to increase productivity of warm season vegetable crops, small fruit crops, and deciduous tree fruit crops. Storage of crops after harvest. Prereq: Introduction to Crop Science and World Crops or Crop Science. 2 hrs and 1-1/2 hr lab. F.
435 Field and Forage Crops (3) Agronomic principles of crop production and management. Crop improvement, cropping systems, tillage, fertilization, pest management, harvest and utilization of major field and forage crops. Prereq: Introduction to Crop Science and World Crops or Crop Science. 2 hrs and 1 lab. Sp.
453 Principles of Plant Breeding (3) Genetic principles and techniques used in crop improvement. Consideration of breeding methods for various crop improvement systems and applications. Discussion of heritability estimation, genetic advances through selection and theory of gene action methods are based. Prereq: Biodiversity, Genes and Evolutionary Genetics, and General Genetics. 2 hrs and 1-1/2 hr lab. Sp, A.
471 Statistics for Biological Research (3) Application of statistics to interpretation of biological research. Notation, descriptive statistics, probability, distributions, confidence intervals, t- and chi-square tests, analysis of variance, mean square procedures, linear regression and correlation. Prereq: Mathematics 121 or equivalent. F.
500 Thesis (1-15) P/NP only. E.
501 Seminar Preparation (1) Application of speaking, writing, and organizational skills in preparation and presentation of scientific material to both scientific and general audiences. Preparation of abstracts for scientific presentations. Required of all entering graduate students during their first year of graduate study. F.
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. Maximum 3 hrs. F, Sp.
507 Professional Development Seminar (1) (Same as Agriculture 507, Animal Science 507, Biosystems Engineering 507, Biosystems Engineering Technology 507, Food Science and Technology 507, Ornamental Horticulture and Landscape Design 507) S/NC only. F.
509 Scientific Communication (1) (Same as Agriculture 509, Animal Science 509, Food Science and Technology 509, and Ornamental Horticulture and Landscape Design 509). F.
511 Soil-Plant Relationships (3) Principles of mineral nutrition of higher plants; plant physiological characteristics that influence the uptake of water and nutrients; functions of nutrient elements in plants; soil factors influencing nutrient availability to plants; important relationships at soil-plant root interface; and responses to adverse soil environmental conditions. Prereq: 413 or 431 or introduction to Plant Physiology. 3 hrs and 1 rec. F, A.
512 Pedology (3) Physical and chemical weathering processes, factors of soil formation, soil forming processes. Prereq: 412 or consent of instructor. 2 hrs and 1 lab. Sp-A.
513 Advanced Soil Chemistry (3) Chemical properties and processes that operate in soil environment: thermodynamics of soil solutes and solution chemistry of soils, solubility complex formation. Examines solubility, electrochemical equilibria, geochemical modeling of exchange equilibria, surface functionality and reactivity, adsorption phenomena, and surface complex modeling. Prereq: 413 or consent of instructor. Sp-A.
514 Advanced Soil Physics (3) Theory and mathematical modeling of flow and solute transport in saturated and unsaturated soil: geostatistical analysis of soil heterogeneity and elastic properties multi-scale pore processes, anisotropy, hysteresis, analytical and numerical solution techniques, unsaturated soil: geostatistical analysis of soil heterogeneity and anisotropy, hysteresis, analytical and numerical solution techniques. Prereq: 414 or consent of instructor. Sp-A.
515 Soil Biology and Biochemistry (3) Soil microorganisms and their activities in soil. Basic soil biochemical cycling of important elements, organic matter decomposition, and applications of agricultural and environmental biology and biochemistry. Prereq: Soil Science. 2 hrs and 1-1/2 hr lab. F, A.
Political Science

(College of Arts and Sciences)

MAJORS

Political Science ......................... M.A., Ph.D.
Public Administration .................. M.P.A., J.D.-M.P.A.
Patricia Freeeland, Head

Professors:
Carlisle, D. H. (Emeritus), Ph.D. ............ North Carolina
Cunningham, Robert B., Ph.D. ............... Indiana
Fitzgerald, Michael R., Ph.D. ............... Oklahoma
Freeeland, Patricia K.
Ph.D. ......................... Wisconsin (Milwaukee)
Gant, Michael M., Ph.D. .................... Michigan State
Gorman, Robert A., Ph.D. ................. New York
Lyons, William, Ph.D. ...................... Oklahoma
Peters, John, Ph.D. ......................... Illinois
Plass, Hyram, Ph.D. ......................... Utah
Robinson, Nelson M. (Emeritus), Ph.D. .... Syracuse
Scheb, John M., II, Ph.D. ...................... Florida
Smith, T. Alexander, Ph.D. ................ State Stephens, Otis H. (Distinguished Prof.)
Ph.D. ....................................... Johns Hopkins
Ungs, Thomas D. (Emeritus), Ph.D. ........ Iowa
Welborn, David M. (Emeritus), Ph.D. .... Texas

Associate Professors:
Fitz, David H. (Liaison), Ph.D. .......... Tennessee
Houston, David J. (Liaison), Ph.D. ...... SONY (Binghamton)
Nowens, Anthony J., Ph.D. ............... Kansas
Peterson, Robert L., Ph.D. ............... Yale
Richardson, Lillard, Ph.D. ............... Texas
Zhong, Yang, Ph.D. ....................... Kentucky

Assistant Professor:
VanCott, Donna, Ph.D. ..................... Georgetown

The Department of Political Science offers the M.A., M.P.A., and Ph.D. The department also offers a dual program with the College of Law, involving all programs should be directed to the departmental office.

ADMISSION REQUIREMENTS

Three departmental recommendation forms must be submitted to The Graduate School, at least two of which must be completed by instructors at the institution most recently attended. In addition, scores on the general portion of the Graduate Record Examination must be submitted.

THE MASTER OF ARTS PROGRAM

A Bachelor's degree or its equivalent is required for admission. Normally an overall average of 3.0 is required together with an average of 3.2 in the last two years of political science or social science courses. In addition, a composite score of at least 1100 on the verbal and quantitative parts of the GRE is normally required.

Students pursuing the Master of Arts degree may follow one of two options: Thesis Option (30 hours) Coursework preparation of a thesis, and an oral examination on coursework and the thesis is required. At least 12 of these hours must be in political science, with 6 in the field of methodology (Political Science 510 and either 511 or 512). Six hours may be earned through thesis credit.

Non-Thesis Option: (36 hours) Coursework, plus a written comprehensive examination on all coursework is required. At least 12 of these hours must be in political science, with 6 in the field of methodology (Political Science 510 and either 511 or 512), and 3 hours in the 600-level research seminar in the student's first field of interest.

THE MASTER OF PUBLIC ADMINISTRATION PROGRAM

The M.P.A. program is intended to prepare students for public service careers by acquainting them with management principles, analytical tools, and the ethical dilemmas they will face as public administrators. It consists of a total of 39 semester hours, including a core program, an elective specialization and a recommended internship.

Applicants for admission to the program must have a Bachelor's degree or its equivalent. Normally, an overall average of 3.0 and an average of 3.2 in the last two years of political science or social science courses is required. In addition, a composite score of at least 1100 on the verbal and quantitative parts of the GRE is normally required.

Students must demonstrate proficiency in the use of software applications for the personal computer. This requirement can be fulfilled by achieving a satisfactory grade in Political Science 586, Workshop in Computer Applications. Exception to this requirement will be considered on an individual basis.

The M.P.A. is a non-thesis program requiring 36 hours. Specific requirements include the following:
1. Core Curriculum (24 hours)
   a. General perspectives (9 hours) - 550
      Public Administration; 552 Organization Theory; and any one of the following: 538 State and Local Government; 540 Public Law; 546 Law and the Administrative Process; 548 Policy Process; 558 The Politics of Administration; or 566 Ethics, Values, and Morality in Public Administration.
   b. Analytical skills (6 hours) - 512 Quantitative Political Analysis; 514 Research and Methodology in Public Administration.
   c. Management skills (9 hours) - 560 Public Budgeting and Finance; and any one of the following: 562 Public Management; 564 Human Resources Management; 556 Policy Analysis.
2. Specialization (9 hours)
   a. A specialization is designed by the student in consultation with the coordinator of the M.P.A. degree program. Possible specializations include general government, health, budgeting and finance, planning, natural resources, program evaluation, criminal justice, public relations, personnel, and others.
   b. Recommended Internship (6 hours)
      Internships are arranged in consultation with the coordinator of the M.P.A. degree program.
3. Final Examination A written final examination, which may be followed by an oral examination, is required.

DUAL J.D.-M.P.A. PROGRAM

The College of Law and the Department of Political Science in the College of Arts and Sciences offer a coordinated dual degree
program leading to the conferment of both the Doctor of Jurisprudence and Master of Public Administration degrees. In this program, a student may earn the M.P.A. and J.D. degrees in about four years rather than the five years that otherwise would be required. Students pursuing the dual degree program should plan to be enrolled in coursework or an internship for one summer term in addition to taking normal course loads for four academic years.

Admission

Applicants for the J.D.-M.P.A. program must make separate application to, and be independently accepted by, the College of Law for the J.D. degree and the Department of Political Science and The Graduate School for the M.P.A. degree. Applications must also be accepted by the Dual Degree Committee. All applicants must submit a Law School Admission Test (LSAT) score. An applicant's LSAT score may be substituted for the Graduate Record Examination (GRE) score, which is normally required for admission to the M.P.A. program. Application may be made prior to or after matriculation in either the J.D. or the M.P.A. program, but application to the dual program must be made prior to entry into the last 29 semester hours required for the J.D. degree and prior to entry into the last 15 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 complete the requirements of the M.P.A. program and are encouraged to take Local Government (Law 821) and are required to take a seminar in each of six broad subfields available in the College of Law. 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.

THE DOCTORAL PROGRAM

The Ph.D. program prepares students for careers in college teaching, as well as careers in other occupations related to service in the public or private sectors. Applicants for admission to the program should normally have completed a master's degree in political science or a related field with a 3.5 GPA and have earned a composite score of at least 1100 on the verbal and quantitative parts of the Graduate Record Examination.

Doctoral students admitted to the program must complete 84 hours beyond the bachelor's degree, including 24 hours of coursework beyond the master's degree, graded A-F, must successfully pass written and oral comprehensive examinations in three broad subfields of political science, and must pass a final oral examination on the dissertation. In addition, students must satisfy a research tool requirement. Usually, students meet this requirement by completing 12 hours of coursework numbered above 500 in empirical theory and research methodology. However, if a student's advisor and program committee certify that competency in a foreign language is a more appropriate research tool, a foreign language can be used instead.

In addition to the total hours required for the degree, the following requirements must also be met:
1. At least 69 hours must be in political science courses.
2. At least 54 hours in political science must be in courses numbered above 500.
3. Completion of Political Science 510, 511, and 512.
4. Completion of at least three courses or seminars at UTK in each of the three broad subfields in which the student takes examinations.
5. Completion of at least one course or seminar in each of six broad subfields available for graduate instruction in the department.
6. At least 6 hours must be earned in political science courses numbered above 600.
7. A total of 24 hours must be earned by writing the dissertation.

MINOR IN ENVIRONMENTAL POLICY

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

GRADUATE COURSES

430 United States Constitutional Law: Sources of Power and (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 (Analysis of current issues in civil rights and liberties including first amendment freedoms, equal protection, privacy and rights of accused.)

442 Administrative Law (Legal dimensions of administrative power and procedures, and constitutional controls over administrators.)

452 Black African Politics (Recent evolution and current political environment of Black African nations.)

454 Government and Politics of China and Japan (Examination of the political systems, structure and political processes in China and Japan.)

459 Government and Politics of the Soviet Union (Origins and development of Soviet political system, and study of selected policy areas.)

461 Policy Making in Democracies (Comparative analysis of policy making and policy implementation in the public or private sectors.)

463 Contemporary Middle East Politics (Governments and movements in Middle East, their characteristics, bases, and interrelationships.)

470 International Law (Nature and development of international law and compliance. Function of international law in context of international conflict.)

475 Ancient and Medieval Political Thought (Survey of major western political thinkers from Socrates to Marsilius of Padua.)

476 Modern Political Thought (Survey of major western political thinker from Machiavelli to Marx.)

500 Thesis (1-15) VPNP only, E.

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

510 Scope and Methods in Political Science (3) Procedures of analysis in political science.

511 Research Design (3) Methods for planning and executing research, from case studies to experimental designs. Development of research questions and hypotheses; measurement; issues, and validity of inferences.

512 Quantitative Political Analysis (3) Methods and techniques in quantitative political analysis: univariate and bivariate statistics.

513 Quantitative Political Analysis (3) Methods and techniques in quantitative political analysis: multivariate model building.

514 Research and Methodology in Public Administration (3) Basic assumptions and techniques of research in public administration: measurement, analysis, and reporting of data.

520 Political Theory (3) Survey of major ideas, thinkers and works of Western political theory.

522 American Political Thought (3) Systematic examination of the normative and empirical theories of leading American political thinkers from the colonial period to the present.

530 American Government and Politics (3) Survey of major works, approaches to research and analysis, critical examination of major works, and overviews of research in various subfields. May be repeated with consent of department. Maximum 9 hrs.

532 Presidency (3) Systematic examination of the structure, functions and powers of the American presidency as they have evolved from the founding to the present.

533 Congress (3) Formal, empirical and theoretical approaches to and models of the institutional workings of Congress and the behavior of legislators.

535 Mass Political Behavior (3) Theoretical and empirical analyses of public opinion, political socialization, political attitudes and behavior, especially voting behavior.
537 Political Parties and Interest Groups (3) Theoretical and empirical examination of the structure, functions, and operations of political parties and interest groups.

539 State and Local Government and Politics (3) Theoretical and empirical analysis of government, politics, policymaking, and public administration at the state and local levels.

540 Public Law (3) Selective examination of published research and current approaches to matters in constitutional law, judicial process, and judicial behavior. May be repeated with consent of department. Maximum 9 hrs.

546 Law and the Administrative Process (3) Constitutional position; decisional processes, regulations and management; limitations on government action; questions of structure, role, and administrative choice. May be repeated with consent of department. Maximum 9 hrs.

548 Public Policy Process (3) Theoretical, formal, and empirical analysis of the roles, functions, and decision-making processes of public policymakers, including legislative, executive, and judicial actors.

550 Public Administration (3) Overview of public administration theory and function.

552 Organization Theory (3) Appraisal of major theories of organization and their applicability to public sector.

553 Management of Information Systems (3) Theory, design, development, implementation and evaluation of information systems and organizational database systems, computer applications, and training in management information technology.

556 Policy Analysis (3) Strategies and techniques for identification and analysis of public problems and public 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, and related public finance tasks. May be repeated with consent of department. Maximum 9 hrs.

562 Public Management (3) Interpersonal and leadership skills, techniques and methods for planning, decision making, and implementation of management strategies in public sector. May be repeated with consent of department. Maximum 9 hrs.


566 Ethics, Values, and Morality in Public Administration (3) Moral-ethical dilemmas confronting administrators in American political system.

569 Internship in Public Administration (3-6) Open to students participating in approved intern and practicum programs. May be repeated with consent of department. Maximum 9 hrs. S/N only.

570 Comparative Government and Politics (3) Selected topics in modern governments. May be repeated with consent of department. Maximum 9 hrs.

572 The Politics of Development (3) Selected topics dealing with political problems of less developed countries. May be repeated with consent of department. Maximum 9 hrs.

574 Area Seminar in Comparative Government and Politics (3) Selected topics in area studies: African, Asian, Latin American, Middle East, Soviet Union and Eastern Europe or Western Europe. May be repeated with consent of department. Maximum 9 hrs.

580 International Politics (3) Survey of literature and major aspects of International Politics. May be repeated with consent of department. Maximum 9 hrs.

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

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

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

594 College Teaching in Political Science (1) Instructural effectiveness, techniques, organization, materials for teaching political science at college level. Prereq: Consent of instructor. S/N only. Maximum 15 hrs.

595 Readings and Special Problems in Political Science (1-3) Prereq: Consent of instructor. May be repeated. Maximum 15 hrs.

596 Workshops in Computer Applications (1) Training in software applications to support research and decision making tasks in public service. Successful completion certifies proficiency of MPA students in use of software applications for personal computer. S/N only.

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

610 Special Topics in Empirical Theory and Methodology (3) Advanced methods and procedures of analysis in political science. May be repeated with consent of department. Maximum 9 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) Systematic analysis of published research and judicial decision: development of constitutional law as major component of public policy. May be repeated with consent of department. Maximum 9 hrs.

642 The Politics of Criminal Justice (3) Selective examination of contemporary problems of the administration of justice, both at federal and state levels. May be repeated with consent of department. Maximum 9 hrs.

654 Contemporary Public Policies (3) Problems in one or more public policy areas from political and administrative perspectives. Topics selected by instructor. May be repeated with consent of department. Maximum 9 hrs.

660 Contemporary Perspectives on Public Administration (3) Development of theory in public administration: contemporary critiques and alternatives. May be repeated with consent of instructor. Maximum 9 hrs.

668 Special Topics in Public Administration (3) Analysis of selected issues and problems in public administration. May be repeated. Maximum 6 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 the decision making in foreign policy areas and analysis of policy-making process. May be repeated with consent of department. Maximum 9 hrs.

688 Special Topics in International Politics (3) Selected issues and problems in international politics. Specific content determined by instructor. May be repeated with consent of instructor. Maximum 9 hrs.

Psychoeducational Studies

See Materials Science and Engineering

Polymer Engineering

See Materials Science and Engineering
THE MASTER'S PROGRAM

Graduate study leading to the M.A. degree in psychology is available with a concentration in experimental psychology. This program is appropriate for students who desire a master's degree as part of their progress toward a doctorate or for those who wish to complement a degree in a different field.

Admission

Any student with a B.A. or B.S. may apply to the Department of Psychology for admission to the master's program. All students must also submit scores from the Graduate Record Examination (general and subject).

Major Advisor and Committee

Initially, the Director of Experimental Psychology will advise the student. As soon as possible, the student must select an advisor and obtain his or her approval for registration. Subsequently, the advisor and student will select two additional faculty members to comprise the student's master's committee. Final committee approval comes from the Graduate Dean, upon recommendation by the Department Head.

Program Requirements

All students must complete 30 semester hours of graduate level courses in psychology. These hours must include 504-05, or Statistics 531-32 or an equivalent sequence; 565 or 420; six semester hours of Thesis 500; and twelve hours of 500- or 600-level foundation courses.

These hours must include 12 semester hours of statistics and research methods or design). The basic requirements are:

1. Twelve semester hours of statistics and research (510, 511 or 512, 513, 543, 546 or 547, 550, 560, and 570 or 571).

2. A student with a B.A. or B.S. may apply to the Department of Psychology for admission to the doctoral program with a concentration in experimental psychology or clinical psychology.

3. Experimental psychology or clinical psychology. The doctoral program with a concentration in experimental psychology is offered through the Department of Psychology. The doctoral program with a concentration in clinical psychology is offered through the Department of Clinical Psychology.

4. The doctoral program with a concentration in clinical psychology is offered through the Department of Clinical Psychology. The doctoral program with a concentration in clinical psychology is offered through the Department of Clinical Psychology. The doctoral program with a concentration in clinical psychology is offered through the Department of Clinical Psychology. The doctoral program with a concentration in clinical psychology is offered through the Department of Clinical Psychology. The doctoral program with a concentration in clinical psychology is offered through the Department of Clinical Psychology. The doctoral program with a concentration in clinical psychology is offered through the Department of Clinical Psychology. The doctoral program with a concentration in clinical psychology is offered through the Department of Clinical Psychology. The doctoral program with a concentration in clinical psychology is offered through the Department of Clinical Psychology. 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The doctoral program with a concentration in clinical psychology is offered through the Department of Clinical Psychology. The doctoral program with a concentration in clinical psychology is offered through the Department of Clinical Psychology. The doctoral program with a concentration in clinical psychology is offered through the Department of Clinical Psychology.
b. Interviewing and Observation (556) and Laboratory (557).

c. Research Practicum (509) (4 hrs.

d. Life-Span Development (512) or Developmental Psychology (511).

e. Personality: Theory and Research I and II (570-71).

f. History and Systems of Psychology (565).

g. Research Questions and Designs (580).

h. Psychological Assessment I and II (594-95) and Laboratory (566).

i. Empirical Methods in Psychology (504) and Research Design (505).

j. Social Psychology (560).

k. Field Placement in Clinical Psychology (695) (18 hrs.).

l. Dynamics of Psychopathology (573).

m. Psychometrics (555) or Applied Psychological Measurement (557).

n. Ethical, Legal and Professional Issues in Psychology (683).

o. Psychodynamic Psychotherapy I and II (670-71) and Laboratory (673) (4 hrs.).

p. Doctoral Research and Dissertation (600) (24 hrs.).

q. Satisfactory completion of a one-year clinical internship at a site approved by the program.

r. Students who choose a teaching assistantship in the third or fourth year must have satisfactorily completed 528 College Teaching in Psychology.

s. Satisfactory completion of at least 3 additional graduate-level courses in non-clinical topics in psychology.

s. Satisfactory completion of a one-year clinical internship at a site approved by the program.

GRADUATE COURSES


409 Group Facilitation (3) Study of theory and technique through supervised experience in small groups. Prereq: General Psychology or consent of instructor. May be repeated. Maximum 6 hrs.


415 Psychology of Religion (3) History of psychology of religion: various philosophical and empirical orientations. Psychological function of religion for individuals and society. Prereq: General Psychology or consent of instructor.

420 History and Systems of Psychology (2) History of psychological thought. Classical approaches and recent developments. Prereq: General Psychology or consent of instructor. May be repeated. Maximum 6 hrs.

424 Psychology and the Law (3) Psychological aspects of legal systems. Prereq: General Psychology or consent of instructor.

430 Health Psychology (3) Survey of psychological factors related to health and illness: stress, personality, and environment. Applications of psychological treatments to physical illness. Prereq: General Psychology or consent of instructor.

434 Psychology of Gender (3) Biological, psychological, and social factors in gender. Importance of gender roles and stereotypes for behavior and experience. Prereq: General Psychology or consent of instructor. (Same as Women's Studies 434.)

440 Organizational Psychology (3) Social-psychological analysis of organizations, role-theory and systems theory. Prereq: General Psychology and Social Psychology or consent of instructor.


450 Comparative Animal Behavior (3) (Same as Ecology and Evolutionary Biology 450.)

455 Biology of Animal Behavior Laboratory (3) Coreq: 450. (Same as Ecology and Evolutionary Biology 459.)

461 Physiological Psychology (3) Nervous system and physiological correlates of behavior. Biological basis of emotion, learning, memory and stress. Prereq: General Psychology or consent of instructor and either Biodiversity and Organization or Function of the Cell, or Human Origins and Principles of Biological Anthropology.

470 Theories of Personality (3) Survey of major theoretical positions taken by personality and development. Prereq: General Psychology or consent of instructor.

475 Adolescent Development (3) Theoretical perspectives and empirical research findings pertinent to adolescent development. Prereq: General Psychology or consent of instructor.

480 Theories of Learning (3) Classical and current approaches to learning and cognition. Prereq: General Psychology or consent of instructor.

482 Topics in Psychology (3) Intensive analysis of special topics: Afro-American psychology or evaluation of programs in community. Prereq: General Psychology or consent of instructor. May be repeated. Maximum 6 hrs.

489 Supervised Research (1-9) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

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

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


505 Research Design (3) Techniques for planning and conducting research in controlled and natural settings: experiments, quasi-experiments, observational studies, surveys, and program evaluation. Development of questions and hypotheses for study. Design of studies to maximize validity. Prereq: Consent of instructor.

507 Foundations of Applied Psychology (3) Fundamental methods for application of psychology principles and techniques in community, organizational and industrial settings, and related ethical and theoretical issues. Prereq: 505 and consent of instructor.

508 Readings and Special Issues in Psychology (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

509 Research Practicum (1-3) Required of first-year graduate students in psychology. May be repeated. Maximum 9 hrs. S/N only. E

510 Topics in Psychology (3) Intensive examination of selected issues in psychology. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

511 Developmental Psychology (3) Normal processes of human socialization: physical, cognitive, and emotional development from conception through infancy, childhood, and adolescence. Prereq: Consent of instructor. May be repeated. Maximum 8 hrs.

512 Life-Span Development (3) Theories and research concerning normal human development throughout life adulthood and old age. Prereq: Consent of instructor.

513 Foundations of Psychology: Biological Factors, Perception, Learning, Thinking, Motivation (4) Intensive survey. Prereq: Consent of instructor.

515 Colloquium in Experimental Psychology (1) Research and practical issues in experimental psychology. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. S/N only. F, Sp

516 Colloquium in Ethology (1) Current research and theory. May be repeated. Maximum 9 hrs. (Same as Ecology and Evolutionary Biology 516) S/N only. E

520 General Vertebrate Neuroanatomy (3) Lecture and laboratory. Structure and functioning of central and peripheral nervous system. Prereq: 461, 469, or equivalent and consent of instructor.

527 Behavioral Neurology (3) Disorders of nervous system, organic brain dysfunctions. Diagnosis and treatment. Prereq: Consent of instructor.

528 College Teaching in Psychology (3) Concepts, techniques, and materials for teaching psychology at college and/or university level. Supervised practice. Prereq: Consent of instructor. S/N only.


545 Advanced Animal Behavior (3) (Same as Ecology and Evolutionary Biology 545.)

546 Ethological Psychology (3) Basic ethology and comparative psychology. Implications for human behavior. Prereq: Consent of instructor.

547 Conceptual Foundations of Evolution and Behavior (3) Critical evaluation of seminal writings on theory and methods in comparative analysis of behavior. (Same as Ecology and Evolutionary Biology 547.)

559 Social Psychology (3) Survey of theory and research concerning interpersonal interaction and individual behavior in social context. Prereq: Consent of instructor. F

554 Laboratory in Psychometrics (3) Further learning about psychometrics theories: item response theory (IRT); factor analysis, and applications of those methods using computer programs to simulated or empirical data. Prereq: 555. May be repeated. Maximum 9 hrs.

555 Psychometrics (3) Basic concepts, factor analysis, scaling, test theories, probability models and their applications, computerized adaptive testing and other topics. Prereq: Statistics 537-538 or equivalent. May be repeated. Maximum 6 hrs.

572 Applied Psychological Measurement (3) Issues and techniques for applying psychological measurement in organizational, clinical, and community research. Prereq: Statistics 537-538 or equivalent or consent of instructor. May be repeated. Maximum 6 hrs.

559 Laboratory in Interviewing and Observation (1) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. Coreq: 558.

560 Psychology of Learning (3) Review of current evidence from research involving human and/or non-human animals. Prereq: 400 and consent of instructor. May be repeated. Maximum 6 hrs.

565 History and Systems of Psychology (3) History of philosophy concerning psychology. Major systems of psychology which emerged during 20th century. Prereq: Graduating standing. Sp

570 Personality: Theory and Research (3) Advanced survey of psychodynamic and neo-Freudian approaches to personality; related research. Prereq: Admission to clinical program or consent of instructor.

571 Personality: Theory and Research (3) Advanced survey of behavioral and humanistic approaches to personality; related research. Prereq: Admission to clinical program or consent of instructor.

573 Descriptive and Theoretical Psychopathology (3) Current psychiatric taxonomic system. Theories of etiology for various diagnostic categories. Examples from
696 Advanced Psychology Clinic Placement (1-3) Prereq: Consent of instructor. May be repeated. Maximum 24 hrs. S/NC only. E

575 Psychopharmacology (3) Connects brain chemistry and behavior. Prereq: Consent of instructor. S

576 Object Relations (3) European and American conceptions of self and the other. Prereq: Consent of instructor. S

578 Research Questions and Design (3) Designs basic research process in psychology. Prereq: Consent of instructor. S

593 Independent Study (1-15) Prereq: Consent of instructor. May be repeated. Maximum 24 hrs. S/NC only. E

594 Psychological Assessment I (3) Basic concepts and techniques of adult assessment. Prereq: Consent of instructor. S

595 Psychological Assessment II (3) Advanced techniques of adult assessment. Prereq: Consent of instructor. S

596 Laboratory in Psychological Assessment (1) Prereq: Consent of instructor. S

601 Seminar in Psychology (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs. S

604 Seminar in Psychological Assessment (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs. S

613 Seminar in Existential-Phenomenological Psychology (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs. S

623 Seminar in Methods of Naturalistic Research (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs. S

635 Ethical, Legal, and Professional Issues in Psychology (3) Legal and ethical issues in psychology. Prereq: Consent of instructor. S

670 Psychodynamic Psychotherapy I (3) Theories and principles. Prereq: Consent of instructor. S

671 Psychodynamic Psychotherapy II (3) Advanced theories and principles. Prereq: Consent of instructor. S

673 Laboratory in Psychotherapy (2) Prereq: Consent of instructor. S

675 Field Placement in Clinical Psychology (3) Prereq: Consent of instructor. May be repeated. Maximum 24 hrs. S/NC only. E

695 Advanced Psychology Clinic Placement (1-3) Prereq: Consent of instructor. May be repeated. Maximum 24 hrs. S/NC only. E

696 Advanced Psychology Clinic Placement (1-3) Prereq: Consent of instructor. May be repeated. Maximum 24 hrs. S/NC only. E

697 Supervised Field Work in Applied Psychology (1-6) Guided practical experience in psychology applied to professional settings. Prereq: Consent of instructor. May be repeated. Maximum 24 hrs. S/NC only. E

Rehabilitation, Deafness, and Human Services

(College of Education)

MAJORS

Counseling ........................................ M.S.
Education ............................................. M.S., Ph.D.

Robert F. Kronick, Leader

Professors:

Doll, J. E. (Emeritus), Ph.D. ...... Pennsylvania
Frey, Roger M. (Emeritus), Ed.D. ...... Illinois
Kronick, Robert F., Ph.D. ...... Tennessee
Martin, T. Ph.D. ...... South Carolina
Miller, James H. (Liaison), Ed.D. ...... Auburn
Welch, Olgia, Ph.D. ...... Tennessee
Woodhead, William E., Ed.D. ...... Mississippi
Woodside, M.R., Ed.D. ...... \* Virginia Polytechnic Institute

Associate Professor:

Warden, K. Ph.D. ...... Tennessee

Research Professors:

Cassell, Jack L., Ph.D. ...... Kansas
Colvin, Craig R., Ed.D. ...... Virginia
Mulkey, S. Wayne, Ph.D. ...... Florida State

The Rehabilitation, Deafness and Human Services Education unit participates in graduate and professional programs leading to degrees, majors, and concentrations in:

Master of Science

Counseling Rehabilitation counseling
Education
Track 1 - education of the deaf and hard of hearing
Track 2 - education of the deaf and hard of hearing

Doctor of Philosophy

Education

Rehabilitation/special education

See Education under Fields of Instruction for full description of all degree requirements.

The vision of the Rehabilitation, Deafness, and Human Services unit is to educate students with disabilities in a multicultural environment. Faculty and staff pursue, as a common mission, improvement in the quality of life for persons with disabilities and focus research interests on the development of knowledge and technology to meet the unique educational, social, and employment needs of this population. A major goal of the unit is to prepare graduates for future leadership roles in business, government, and social service organizations.

The Rehabilitation, Deafness, and Human Services unit includes several educational programs sponsored by the U.S. Department of Education, Office of Special Education and Rehabilitation Services. Rehabilitation Services Administration, including: Regional Rehabilitation Continuing Education Program, Orientation to Deafness, Southeastern Regional Interpreter Training Consortium, National Interpreter Training Center, and the Educational Interpreting Program.

GRADUATE COURSES

415 Language Development of Hearing Impaired I (3) Language development of hearing impaired contrasted with normal language development. Normal linguistic systems used to describe language development problems.


419 Speech Development of Hearing Impaired (3) Theories of speech development, approaches in teaching, and production of speech, and aural habilitation. Practicum experiences.

324 Nature of Hearing Impairments (3) Basic principles of audiology: anatomy, physiology, and psychology of hearing; nature and causes of hearing loss; methods and interpretation of audiometric services; medical and otologic rehabilitation disciplines.

425 Introduction to the Psychology and Education of the Hearing Impaired (3) Primarily for those planning to teach hearing impaired. Overview of research and educational psychology, social adjustment, communication methodology, language development, and education of the hearing impaired. Survey of literature. Visits to programs.

431-32 American Sign Language III, IV (3, 3) Fluency of expressive and receptive sign communication skills. Use of language in context. Contextual structures of ASL and cultural implications of deaf community. Must be taken in sequence. Prereq: 426, 431 for 432 or consent of instructor.

500 Thesis (1-15) S/NC 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


504 Clinical Experience in Teaching of Exceptional Children (3-3) (Same as Inclusive Early Childhood Education 504.)

509 Vocational Guidance and Career Planning With Hearing Impaired (3) Utilization of psychological, educational, social, vocational, and diagnostic materials and resources appropriate for hearing impaired persons to provide guidance in career decisions and individualized rehabilitation plan.

518 Educational Specialist Research and Thesis (3) May be repeated. S/NC only. E

523 Practicum in Hearing Impairment (3) Receives and interprets clinical data for hearing impaired individuals. Design, testing, and scoring of tests. Practicum experiences.


529 Teaching Reading to the Hearing Impaired (3) Specific methods necessary to teach the profoundly hearing impaired student. Practice in preparation of developmentally appropriate reading materials. Methods which assist in integration of hearing impaired students in regular reading curricula and materials.

530 Orientation to Rehabilitation (3) History, philosophy, legal and economic bases, current issues, and practices in public and private rehabilitation programs. Qualifica-
532 Case Management in Rehabilitation (3) Techniques and procedures involved in the management of cases and rehabilitation agencies, private rehabilitation companies, and public or private rehabilitation facilities. Analysis of appropriate rehabilitation models for the rehabilitation program.


555 Vocational Evaluation: Statistical Methods (3) Process principles and techniques used to determine vocational assets and liabilities of people with disabilities. Statistical analysis of work samples, application of statistical methods to vocational counseling, and use of statistical computing in vocational evaluation.

537 Vocational Evaluation: Clinical Methods (3) Process, principles, and techniques used to assist individuals in determining their own work behavior and potential. Selection and use of occupational evaluation programs and work samples; application of informational techniques; job interviews; simulated work experiences in vocational evaluation. Clinical interpretation of data from formal and informal test procedures, vocational counseling, and report writing.

541 Psychosocial Aspects of Exceptionalities (3) Psychosocial impact of abnormality on person and family. Reaction to loss, coping with disability, and societal rehabilitation.

543 Medical Aspects of Disability (3) Medical and clinical aspects of disabilities as related to disabilities caused by medical conditions. Distinctions of treatment and rehabilitation.

545 The Rehabilitation Interview (3) Interview used in assessment and planning with people who have disabilities and vocational handicaps.

547 Practicum in Rehabilitation (3) Supervised experience in area of rehabilitation; application of concepts, principles, and skills. Prereq: Consent of instructor.

549 Internship in Rehabilitation Counseling (12) Supervised practice in rehabilitation counseling. Full-time clinical experience for second-year students (800 clock hours required).

579 Special Topics (1-3) Prereq: Admission to doctoral program. May be repeated. Maximum 6 hrs. S/N or letter grade.

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

601 Seminar in Educational Theories in Special Education and Rehabilitation (3) Educational and rehabilitation theories; education and rehabilitation of exceptional persons. Theory applications in educational settings. Prereq: Admission to doctoral program or consent of instructor.

602 Seminar in Social Processes in Special Education and Rehabilitation (3) Social phenomena which influence the development of the individual in society and the impact of the social environment on the individual. Prereq: Admission to doctoral program or consent of instructor.

603 Seminar in Research in Special Education and Rehabilitation (3) Development and implementation of research. Independent research studies. Research proposal. Prereq: 9 hrs of research core and consent of instructor.

610 Internship in College Teaching and Supervision (3-9) Supervised practice in college teaching and supervision. Prereq: Admission to doctoral program or consent of instructor. May be repeated. Maximum 9 hrs. S/N only.

620 Internship in Research in Special Education and Rehabilitation (3-9) Field placements for graduate students engaged in research and evaluation. Prereq: Professional experience in the field of rehabilitation. May be repeated. Maximum 9 hrs. S/N only.

630 Internship in Institutional Leadership in Special Education and Rehabilitation (3-9) Advanced level of administration experiences under supervision of practitioner. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. S/N only.

659 Social Topics (1-3) Prereq: Admission to doctoral program. May be repeated. Maximum 6 hrs. S/N or letter grade.

693 Independent Study (1-3) May be repeated. S/N or letter grade.

Religious Studies

Charles H. Reynolds, Head

Professors:

Dungan, David L., Ph.D............... Harvard
Hackett, Rosalind J., Ph.D.--------Aberdeen
Humphreys, W. Lee, Ph.D.-------Union
Linge, David E., Ph.D.---------Vanderbilt
Lusby, F. Stanley (Emeritus).--------M.Div.
Norman, Ralph V., Jr., Ph.D............Colgate Rochester
Reynolds, Charles H., Ph.D.............Harvard

Associate Professors:

Fitzgerald, James L., Ph.D.........Chicago
Gwynne, Rosalind W., Ph.D--------Washington
Hodges, John O., Ph.D.-------Harvard
Levinger, Miriam L., Ph.D....Harvard
Schmidt, Glya G., Ph.D.........Pittsburgh

Assistant Professor:

Huie, Stephen (Emeritus).--------Minnesota

A master's degree in Philosophy with a concentration in religious studies is available. Contact the department for details of this program. Graduate courses in religious studies provide opportunity for students in a variety of disciplines to pursue work in religious studies as a graduate concentration.

Graduate Courses

405 Modern Jewish Thought (3) History, culture, and philosophy of Jewish thought. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

411 Modern Religious Philosophies (3) Religious implications of major Western thinkers. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.
The Master's Program

The Master of Science in Social Work program prepares social workers to provide professional leadership in: 1) clinical social work practice and 2) social work management and community practice. These objectives are met through a curriculum requiring of all students a professional foundation and a concentration in either clinical social work practice or social welfare management and community practice. The M.S.S.W. program is accredited by the Council on Social Work Education.

Admission Requirements

Admission to the master's program is based on the following requirements:

1. A Bachelor's degree from an accredited college or university with appropriate preparation in the social sciences. At least three-fourths of the applicant's undergraduate work should be in the social sciences, humanities, physical sciences, and other Arts and Sciences subjects. Applicants must have a course in human biology and demonstrate a liberal arts perspective through coursework in at least four of the following five areas: economics or mathematics, government, political science or history, sociology or anthropology, psychology, philosophy, literature, or the arts. Applicants with other academic backgrounds may request consultation to discuss ways that they can meet the requirements.

2. A grade point of 2.7 or higher on a 4.0 scale. Applicants falling below this average may be considered for probationary admission on the basis of supplemental evidence of the ability to perform at a satisfactory level. The University requires a minimum GPA of 2.7 for admission to The Graduate School.

3. Personal qualifications acceptable for entrance into the professional practice of social work.

4. All applicants must submit up-to-date scores from the Graduate Record Examination (general). Preference is given to applicants with a GPA of 3.0 or above in their undergraduate work with substantial preparation in the social sciences.

Advanced Standing

The University of Tennessee College of Social Work has an advanced standing program. Admission to advanced standing requires: (1) a D.S.W. from an accredited program; (2) an overall undergraduate GPA of 3.0 or greater; and (3) personal qualifications acceptable for entrance into the professional practice of social work. Students admitted into advanced standing are required to complete a minimum of 42 hours of study in either of the college's concentrations - clinical social work practice or social welfare management and community practice. These students will follow the curriculum plan and meet all requirements of the concentration during three semesters of study in the program.
edge and practice skills in differential assessment, clinical interventions and practice evaluation. The concentration also emphasizes knowledge and skills toward (1) amelioration of complex psychosocial, interpersonal problems; (2) emotionally sound and culturally sensitive practice; and (3) influencing the development of services and programs that are responsive to the needs of vulnerable, high-risk clients and groups.

**Required courses:**
- 521 Clinical Social Work Practice with Individuals (3 hours)
- 525 Clinical Social Work Practice with Groups (3 hours)
- 526 Research for Assessment of Social Work Treatment (3 hours)
- 582-83 Field Practice (12 hours)
- Minimum of three (total of 9 hours) advanced course electives as follows:
  - One or more from a pool of advanced clinical practice courses
  - One or more from a pool of advanced general courses.

**Social Welfare Management and Community Practice:**

The social welfare management and community practice concentration focuses on students' developing skills directed toward the management and analysis of complex social service delivery needs within organizations and communities; knowledge and skills in the development of service intervention strategies to address such related needs; and the organizational and management skills that enable practitioners to work in a variety of challenging and turbulent environments. The concentration emphasizes theory and skills related to leadership and administration, and permits flexibility in tailoring a program to fit the student's individual interests, capabilities, and career goals.

**Required courses:**
- 541 Leadership and Management in Human Services (3 hours)
- 543 Financial Management and Resource Development (3 hours)
- 547 Evaluation Research (3 hours)
- 582-83 Field Practice (12 hours)
- Minimum of three (total of 9 hours) advanced course electives as follows:
  - One course in advanced policy (3 hours)
  - Two courses from a pool of advanced general courses (6 hours).

**Field Practice**

Field instruction is a critical component of the student's first- and second-year programs. Through cooperation with a wide range of social agencies and human service programs throughout Tennessee, the college is able to provide field placements in a variety of social work practice areas. The faculty works closely with the placement agencies and the field instructors to ensure that students have quality field practice experiences, meeting the objectives of the core curriculum and the concentration.

The college uses a concurrent class and field plan. Students are in field two days per week during the first year and three days per week in the second year.

First-year agency placements are selected to provide practice experiences related to the foundation curriculum content. Within the placement, each student's experiences are planned and designed according to educational objectives.

Second-year placements are selected according to the student's area of concentration, individual career interests, and educational needs. The student actively participates with the field practice coordinator and the educational committee in the selection of the second-year placement. The second-year field placement experience focuses on the integration of social work knowledge and values, and emphasizes the acquisition and development of practice skills.

Students are responsible for meeting the requirements of their placement agencies in terms of office hours and workload coverage. This responsibility takes precedence over scheduled University breaks and may result in variations in holidays and office hours for the student.

Students receiving a grade of NC in field practice may not repeat the field practice.

**Transfer Credits**

Coursework equivalent to the first year of the master's program, completed in another accredited graduate social work program, is usually accepted toward degree requirements. Applicants must meet the admission requirements of The Graduate School and the College of Social Work. Transfer courses must be approved as equivalent to required and elective coursework taken for graduate credit and passed with a grade of B or better. An S (earned on an S/NC system) for the field practicum is also accepted. In addition, transfer courses must be part of an otherwise satisfactory graduate program (B average) and be approved by the dean. This coursework must be completed within the six-year period prior to the receipt of the degree.

A maximum of 6 semester credits from work earned in disciplines other than social work may be transferred as elective credits. The student's academic committee must approve the request and the transfer credit must meet Graduate School requirements.

**Proficiency Examination**

Students in the master's program may earn a maximum of nine hours by proficiency examination, with the exception of field practice courses. Students interested in proficiency examinations are referred to The Graduate School statement describing the procedure for applying for examination.

**THE DOCTORAL PROGRAM**

The College of Social Work offers the Doctor of Philosophy with a major in Social Work. The 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 relationship among each of them and their social policy, organization, and community contexts.
- Research-based knowledge to inform and guide social work practice, social policy, and social welfare program development.

The program consists of foundation courses, elective courses, and dissertation research. The courses are available only in Knoxville. Students and their committees can develop a plan for completing their research in Nashville and Memphis based on the availability of dissertation resources.

Students have the opportunity to work in the Children's Mental Health Services Research Center, a National Institute of Mental Health research center, as part of their training. The center is one of only three such centers nationwide and focuses on services to children who have experienced mental health problems associated with abuse, neglect, violence and a variety of psychosocial problems.

**Admission Requirements**

The Ph.D. program is designed for students who have completed a master's degree in an accredited school of social work and have post-master's social work/social welfare experience. Applicants who do not meet these requirements, but believe they have equivalent credentials should contact the Chair of the Ph.D. program for further information regarding admissions criteria.

**General Requirements**

1. A minimum of 63 hours beyond the master's degree including: a) completion of 24 hours of required coursework, b) completion of 15 credits of advanced electives, at least 12 of which are taken outside the department, and c) completion of at least 24 credit hours of dissertation research.

2. Successful completion of qualifying and comprehensive examinations.

3. Completion and defense of the dissertation.

**Curriculum**

The curriculum of the Ph.D. program consists of foundation course work, electives, and dissertation research. The foundation curriculum consists of 24 hours of coursework in the history and philosophy of social work, issues in direct service and administration and planning, areas of practice, and research methodology and 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 continued in the third year of study. While it is generally expected that the coursework will be completed on a full-time basis, dissertation research can be completed on a planned part-time basis.

Specific courses required are 601, 602, 612, 613, 640, 650 and Statistics 531 and 532 or any two graduate level statistics courses approved by the Doctoral Program Chair.

**Examinations**

All doctoral students are required to pass a qualifying examination and a comprehensive examination. The qualifying examination covers the foundation curriculum. The comprehensive examination is administered by members of the doctoral committee and is designed for the student to demonstrate comprehensive knowledge of the major and cognate areas and
Graduate students in the College of Social Work may pursue a specialized minor in gerontology. This interdepartmental/interdisciplinary minor gives the student an opportunity for combining the knowledge about aging in American society with his/her major concentration. Please refer to Human Ecology for specific requirements.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S.W. and Ph.D. programs in Social Work are available at the University of Tennessee, the state of Arkansas; the Ph.D. to residents of Delaware, Oklahoma or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

NOTE: Graduate students majoring in fields other than social work are admitted to certain social work courses with the approval of the College of Social Work and the student's major professor.

500 Thesis (1-15) P/NP only. E
501 Foundations of Social Work Practice I (3) Survey of history, mission, and identity of profession, basic theory, values, and methods specific to social work practice at various systems levels. Assessment, planning, communication, intervention, and evaluation skills. Prereq: Admission to College or consent of instructor. F
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when the student uses University facilities and/or facility time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
503 Foundations of Social Work Practice II (3) Generalist practice with individual, family, and small group systems. Ecological theory and frame of reference of such systems and their adaptation to environments. Various social work roles and intervention strategies pertaining to each client system. Prereq: 501 or consent of instructor. Sp
504 Foundations of Social Work Practice III (3) Basic theory, methods, problems, and strategies in implementing planned changers within and among larger social systems: task groups, human service organizations, and community systems. Various practice roles: planner, program developer, supervisor, administrator, advocate, and task group leader. Prereq: Completion of first semester of foundation or consent of instructor. Sp
505 Social Work Research (3) Research methodologies with respect to evolution and application to social work theory and practice. History and philosophies of science: problem formulation; research design; ethics; instrument use and construction; data collection; analysis and reporting; and evaluation of utilization of research. Prereq: Admission to college or consent of instructor. Sp
506 Practicum in Social Work Research (3) Supervised practice in application of research methods to social work.

514 Human Behavior in the Social Environment I (3) Theories pertaining to individual, family, and group development while emphasizing relationships among the societal, psychological, and cultural systems. Dynamics of behavior in context of social structures: race, ethnicity, social class, gender roles. Prereq: Admission to College or consent of instructor. F
515 Human Behavior and Social Environment II (3) Patterns of adaptive and maladaptive behavior, recognizing different theoretical models and criteria. Interactions among individuals, families, organizations, communities, and maladaptive behavior: mental illness and abusive behavior. Prereq: 514 or consent of instructor. Sp
516 Social Welfare Policy and Services (3) Development of contemporary social welfare activities of local, state, national, and international levels. Contribution of social work professionals to formal policy-making processes through which aggregate social welfare services are proposed, authorized, financed, and programmed. Theories of complex organization applied to social welfare service delivery settings. Prereq: Admission to college or consent of instructor. F
518 Social Work and Oppression (3) Sources, dynamics, and impact of oppression in U.S. society as manifested in both social/educational systems and personal experience. Connections among various forms of oppression: racism, sexism, classism, heterosexism. Forces which perpetuate such conditions. Prereq: Admission to College or consent of instructor. F
521 Clinical Social Work Practice with Individuals (3) Theories, knowledge, skills, and values for clinical practice with individuals from a psychological perspective. Therapeutic process, process, and treatment strategies, incorporating content from psychodynamic and cognitive practices. Specific client problems. Prereq: Completion of foundation or consent of instructor. F
523 Clinical Social Work Practice with Families (3) Concepts related to understanding and analyzing family dynamics and interactions patterns from a psychological perspective. Major family therapy theories and techniques of treatment in terms of application to families with varied system and individual problems and to families from varied social and cultural backgrounds. Prereq: Completion of foundation or consent of instructor. F
525 Clinical Social Work Practice with Groups (3) Theoretical and historical approaches to social work with groups and clinical principles supporting specific types of group work used in clinical practice, intervention, and evaluation skills. Prereq: Admission to College or consent of instructor. F,Sp
526 Research for Assessment of Social Work Treatment (3) History and philosophies, conceptual approaches, techniques and methods in the practice and use of research as applied to implementation and evaluation of direct services to clients. Prereq: Completion of foundation or consent of instructor. F,Sp
530 Seminar in Clinical Social Work (3) Topics in theory and practice of clinical social work with individuals, couples, families and groups. Prereq: Completion of foundation or consent of instructor. F
532 Short-Term Treatment (3) Theory and practice of planned short term treatment, emergency intervention, and crisis intervention. Prereq: Foundation or consent of instructor. Sp
533 Social Work Treatment with Couples (3) Theories regarding contemporary marriage styles, problem areas in relationship and treatment methods and skills for problem resolution. Prereq: Foundation or consent of instructor. F
534 Social Work Treatment with Children and Adolescents (3) Examination of various treatment modalities for assessing and treating children and adolescents. Prereq: Foundation or consent of instructor. F
535 Social Work Practice (3) Place of social work in community institution and resource. Methods, processes, and techniques employed in social work. Prereq: Foundation or consent of instructor. F
541 Leadership and Management in Human Services (3) Management practices and leadership skills required in development and management of human services delivery systems, issues regarding human resources management, resource allocation, strategic planning, and organizational dynamics. Prereq: Completion of foundation or consent of instructor. F
543 Financial Management and Resource Development (3) Administration, financial, and budgeting skills in human services organizations. Knowledge and skills in budgeting, allocating, expenditure control, fund raising, marketing, and evaluation. Prereq: Foundation or consent of instructor. F
547 Evaluation Research (3) History and philosophies, conceptual approaches, techniques and methods, and utilizes research as applied to development and evaluation of social work programs and policies. Issues pertaining to strengths and limitations of various evaluation methods, microcomputer application of data, and program goals and objectives. Prereq: Completion of foundation or consent of instructor. F
550 Seminar in Management and Community Practice (2-3) Topics in theory and practice of management and community practice. Prereq: Foundation or consent of instructor. May be repeated. Maximum 6 hrs. E
551 Seminar in Social Welfare Policy (3) Advanced social welfare policy seminar in specific fields of practice. Prereq: Foundation or consent of instructor. May be repeated. Maximum 6 hrs. E
552 Community Organization (3) Boundary development and social planning and action as practice models for development of resources to meet human needs. Prereq: Foundation or consent of instructor. F
555 Current Issues in Management and Community Practice (3) Major trends affecting delivery of human services and requisite knowledge and problem solving skills needed to address them: board/leadership development, coalition building, conflict management, and team development. Prereq: Completion of foundation or consent of instructor. F
561 Supervision and Consultation in Social Work (3) Roles, techniques, and practices of social work supervision and consultation. Prereq: Foundation or consent of instructor. F
563 Social Aspects of Illness (3) Social, economic, and emotional problems arising from or related to illness and their implications for social work. Prereq: Foundation or consent of instructor. F
564 Substance Abuse (3) Survey and analysis of social, cultural, medical, and psychological factors underlying alcoholism and drug abuse and addiction; recent research and treatment innovations. Prereq: Foundation or consent of instructor. Sp
586 Social Gerontology (3) Physical, psychological and social aspects of aging. Major social policies and programs. Prereq: Foundation or consent of instructor. F
590 Field Practice (3) Instruction and supervision in social work practice. Prereq or coreq: 501. S/NC only.
591 Field Practice (3) Instruction and supervision in social work practice. Prereq or coreq: 500. S/NC only.
592 Field Practice (6) Instruction and supervision in clinical social work practice and management and community practice. Prereq: Completion of foundation. S/NC only.
593 Field Practice (6) Instruction and supervision in clinical social work practice and management and community practice. Prereq: S/NC only.
594 Field Practice (3) Instruction and supervision in social work practice. Prereq or coreq: 502. S/NC only.
596 Field Practice (2-6) Instruction and supervision in social work practice. Prereq or coreq: 502. 512. May be repeated. S/NC only. E
598 Field Practice (5) Instruction and supervision in social work practice. Prereq or coreq: 502. S/NC only.
599 Field Practice (5) Instruction and supervision in social work practice. Prereq or coreq: 502. S/NC only.
600 Field Practice (2-6) Instruction and supervision in social work practice. Prereq or coreq: 512. May be repeated. Maximum 6 hrs. F,Sp
601 Research for Social Work Practice (3) Epistemological and methodological considerations for both quan-
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, 561, 661, 662, and 665. The political economy concentration includes 504, 540, 541, 643, 644, and 645. Both the master's and the doctoral program allow for the construction of individualized programs of study. Detailed information may be obtained from the Director of Graduate Studies in Sociology. All incoming students will be advised by the Director of Graduate Studies. New students are admitted in fall semester only and applications must be received by the Graduate Admissions and Records Office by February 1.

ADMISSION REQUIREMENTS

1. Acceptable scores on the general Graduate Record Examination (verbal, quantitative, and analytical) are required. GRE scores in the subject area (Sociology) are requested but not required.
2. Three letters of recommendation (forms may be obtained from the department).
3. Completion of the appropriate previous degree (baccalaureate, preferably with a major in one of the social sciences, for the M.A. program; master's degree in one of the social sciences for the doctoral program).

THE MASTER'S PROGRAM

Thesis Option

A minimum of 30 hours beyond the baccalaureate degree, including 24 hours of coursework and 6 hours of Thesis 500, is required. Students must complete Sociology 521, 531, and 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, Sociology 531, and one of the following: 504, 505, or 560. Sociology 534, 622, and Sociology 532 are recommended. Sociology courses at the 400 level may be taken with the approval of the student's committee. A student's plan of study should follow one of the following approaches: Plan 1, 6 hours in one of the department's concentrations and 6 hours in a second area, including areas outside the department, subject to the approval of the student's committee; Plan 2, 12 hours in a special area of study approved by the student's committee and the department's Graduate Program Committee. Students are encouraged to prepare a paper synthesizing their knowledge of the concentration(s). Students who incorporate 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 SNC 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 select complete Sociology 522, 534, 633, and 636; and Sociology 532 or another advanced course in statistics. Completion of 9 hours in each of two concentrations is encouraged. A student who cannot achieve his/her educational goals within the department's concentrations may construct an individualized course of study subject to the approval of the student's doctoral committee and the Graduate Program Committee. Sociology courses at the 400 level may not be taken without the consent of the student's advisor and the Graduate Program Committee. Six hours may be taken in related fields without petitioning the Graduate Program Committee for approval. The student's program may include a minor or cognate field.

Comprehensive Examinations

Written examinations in four areas are required (sociological theory, methodological and substantive areas). Doctoral students are eligible to take the theory and methodology examinations whenever offered. Substantive examinations may be taken upon completion of theory and methodology examinations. Detailed information on examinations and examination options (generalist, specialist, and colateralist) may be obtained from the department.

Dissertation and Final Examination

A dissertation based on original research must be completed (24 hours). The candidate must pass an oral defense of the dissertation, including the theory and methodology related to the research, in accordance with the deadlines specified by The Graduate School.

MINOR IN ENVIRONMENTAL POLICY

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

MINOR IN GERONTOLOGY

Graduate students in the Department of Sociology may pursue a specialized minor in gerontology. This interdisciplinary/interdisciplinary minor gives the student an opportunity for combining the knowledge and skills 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.A. program in Sociology is available to residents of the state of Virginia (concentration in criminology only); the Ph.D. to residents of Florida (concentration in criminology only), or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

405 Sociology of Sport (3) Social meaning, organization, and processes of sport. Prereq: 291 or consent of instructor.

414 Sociology of Health Care (3) Organization of health care facilities, staff-patient relationships, demographic characteristics, and prevalence of disease.

415 Sociology of Aging (3) How roles and statuses change with age in relation to major social institutions; impact that rapidly increasing number of older people has on society, effect of society on older people.

446 The Modern World System (3) Critical examination of capitalist world-system as social system, its coherence, boundaries, regions, member states, disputes, and patterns of conflict. Analysis of whose benefits what, and how in global political economy.


456 Society and Law (3) How laws and legal processes are affected by social change, social impact of legal sanctions, relations between laws 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 governmental and regulatory agencies.

462 Population (3) Demographic factors and social structure: trends in fertility, mortality, population growth, migration, distribution, and composition; population policy.

464 Urban Ecology (3) Relation of humans to their urban environment: conservation and use of appropiate technology. (Same as Urban Studies 464.)

471 Sociolinguistics (3) (Same as English 471 and Linguistics 471.)

480 Diffusion of Agricultural Technology (3) (Same as Rural Sociology 480.)

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

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

504 Sociological Foundations of Political Economy (3) Survey of contemporary sociological theories of political economy, sources of political and economic power and conflict.


507 Foundations of Social Psychology (3) Current and classical theoretical perspectives in social psychology.

510 Teaching Sociology (3) Art and craft of teaching sociology from curricular considerations through teaching techniques. May be repeated. Maximum 6 hrs.

512 Sociological Theory II (3) Distinct schools of sociological theory and contributions of their principal exponents. Prereq: 521 or consent of instructor.

529 Supplementary Readings in Sociological Theory (3) Individual guidance. Preparation for comprehensive examination. Prereq: Consent of instructor. S/NC only.

533 Survey Design and Analysis (3) Systematic exploration of survey problems through student participation in design and analysis of survey. Prereq: 531 or consent of instructor. (Same as Child and Family Studies 533.)

536 Field Research (3) Research experience in selected field sites using techniques of interviewing, participant observation, and other methods of field research. Prereq: 531 or consent of instructor.

539 Supplementary Readings in Methodology (3) Individual guidance. Preparation for comprehensive examination. Prereq: Consent of department. S/NC only.

622 Sociological Theory (3) Distinct schools of sociological theory and contributions of their principal exponents. Prereq: 521 or consent of instructor.

629 Social Psychology (3) Systematic exploration of survey problems through student participation in design and analysis of survey. Prereq: 531 or consent of instructor. (Same as Child and Family Studies 533.)

636 Field Research (3) Research experience in selected field sites using techniques of interviewing, participant observation, and other methods of field research. Prereq: 531 or consent of instructor.

643 Class Analysis (3) Critical analysis of theories and research on class structure and conflict.

644 Political Sociology (3) Critical examination of theories of political and social processes.

645 Advanced Studies in Political Economy (3) Topical seminar. Prereq: 504 or consent of instructor. May be repeated. Maximum 6 hrs.

649 Supplementary Readings (3) Prereq: Consent of department. May be repeated. Maximum 6 hrs. S/NC only.

653 Sociology of Law (3) Intensive examination of selected topics in sociology of law. 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 cores and regional environment 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. E

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) Topical interest or student-initiated courses that will not be regularly offered. Prereq: Consent of department. May be repeated. Maximum 6 hrs.


699 Spanish

See Modern Foreign Languages and Literatures

Special Programs

(College of Arts and Sciences)

GRADUATE COURSES

510 Humanities Perspectives in the Arts and Sciences (2) Seminar on nature of inquiry in humanities. Emphasis on nature and formal features of human experience and its interpretation through study of formal texts and critical figures.

520 Natural Science Perspectives in the Arts and Sciences (2) Seminar on nature of inquiry in physical and biological sciences. Drawing on history of science, critical figures in shaping of scientific thought, and methodology for observation and experimentation in natural sciences.

530 Social Science Perspectives in the Arts and Sciences (2) Seminar on nature of inquiry in social sciences. Emphasis on methodology for observation and research in study of human beings, their social environments and their behavior.

Speech Communication

(College of Communications)

John Haas, Head

Professors:
Julian, Faye D. (Liaison), Ph.D. Tennessee
Lester, Loryne W., Ed.D. Tennessee
Yeomans, G. Allan (Emeritus), Ph.D. Louisiana State

Associate Professors:
Ambrester, M. L., Ph.D. Ohio
Buckley, J. E., Ph.D. Northwestern
Cook, N. C., M.A. Alabama
Glenn, Robert W., Ph.D. Northwestern
Haas, John W., Ph.D. Kentucky

Assistant Professors:
Ambler, R. S., Ph.D. Ohio State
The Sport and Physical Activity unit participates in graduate programs leading to degrees, majors, and concentrations in:

**Human Performance and Sport Studies**

**Sport management**

See Education under Fields of Instruction for full description of all degree requirements. Elective courses are offered in dance. These courses are appropriate for students interested in management of dance studios, teaching dance, or dance performances.

The purpose of the unit is twofold: 1) to provide the opportunity for students to attain knowledge and to develop the essential skills to be successful sport managers, and 2) to coordinate and provide instruction in many physical activities designed to improve physical fitness and encourage future participation in lifetime sports.

**ADMISSION REQUIREMENTS**

Applicants are required to complete the unit application which will be sent to all persons upon their initial inquiry about the program. Preference will be given to students with an overall GPA of 3.0 or higher. Students with a GPA between 2.7 and 2.99 are encouraged to submit GRE scores. Preference will be given to students with an overall undergraduate GPA of 3.0 or higher. Students with an overall GPA below 3.0 are considered on a case-by-case basis. Students with a GPA between 2.7 and 2.99 are encouraged to submit GRE scores. Preference will be given to students with an overall undergraduate GPA of 3.0 or higher. Students with an overall GPA below 3.0 are considered on a case-by-case basis.

**GRADUATE ASSISTANTSHIPS**

A limited number of graduate assistantships are available for qualified women and men who are graduates of accredited colleges or universities. These assistantships are open to students in the master's program. Students interested in these opportunities should file their application before January 15. Letters should be addressed to Coordinator, Graduate Assistantship Program, Sport and Physical Activity unit, The University of Tennessee, Knoxville, TN 37996-2700.

**Sport Management**

**GRADUATE COURSES**

**415 Development and Maintenance of Leisure, Sport, Tourism Services (3)** (Same as Recreation and Tourism Management 415)

**440 Sport Marketing (3)** Application of fundamental marketing concepts to sport industry. Marketing research, promotions, fund-raising, advertising, and assessment of marketing programs specific to sport. Historical development of sport marketing. Prereq: Marketing or consent of instructor.

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

**501 Special Project (3)** Culminating experience for non-thesis major. Research study suitable for publication, or practicum requiring special written work. Prereq: 532.

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

**503 Problems in Lieu of Thesis (2-3)** May be repeated. Maximum 9 hrs. S/NC only. E

**511 Administration/Supervision in Sport (3)** Development of knowledge and analytic skills desirable for management/administrators in sport business/organization: organizational, administrative, and supervisory strategies related to sport in profit and non-profit settings. F.Sp

**512 Application of Legal Concepts to Sport Settings (3)** Application of contract law, breach of contract, and monetary damages in sport settings; risk assessment and development of effective risk management strategies; development of contracts in sport; and analyses of cases involving discrimination based on gender, race, and age as well as protection of rights at amateur and professional levels of sport. Sp

**532 Research Techniques in Sport (3)** Evaluate, compare, and contrast research techniques in sport with consideration for and experiences in appropriate review, design, analysis procedures, and proposal development. F.Sp

**533 Ethics in Sport Administration (3)** Development of analytical skills and knowledge desirable of middle and upper level managers in sport business/organization. Social issues and ethics in sport administration. Sp

**544 Theories of Leadership and Leader Behavior in Sport (3)** Integration of various theoretical approaches to leadership styles in sport administration within cultural contexts, research, and field experiences. Sp

**553 Case Studies in Sport Administration (3)** Current issues and problems in sport administration at all levels of amateur and professional sport. May be repeated under different topic. Maximum 9 hrs.

**554 Readings in Sport Administration (3)** Survey of pertinent literature in refereed and applied journals and texts. Su

**555 Assessment of Sport Programming Needs (3)** Development and assessment of approaches and/or instruction for purposes of evaluation, research, feasibility studies, and needs assessment in sport administration/management: qualitative and quantitative techniques. Prereq: 532. Sp

**570 Event Management (1-3)** Review of current research related to theory and practice in event management and involvement in management capacity with one or more special events. Su

**575 Seminar in Sport Management (1)** Selected topics in sport management. May be repeated with consent of instructor. Maximum 6 hrs. S/NC only.

**580 Special Topics (1-3)** Advanced study in selected disciplinary or professional areas of physical education and/or sport. May be repeated. Sp

**590 Practicum (1-3)** Internship in areas of major interest. May be repeated. S/NC only.

**593 Independent Study (1-15)** May be repeated. S/NC only.

**595 Internship (3)** Full-time application of previous theoretical and applied knowledge and skills in appropriate sport setting. S/NC only. E

**Dance**

**GRADUATE COURSES**

**415 Teaching Creative Dance for Children (2)** Theory, methods, materials and practical experience in presentation and integration of creative dance in grades K-6. Mini-teaching experience.

**480 Dance Through the 19th Century (3)** Danse of various societies and culture from pre-history through 19th century.

**490 Dance in the 20th Century (3)** History and philosophy of dance.

**495 Dance Pedagogy (3)** Principles and methods of teaching dance with practical application in mini-teaching experience. Prereq: Upperclass or graduate standing and consent of instructor.
Statistics

(College of Business Administration and Intercollegiate Program)

MAJORS

Statistics.................................................. M.S.
Business Administration................................ MBA, Ph.D.

Professors:
Bozdogan, Hamparsum, Ph.D. Illinois
Guess, Frank M., Ph.D. Florida State
McLean, Robert A. (Emeritus), Ph.D. Purdue
Mee, Robert W. Ph.D. Iowa State
Parr, William C. Ph.D. Southern Methodist
Philip, John W. Ph.D. VPI
Sanders, Richard D. (Emeritus), Ph.D. Texas
Sylwester, David L. Ph.D. Stanford
Thigpen, Charles C. (Emeritus), Ph.D. VPI

Associate Professors:
Leitnaker, Mary G., Ph.D. Kentucky
Leon, Ramon V., Ph.D. Florida State
Walker, Esteban, Ph.D. VPI
Younger, M. S. (Liaison), Ph.D. VPI

Additional Intercollegiate Program Faculty:
Aikens, Charles, Engineering; Bunting, Dawey, Arts and Sciences; Chatterjee, Arun, Engineering; Dessart, Don, Education; Dyer, Carl, Human Ecology; Fitzpatrick, Een, Arts and Sciences; Fribourg, Henry, Agricultural Sciences and Natural Resources; Cant, Michael, Arts and Sciences; Gillson, Charles, Social Work; Gross, Louis, Arts and Sciences; Huck, Schuyler, Education; James, Lawrence, Business Administration; Ladd, R. T., Business Administration; Lounsbery, John, Arts and Sciences; Lyons, William, Arts and Sciences; McLemore, Dan, Agricultural Sciences and Natural Resources; Miller, Mark, Communications; Omne, John, Social Work; Ploch, Donald, Arts and Sciences; Raja, Baliram, Arts and Sciences; Richardson, Jr., Lillard, Arts and Sciences; Resnajk, Jan, Arts and Sciences; Samejima, Fumiko, Arts and Sciences; Saxton, Arnold, Agricultural Sciences and Natural Resources; Singletary, Michael, Communications; Smith, Julius, Arts and Sciences; Wagner, Carl, Arts and Sciences;

THE MASTER’S PROGRAM

The M.S. program in Statistics provides students with the foundations in theory and practice required for careers in applied statistics. In addition to the education traditionally offered in such a program, the department offers a concentration in industrial statistics, which provides unique opportunities for experiences in practical applications of statistics. Through involvement in The University of Tennessee Institute for Productivity Through Quality and related programs, department faculty participate in a variety of consulting and research projects in industry. Students may supplement their classroom study with an industrial internship and participation in research projects dealing with industrial problems. Department faculty also collaborate with researchers from many academic disciplines and hold joint appointments with the College of Agriculture, the Computing Center and the Medical Center. Statistics graduates may obtain consulting experience by working with faculty involved in these consulting activities. All students are encouraged to participate in supervised internship or consulting activities as part of their graduate program.

Individuals with undergraduate or graduate degrees in other disciplines are encouraged to enter the program. The candidate’s mathematics background should include differential and integral calculus of several variables. Individuals with limited mathematics background should seek departmental guidance regarding specific ways in which they may prepare themselves for the program by taking coursework as non-degree students. Requests for application forms and further information may be sent to the Director of Graduate Studies, Department of Statistics, Stokley Management Center, University of Tennessee, Knoxville, TN 37996-0532 or ewalker@utk.edu or http://www.pemba.utk.edu/igsp.

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 basic statistics. Applicants whose native language is other than English must submit results of the Test of English as a Foreign Language (TOEFL).

Curriculum

A minimum of 33 credit hours must be completed for the master’s degree. Required of all students are 6 hours in statistical methods, 6 hours in statistical theory and 1 hour in statistical computing. Students must complete a minimum of 21 hours in approved statistics courses, exclusive of consulting, internship, independent study, or thesis.

Thesis or Independent Study

The thesis option for the master’s degree requires the student to complete 6 hours for the thesis. Alternatively, the non-thesis option requires a minimum of 3 hours for an independent study project.

Comprehensive Examination

Students must pass a two-hour written comprehensive examination covering 1) theory and 2) methods. Upon failing either part of the examination, the student may retake it. The result of the second examination is final. For students writing a thesis, this examination must be passed before the thesis is defended.

INTERCOLLEGIATE GRADUATE STATISTICS PROGRAM

The Intercollegiate Graduate Statistics Program (IGSP) is a formal University of Tennessee academic program established to enable students to earn either a minor or an M.S. in Statistics simultaneously with a master’s or doctoral degree in another department. Approved coursework taken to meet degree requirements in the student’s home department may also be credited toward the M.S. in Statistics. Similarly, approved coursework in statistics taken to meet the requirements for a master’s or doctoral degree in another department may also count toward the minor in Statistics. The program is open to graduate students in all departments which have an approved minor and which M.S. joint major curriculum offered through the program. The program is administered by an Executive Committee, consisting of college representatives from all colleges with approved programs, with advisory input from the program faculty.

Degree Program

<table>
<thead>
<tr>
<th>Hours in Approved IGSP Courses</th>
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<tbody>
<tr>
<td>Master’s in home department, minor in Statistics</td>
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<tr>
<td>Master’s in home department, M.S. in Statistics</td>
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<tr>
<td>Doctorate in home department, minor in Statistics</td>
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<tr>
<td>Doctorate in home department, M.S. in Statistics</td>
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</tbody>
</table>

The M.S. in Statistics requires 33 hours.

Course options consist of courses in statistics, offered either by the Department of Statistics or by other departments, which have been reviewed and approved by the IGSP Executive Committee. Students taking an M.S. in Statistics must pass the two-part comprehensive examination covering statistical theory and methods. Students taking a minor in Statistics in conjunction with a doctorate in another field must pass a written comprehensive examination in Statistics, constructed and evaluated by the student’s Examination Committee. No formal comprehensive examination is required of students earning a Statistics minor along with a master’s in another field beyond questions which the home department wishes to include as part of the comprehensive examination for the master’s degree.

General Admissions and Degree Requirements

1. The student’s home department must have approved a program of courses with the Executive Committee. That program will specify the sequences of statistics courses, chosen from the IGSP approved list, that are considered appropriate by the home department. Students who wish to participate in this program should contact their college representative or the Chair of IGSP in the Department of Statistics.

2. The student’s graduate committee must include a faculty member of the Department of Statistics at the rank of Assistant Professor or above.

3. The student’s Admission to Candidacy form must contain all courses required for the chosen degree program set off in a group and labeled “Statistics Courses Required for the Minor or M.S. in Statistics.” Should the student not decide to apply for admission to the program until after completion of some of the courses, the student’s major professor should file a program change with the cooperating departments and assist the student in obtaining a Department of Statistics faculty member to serve on the student’s graduate committee.

Successful completion of the Statistics M.S. or minor is recognized by appropriate documentation on the student’s transcript.
BUSINESS ADMINISTRATION CONCENTRATION

For complete listing of MBA program requirements, see Business Administration.

MBA Concentration: Statistics.

Minimum course requirements are 571, 566, 572 with prerequisite or corequisite of 561.

Ph.D. Concentration: Statistics

This degree provides students with a broad knowledge of the field of statistics, the ability to apply statistics in practical situations to problems of business and industry and the ability to develop new statistical methods; all of which takes place while students are exposed to coursework in the basic functional areas of business.

Minimum course requirements are: 673, 666, 691, and 592.

ACADEMIC STANDARDS

A graduate student in the College of Business Administration whose grade-point average falls below 3.0 will be placed on probation. If the student's cumulative grade-point average is 2.5 or less at the end of the probationary period, the student will be dropped from the program unless higher 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


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. E/NP only.


531 Survey of Statistical Methods I (3) Univariate and bivariate data collection and organization; statistical estimation and hypothesis testing; analysis of relationships for categorical and numerical data, including Chi-square tests and simple linear and quadratic regression. Use of computing facilities required. Credit not given for both 531 and 537. Prereq: Mathematics 114 or 116, or 117, or 131.

532 Survey of Statistical Methods II (3) Multiple linear regression, including use of dummy variables; single and multiple factor analysis of variance and covariance;
The Department of Theatre offers the Master of Fine Arts degree with a major in Theatre, concentrations in costume design, international performance studies in acting, international performance studies in directing, lighting design, scene design, and theatre technology. Not all areas of concentration accept applicants every year. Applicants must have completed undergraduate degrees approximately equivalent to those specified for degrees conferred by The University of Tennessee, Knoxville.

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 programs must submit samples of their work. Auditions are required of M.F.A. degree acting 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 in the first year of residence. Three additional hours at the 500 level are required from history, literature, or dramaturgy. Students in the M.F.A. degree program are evaluated annually by juried performance or portfolio submission. Continuation in the program is with the approval of the faculty committee for the M.F.A. degree program. Theatre 598, 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.

### GRADUATE COURSES

#### 401 Principles of Theatrical Design (3)
Fundamental principles of design; visual and structural relationships. Projects assigned to develop understanding and perception.

#### 409 Stage Make-up (3)
Study and problems in make-up design and application: character analysis. Prereq: Introduction to Theatre.

#### 420 Special Studies in Acting (3)
Content varies. Exercises in selected concentrated areas such as styles, techniques, approaches, e.g., Shakespeare, movement, humor. Prereq: Theatre Dance or consent of instructor. May be repeated. Maximum 6 hrs.

#### 423 Period Movement and Dance (2)
Movement styles and dances from Renaissance to 20th century. Prereq: Stage Movement or consent of instructor. May be repeated. Maximum 6 hrs.

#### 424 Theatre Dance II (Advanced) (3)
Advanced dance technique incorporating techniques of musical theatre. Prereq: Theatre Dance or consent of instructor. May be repeated. Maximum 6 hrs.

#### 520-21-22-23-24-25 Master Classes in Acting (6, 6, 6, 6, 6, 6)
Master classes in acting techniques, voice, movement. Theatre MFA students only.

#### 530-31-32-33-34-35 Master Class in Directing (6, 6, 6, 6, 6, 6)
Master classes in directing techniques. Prereq: Admission to MFA program.

### REQUIREMENTS FOR SECOND MASTER'S DEGREE

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

Any such credits applied from a previous graduate program must be consistent with the student's MFA curriculum and must have been earned within the time limit (6 years) established for completion of the MFA degree.

### International Performance Studies in 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.

### International Performance Studies in Directing

Theatre 530-31-32-33-34-35 Master Class are required along with Theatre 401 Principles of Design. Directing candidates are also expected to take art and music survey courses and language courses as advised.

### REQUIREMENTS FOR SECOND MASTER'S DEGREE

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

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### REQUIREMENTS FOR SECOND MASTER'S DEGREE

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

Any such credits applied from a previous graduate program must be consistent with the student's MFA curriculum and must have been earned within the time limit (6 years) established for completion of the MFA degree.
Transportation

See Marketing, Logistics and Transportation

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 course requirements listed below. These may be completed at any accredited college or university, either in high school or college, as long as the courses are 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 66

*May include, for example, courses in English literature, speech, music, art, philosophy, religion, language, history, economics, anthropology, political science, psychology, sociology and geography.

**Exclusive of laboratory.

***It is expected that this requirement will be fulfilled by a course in cellular or molecular biology.

Admission Procedures
Admission of new students is for the fall semester, with first priority given to residents of Tennessee.

The College of Veterinary Medicine utilizes the Veterinary Medical College Application Service (VMCAS) for all applicants. Forms and instructions for making application for admission may be obtained beginning June 1, 1999 from the Office of the Associate Dean, College of Veterinary Medicine, P.O. Box 1071, Knoxville, TN 37901-1071.

Note: The deadline for receipt of the completed application materials by VMCAS is November 1. NON-TENNESSEE APPLICANTS MUST HAVE A MINIMUM CUMULATIVE GRADE-POINT AVERAGE OF 3.2 ON A 4.0 SCALE FOR APPLICATION TO BE CONSIDERED.

Applications are accepted only from U.S. citizens or permanent residents of the U.S.

D.V.M. Curriculum
The curriculum of the College of Veterinary Medicine is a nine-semester, four-year program. Each class begins in August and graduates four years later in May. The first three years generally follow the traditional fall and spring semesters with the summer break following years one and two. The final year of the professional curriculum begins immediately following semester six and is a continuous clinical rotation experience extending over 54 weeks.

Development of a strong basic science foundation is emphasized in the first year. Courses consist mostly of preclinical subjects of anatomy (gross and microscopic), physiology, immunology, bacteriology, virology and parasitology. Also included in the first year are clinical subjects of physical diagnosis and epidemiology. Considerable integration of subject matter is incorporated during this year.

The second and third years include the study of diseases, their causes, diagnosis, treatment and prevention, and courses are team-taught on an organ system basis.

The final year (three semesters) is devoted to intensive education in solving animal disease problems involving extensive clinical experience in the Veterinary Teaching Hospital. Each student will participate exclusively in clinical rotations in the Veterinary Teaching Hospital and in required externships (preferably off-campus).

Innovative features of this curriculum include: eight weeks of student centered, small group, applied learning exercises in seminars one through six; three weeks of dedicated clinical experiences in the Veterinary Teaching Hospital in semesters three through five; and elective course opportunities in semesters four, five and six which allow students to focus on individual educational/career goals.

Students enrolled in the D.V.M. program are required to complete at least 14 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 163 semester credits.

THE GRADUATE PROGRAM
The College also administers a graduate program involving all departments which leads to the Master of Science and the Doctor of Philosophy degrees. Because of the interdisciplinary departmental administration of the College of Veterinary Medicine, the faculty have opportunities in the graduate programs of other instructional units, including Animal Science (nutrition, physiology, genetics and animal management), Microbiology (bacteriology, virology and immunology), Ecology and Evolutionary Biology (environmental toxicology), Public Health, and Comparative and Experimental Medicine. (Refer to other sections of this catalog for a full description of these programs.) The majority of the graduate students and graduate faculty of the College of Veterinary Medicine are involved in the Comparative and Experimental Medicine program. This program provides a wide spectrum of interdisciplinary training that prepares graduates for teaching and/or research careers in the health sciences.

PROFESSIONAL COURSES

881-02-03 Application Based Learning Exercise (ABLE) I, II, III (2,2.1) Small group, student-centered learning sessions with faculty facilitator for self discovery of new information. Week-long sessions based on specific clinical case or problem, and integration of basic science and clinical material.

884-05-06 Application Based Learning Exercise (ABLE) and Clinical Exposure I, II, III (2.2,2) Week-long small group, student-centered learning sessions with faculty facilitator for self discovery of new information; based on specific clinical case or problem; integration of basic science and clinical material. Week-long clinical experience through participation in specific clinical rotations in Veterinary Teaching Hospital.

811 Infection and Immunity II-Bacteriology and Mycology (3) Fundamental aspects of microbiology and cell biology relative to pathogenic bacterial and fungal diseases of animals; antimicrobial actions and mechanisms of bacterial resistance. General approaches to diagnosis, treatment and prevention.
FACILITIES FOR RESEARCH AND SERVICE
Facilities for Research and Service

Bureau of Educational Research and Service
(College of Education)

Carol E. Kasworm, Director

Housed in the Associate Dean's Office for Research and Technology, the Bureau is responsible for the coordination of research activities and for the development of college research and service activities based in external funding. In addition, it may be called upon to provide brokering services to connect faculty expertise with needs for consultant services, technical assistance, and possible professional development activities. The Bureau directly coordinates select development of research proposals, as well as college grant and contract review, administration, and fiscal processes. The Bureau also provides the administrative home for the interdisciplinary Center for Literacy Studies, the Appalachian Rural Systemic Initiative Resource Collaborative, and the High School Equivalency Program (Migrant Education).

Center for Business and Economic Research
(College of Business Administration)

William Fox, Director

In its economic research endeavors, CBERToday has the same basic mission determined at its inception 60 years ago at the request of the Tennessee Legislature—to produce and disseminate new information in the field of economic research and in the specific areas of regional economic development and fiscal policy. The mission has also expanded to include influencing decision quality in the public and private sectors and integrating departmental research through cooperative ventures in the international arena. In addition to the annual Economic Report to the Governor, the Tennessee Statistical Abstract, the Center publishes research on a wide range of socioeconomic and policy issues, including taxes, banking, telecommunications, environmental concerns, and employment prospects.

While its core mission remains little changed, the scope of the CBERT unit has expanded from a largely individualistic fiscal assistance program to a regional economic research, policy analysis, and communications technology arm of the College of Business Administration, with a staff of three senior research faculty and a support staff in areas of research, information technology and information dissemination, located at 100 Glocker.

Center for Information Studies
(School of Information Sciences)

The Center for Information Studies (CIS) was established in June 1989 to be a focal point for research related to information systems and services. The Center, located at 304 Temple Court, has performed research for the federal government, state and local governments, and business and industry. Projects have ranged from strategic planning efforts to information system and service evaluations, to modeling of scientific and technical communication. Staff of the Center have been actively involved in proposal development and project performance with faculty and staff in other centers and departments at the University.

Areas of interest to the Center include information systems design, information organization and retrieval in very large databases, directories and locator tools in a networked environment, design of regional library and information system networks, new technology applications, information system support for educational reform, modeling of information processes, development of measures and methods for evaluating information system performance and effectiveness.

Center for Literacy Studies
(College of Education)

The Center for Literacy Studies was founded in 1988. The Center's purpose is to bridge theory and practice in the field of adult learning and literacy. To achieve its purpose, the Center collaborates with practitioners, policy makers, and other research organizations on projects that address five common themes: 1) building the capacity for literacy delivery systems that can meet the needs of a changing society; 2) forming partnerships with practitioners who are working to make changes in their practice of adult education; 3) developing innovative approaches to adult learning and literacy; 4) developing innovative technology applications for the field; and 5) disseminating results to the field.

Center for Physical Activity and Health
(College of Education)

The mission of the Center for Physical Activity and Health is to integrate scientific research, education, and practical applications of exercise and health science in a manner that enhances health, fitness, performance, and quality of life. The Center is a service oriented organization designed to educate the UTK and Knoxville communities about the benefits of regular physical activity as well as warn about the serious potential health outcomes of leading a sedentary existence.

The Center focuses its efforts in four main areas: training future leaders in exercise promotion, providing exercise opportunities for members of the UTK community, promoting exercise within the UTK and Knoxville communities, and providing exercise testing and assessment.

For additional information about services, contact Dr. Dixie L. Thompson at (423) 974-1271 or via e-mail at dixielee@utk.edu.
Center of Excellence for Materials Processing

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

The Center is located in 100 Estabrook Hall, 974-0616.

Centers and Chairs of Excellence

The Centers of Excellence grew out of Tennessee's Better Schools Program, an initiative to upgrade state-aided education at all levels. State officials and legislators wanted to give a few outstanding academic programs in state-aided universities a special push toward prominence, well beyond regular annual increases for all programs.

In 1984, the General Assembly appropriated $10 million for the first Centers of Excellence throughout the state. The public colleges and universities submitted their proposals for Centers of Excellence to the Tennessee Higher Education Commission, which made the final determinations. Now four of the University's ten Centers of Excellence are sponsored by UT Knoxville or located in Knoxville.

Concurrently, the University has received state funding, which it must match dollar for dollar, for Chairs of Excellence. These Chairs are $1 million endowed professorships, in areas of significance to the University and to the state. The Centers and Chairs of Excellence add a dimension to the University of Tennessee that is not easily equaled by other institutions. UT's reputation as the premier university in the state and as a regional and national leader in research, and public service is enhanced as a result of the infusion of these special funds.

For information concerning the individual Centers of Excellence, contact:

Center of Excellence for Livestock Diseases and Human Health
Dr. G. M. H. Shires, Director
College of Veterinary Medicine
UT Knoxville
109 Morgan Hall
Knoxville, TN 37996
(423) 974-7262

Center of Excellence for Materials Processing
Dr. Carl McHargue, Director
UT Knoxville
100 Estabrook
Knoxville, TN 37996-2351
(423) 974-7680

The Science Alliance
Dr. Thomas A. Callcott, Director
UT Knoxville
101 South College
Knoxville, TN 37996
(423) 974-6765

Waste Management Research and Education Institute
Dr. Gary Sayler, Director
676 Dabney Buehler
Knoxville, TN 37996-0845
(423) 974-5085

Child Development Laboratories
(College of Human Ecology)
Anne Miller Stott, Staff Director

The Child Development Laboratories, operated by the Child and Family Studies department within the College of Human Ecology since 1953, are 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-telemetry laboratory that features unique videocassette 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, emergent literacy, children's political socialization, mainstreaming, and peer interactions) involves students and faculty in the college and many departments on campus. Graduate Assistants in the Laboratories participate in teaching, assessment, administrative, supervisory and research activities while working with children and families under the guidance of faculty and staff. The Child Development Laboratories are accredited by the National Association for the Education of Young Children.

For more information, check Web site at http://web.utk.edu/~utcdl/.

Communications Research Center
(College of Communications)

The Communications Research Center, 426 Communications Bldg., is an adjunct to the communications graduate program. Objectives of the Center are: (1) to conduct original research in mass and public communication; (2) to disseminate research-generated information; and (3) to provide research services to faculty and students, professional communicators, and others interested in improving the quality of human communications.

Division of Information Infrastructure

The UTK Division of Information Infrastructure (DII) provides computing and telecommunications resources and services for students, faculty and staff on the Knoxville campus. DII consists of three operating units: Innovative Technologies, Computing and Academic Services, and Telecommunications and Network Services. Information about DII is available on the web site http://www.utk.edu/computing.

INNOVATIVE TECHNOLOGIES COLLABORATIVE (ITC)
Susan Metros, Director

The Innovative Technologies Collaborative (ITC) enriches the educational experience of UTK students by supporting the academic community in advancing learning through the use of instructional technologies. The ITC's services and resources are available to all UTK faculty, academic teaching staff, and graduate teaching assistants and associates. The ITC staff is available to consult with instructors on everything from developing technology-driven course components to...
offering fully online curricula. At the heart of the ITC is a team of highly skilled professionals. The group has expertise in instructional, multimedia, graphical interface, and Web design. They also work on projects in technology assessment and integration, computer programming, and information science.

Each semester, the ITC offers a comprehensive selection of courses and workshops (itc.utk.edu/itc/courses) to all members of the UTK academic community. In addition to the hands-on approach used during instruction, online components are available for reference and practice.

In response to current trends in higher education to move instructional materials and courses onto the World Wide Web, the ITC selected Blackboard's CourseInfo as the campus course management system. CourseInfo allows instructional staff to create, edit, and add course materials, organize content flow, communicate with students, manage grades and student materials, and facilitate the course either wholly online or in conjunction with a face-to-face component. This service not only makes publishing class materials on the Web easier, it is free and hosted by the ITC on a restricted server, protecting intellectual property and student privacy. The ITC maintains the Online@UTK Web site (online.utk.edu) with links to UTK courses with a Web presence and courses powered by CourseInfo and the Get Online@UTK Web site (itc.utk.edu/getonline) for access to training and support for the CourseInfo initiative.

The ITC maintains a variety of hardware and software resources for instructional use (itc.utk.edu/itc/resources). The ITC Development Lab is a multi-platform computer laboratory equipped with updated peripherals, software, and resources for designing, developing, authoring, producing, and evaluating online courseware and multimedia prototypes. Faculty may reserve a station and work independently, or consult with one of the ITC staff. In addition to the lab, the ITC maintains a small inventory of equipment that faculty may checkout for instructional use.

The ITC works with Academic Affairs to prioritize needs and standardize and implement technology-enhanced upgrades and renovations for classrooms and labs. This initiative includes oversight for the electronic delivery of instruction and the establishment of policies for the use, support, and maintenance of these facilities. Smart classroom information, equipment use, and training classes are available upon request (itc.utk.edu/itc/smtclas/home.html).

The ITC also maintains the “UTK Homepage” (www.utk.edu) as the Internet portal to The University of Tennessee, Knoxville. This site is an educational and information resource for current and prospective students, alumni, faculty, staff, and the general public. The site averages more than four million hits a month.

COMPUTING AND ACADEMIC SERVICES

Dewitt Latimer, Director

Computing and Academic Services (CAS) provides computing facilities, services, and support for the university’s teaching, research, public service, and administrative activities. Information and assistance in accessing all services may be obtained by calling the Help Desk at 974-9900, or visiting the Acoona Court Service Center, Room 104. Both facilities are open weekdays from 9 a.m. to 4 p.m. The CAS web site at http://www.cas.utk.edu can also provide up-to-date information and documentation.

Individual UNIX and Lotus Notes computer accounts are provided for all UT Knoxville students, faculty and staff for the duration of their affiliation with UTK at no charge to the individual. Either (or both) of these accounts may be utilized for e-mail, course work, research, and personal Web pages. Go to the main CAS web page for more information and to obtain these accounts on-line.

To provide access to computing facilities around campus, CAS maintains six staffed computing labs, 15 unstaffed labs, and supports computing installations in all residence halls. The computing labs are equipped with more than 300 personal computers and 8 workstations including current models of Apple, IBM, Sun, Dell, and Gateway machines. In addition, there are laser printers, scanners and zip drives available. A variety of industry standard software applications are available for use on the machines in the computing laboratories.

Training and documentation are also available through CAS. “The Life Preserver,” an introduction to computing and networking at UTK, is both a manual and a course for the new user to a basic level of expertise. In addition to orientation training, CAS provides classes using Microsoft Office products, basic Web page development, and Internet use. Over 300 self-paced computer-based training (CBT) courses on computing and network topics are also available. Some of the CBT course topics include Microsoft World, Excel, Access, PowerPoint, Lotus Notes, Novell, UNIX, Win95, Win98, Internet, HTML, and Java.

Statistical and mathematical consulting is available to help students, faculty and staff enhance the quality of their instruction and research by effectively applying statistical methodology. Information about the Statistical and Computational Consulting Center (SCCC) is available at either the Web site at http://www.cas.utk.edu/sccc or by calling the Help Desk at 974-9900.

CAS operates the core mainframe and large-scale servers that manage a variety of functions including mail, file, print, and user logins. Equipment includes multiple systems from Sun, SGI, and IBM systems. Software available on the central servers includes commonly used compilers and interpreters, and a large number of programs for statistical, mathematical, engineering, operations research and graphics applications. CAS also coordinates computing resources for research activities on the Knoxville campus. A 34 node (32 thin, 2 high) IBM SP2 parallel architecture machine is available for high performance research computing needs. SCT Banner 2000, the student information system that handles the financial aid, recruiting, registration, and grading aspects of the University, to name a few, is maintained and supported by CAS as well.

IBM, Lotus, Microsoft, SGI, and Sun provide software packages at reduced or no cost to UTK through CAS. Individual copies of Microsoft products, including Win 95/98 and the MS Office Suite, are available to students at a substantially reduced cost. CAS also provides user access to a variety of public domain software for microcomputers and maintains software site licenses for a variety of workstation and microcomputer software.

TELECOMMUNICATIONS AND NETWORK SERVICES

Joe Gipson, Acting Director

Network Services provides network connectivity throughout the UTK campus, data communications between the UT campuses, and connectivity to the Internet. The UTK network consists of approximately 11,000 nodes, and network connectivity is available in all campus residence halls. Network Services also provides dial-up access to the campus network via a 600-modem dial-up pool, which supports ISDN and PSTN dial-up to allow users to connect to the Internet as well as to file servers on campus, and digital connections via ISDN.

Network Services participates in national networking initiatives, including Internet2 (I2), NSF’s very high speed Backbone Network Service (VENS), and the federal Next Generation Internet (NGI) initiative, and maintains a Suns center for Java information and software distribution for networked learning environments. Further information may be obtained from the network services web page at http://www.nets.utk.edu.

Telephone Services operates a Private Branch Exchange, with 15,000 ports, which processes approximately 1.8 million telephone calls per week during each academic year. A copper backbone of approximately 25,000 circuits supports alarm, signaling, voice, and low-speed data services. Local and long-distance telephone service is extended to residents of residence halls and rental properties through The Volunteer Connection. Customer Service Representatives assist customers in systems design, deployment, and use of supported equipment.

Energy, Environment, and Resources Center

(Office of Vice Chancellor for Research)

Jack N. Barkenbus, Executive Director

The Energy, Environment, and Resources Center, 600 Henley Street, Suite 311, was created in 1973 to encourage interdisciplinary research directed at solutions to problems related to energy and the environment. The Center involves faculty and students in research and public service projects, manages research and development projects that involve several disciplines, and assists government and industry in specific problems related to energy, environmental, resource, and technology policy issues. The Center has a close working relationship with the Joint Institute for Energy and Environment, and Oak Ridge organizations. Sponsorship includes federal and state agencies, industry, and foundations. Current research includes solid and hazardous waste management, information...
attention to investigations of concern to the agriculture of Tennessee.

The objectives of the Tennessee Agricultural Experiment Station are the creation and utilization of new knowledge through research. Fundamental research is directed toward: (a) understanding the basic science of the processes of plant and animal production through conversion into usable products and services; (b) understanding the resource and market forces which affect the production, transfer, processing, and utilization of agricultural commodities and the resulting impact on the economic well-being of the agricultural sector, rural areas, and the State of Tennessee; (c) understanding the interaction of agricultural production and land uses on natural resources and the environment as they relate to long-term productivity and affect the quality of rural life; (d) understanding the impact of food and fiber resources and the chemicals used in their production on people's well-being and the quality of life. Applied research utilizes these understandings to formulate effective 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
Billy G. Hicks, Dean
Pat Sober, 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 the college.

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

Professors:
Bayne, Pauline S., M.S.L.S. ...... North Carolina
Felder-Hoehne, Felicia H., M.S.L.S. ...... Atlanta
Kaufman, Paula T., M.B.A., M.S. ...... Columbia
Joyd, James B., Ph.D. ...... Mississippi
Phillips, Linda J., M.L.S. ...... Rutgers
Rader, Joe C., M.S.L.S. ...... Tennessee

Associate Professors:
Baker, Gayle D., M.S., M.L.S. ...... Alabama
Bridges, Anne E., M.A., M.S.L.S. ...... Rhode Island
Britten, William A., M.S.L.S. ...... Clarion
Clement, Russell T., M.A., M.L.S. ...... Brigham Young
Crowther, Karen T., M.A., M.L.S. ...... Emory
Dixon, Lars, M.S.L.S. ...... Tennessee
Garrett, Marie A., M.A., M.S.L.S. ...... Vanderbilt
Harris, Stephen M., M.A., M.L.S. ...... Arizona
Keally, Jillian M., M.S.L.S. ...... Tennessee
Kim, Sook Hyun, M.L.S. ...... Indiana
Leech, Sandra S., M.A., M.L.S. ...... Emory
Mack, Thura, M.S.L.S. ...... Tennessee
Miller, Tamara J., M.S.L.S. ...... Kentucky
Minton, James O., M.S., M.S.L.S. ...... Tennessee
Mitchell, Aubrey H., M.S.L.S. ...... Tennessee
Prescod, Janet, M.S.L.S. ...... Western Michigan
Row, Jane S., M.S.L.S. ...... Tennessee
Sammataro, Linda, M.L.S. ...... Southern Connecticut State
Smith, Rita H., M.S.L.S. ...... Illinois
Thompson-Wise, Deborah A., M.M., M.L.S. ...... South Carolina
Wallace, Alan, M.Ln. ...... Washington
Wise, Norman K., M.B.A., M.S.L.S. ...... Tennessee

Assistant Professors:
Atkins, David P., M.A.L.I.S. ...... Wisconsin
Berry, Teresa, M.S.L.S. ...... Tennessee
Ellis, Kathryn D., M.S.L.S. ...... North Carolina
Johnson, Kay G., M.L.S. ...... Pittsburgh
Ratledge, David, M.S.L.S. ...... Tennessee

Institute of Agriculture
Jack H. Britt, Vice President

The Institute of Agriculture traces its history to 1869 when the University was designated as Tennessee's Federal Land-Grant Institution. Under terms of the Federal Land-Grant Act, the University was enabled to offer instruction in agriculture and 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

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
Robertson, Michelle, M.S.L.S. .... North Carolina
Robertson, Nathan, M.S.L.S. ..... North Carolina
Shrode, Flora G., M.L.I.S. .............. Texas
Thomas, Deborah L., M.B.A.
M.S. ............... George Peabody
Thomas, Steve, M.S.L.S. ............ Tennessee
Viera, Ana M., M.L.I.S. ............... Florida
Williams, Sara, M.A., M.S.L.S. ....... Tennessee

The University of Tennessee, Knoxville Libraries' own approximately 2 million volumes and subscribe to more than 11,000 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 (John C. Hodges Library), four branches on the Knoxville campus (Agriculture-Veterinary Medicine Library, Map Library, Music Library, and University Archives & Special Collections), and the Social Work Library in Nashville.

Research assistance is available at the reference desk in each library. Free self-searching of selected databases is also available in the reference area and remotely, through the World Wide Web.

Users can search the catalog of holdings at any library branch or via the UT Libraries' Web site at www.lib.utk.edu. Materials that are not available in the UT Libraries can be requested through Interlibrary Services.

The services and facilities of the University Libraries are accessible to persons with disabilities. Adaptive equipment such as a Kurzweil Personal Reader and TDD are available at the Hodges Library.

The John C. Hodges Main Library (1015 Volunteer Blvd.) is a 350,000 square-foot facility housing collections in all subject areas. The Hodges Library has over 300 graduate student carrels, 200 faculty studies, and comfortable study space for more than 2,000 people.

The Agriculture-Veterinary Medicine Library (Room A-113, Veterinary Teaching Hospital) has a strong collection in agriculture; veterinary, comparative and human medicine; and related biological sciences. Most of the publications of the U.S. Department of Agriculture and the State Agricultural Experiment Stations and Extension Services are collected.

The Map Library (Room 15, basement of the Hoskins Library, Cumberland Ave. & 15th St.) maintains and develops a collection of sheet maps, atlases, journals, and books related to cartography. Materials in print, film, and digital formats are acquired from commercial sources as well as the Government Depository program.

The Music Library (301 Music Bldg.) has a comprehensive collection of music and music literature, including books, scores, audio and video recordings, current periodicals, and microfilm. All materials in the Library of Congress "M" classification are located here.

Special Collections (2nd floor, west wing, of the Hodges Library) maintains a collection of primary source materials and costly modern library materials. The University Archives contains official records of the University; items published officially and unofficially; and other materials that document University of Tennessee life. Materials from Archives and Special Collections are pagined for library users from closed stacks for use in the Reading Room.

The Social Work Library (1720 West End Ave., Nashville) serves College of Social Work students in field practice and 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 UT system.

*Data excludes Law Library faculty and statistics.

Maintenance and Reliability Center

(Engineering of College)

The Maintenance and Reliability Center (MRC), located in 103 Estabrook Hall, was created in 1996 to provide an international center for research, development and application of advanced maintenance and reliability engineering. MRC's primary goal is to provide productivity improvements to industry by advances in fault prevention technology. Associated with this effort is the establishment of maintenance and reliability engineering as an interdisciplinary activity with application across a broad spectrum of industrial activities. In addition, MRC stresses the development of management techniques that will provide decision makers with the means to assess the availability, costs and benefits of failure prevention techniques.

MRC is an association consisting of industrial members and the University of Tennessee College of Engineering. Interested and qualified students may affiliate as interns with the MRC program while pursuing a degree in an engineering department. A certification in maintenance and reliability engineering can be obtained along the regular degree.

The maintenance engineering courses are available as electives for these students. Research opportunities and graduate assistantships are also available for qualified students.

Center sponsored research projects are focused on life prediction technology, information processing technology, sensors, measurement systems and automation; and maintenance design engineering. Other research focus areas will be developed as the needs of industrial members are identified and matched with areas of university expertise.

Management Development Center

(Engineering of College)

John E. Riblett, Director

The College of Business Administration's executive/management education efforts are facilitated through the Management Development Center, 708 Stokely Management Center.

The mission of the Center is to promote the learning and dissemination of an integrated framework of managerial excellence. The Center defines excellence from the lens of competitive world standards of quality, efficiency, and service to the recognized concerns of all constituencies (customers, employees, suppliers, owners, students, and society in general). This mission includes the acceptance of responsibility for (1) developing close strategic partnerships with a selected set of companies to better facilitate learning and development of the knowledge which is truly externally valued, and (2) acting as a facilitator in driving this knowledge into the credit curriculum of the College.

The Center prides itself on the development of long-term relationships with organizations that provide a living laboratory to test and validate the new knowledge of the Center that is disseminated in a variety of forms. Executive and Management Education Programs are one form of dissemination. The Center has provided custom and public programs for 80 of the Fortune 500 companies.

The Center emphasizes consistent, high-quality programming, small class sizes, outstanding faculty who bring the added value of experience in the public and private sectors to the classroom, a highly interactive style of instruction, and an applied orientation. The focus is on longer term, more developmentally oriented programs of one to four weeks in length such as the four-week University of Tennessee Executive Program, three-week Practical Strategies for Process Improvement Institute, and one-week Lean Enterprise Systems Design Institute.

Measurement and Control Engineering Center

(Engineering of College)

Arlene Garrison, Director

The Measurement and Control Engineering Center, 102 Estabrook Hall, is sponsored by the College of Engineering, the Oak Ridge National Laboratory, and the National Science Foundation. The Center's program combines education, research, and technology transfer. Graduate assistantships are available for qualified students. The research is funded by major U.S. industrial companies and focuses on theoretical and practical developments in measurement and control, concentrating on areas that will significantly improve the productivity, reliability and safety of industrial systems and processes.

Center-sponsored research is carried out in the fields of process control: signal and image processing, and sensor development. Research in process control concentrates in the areas of process analysis, process modeling, control system design, and real-time expert systems. Fiber optics in systems development is underway for monitoring and control of chemical processes.
The Nutrition Institute is a systemwide, multidisciplinary consortium of faculty who are engaged in clinical and experimental nutrition research, teaching, and service. Its expertise and resources are multifaceted, including tools and techniques used in cell biology, epidemiology, metabolism, and clinical training.

The multidisciplinary nature of nutrition has created a situation where nutrition research and teaching is dispersed among a number of academic units, including the Department of Nutrition in the College of Human Ecology as well as in several departments in the colleges of Agricultural Sciences and Natural Resources, Arts and Sciences, Medicine, and Veterinary Medicine. The Institute provides a communication link among all efforts in nutrition sciences, coordinates collaborative research programs in nutrition, and provides a unified forum for exchange and interactions with the national and international nutrition community.

In addition, by creating formal ties among the units within the University that are involved in undergraduate, graduate, and professional education in nutrition, teaching resources may be pooled to strengthen nutrition-related instruction in these units.

The Institute publishes an on-line magazine Nutrition Uncovered which addresses current issues and controversies in the field. It may be found on the Web at http://nutrinst.he.utk.edu/.

Off-Campus Graduate Centers

KINGSPORT GRADUATE PROGRAM

UT Knoxville offers a Kingsport graduate program in engineering and Human Resource Development at the master’s level.

Students who enroll in these programs must be admitted to The Graduate School of UT Knoxville. Information and application forms may be obtained from the ETSU/UT at Kingsport, 1501 University Boulevard, Kingsport, Tennessee 37660.

OAK RIDGE GRADUATE PROGRAM

UT Knoxville offers graduate programs at Oak Ridge leading to the master’s degree in several engineering and related technical areas. Students can earn a master’s degree in Chemical Engineering, Environmental Engineering (concentrations in mixed waste management, environmental risk assessment), Industrial Engineering (engineering management or traditional industrial engineering concentrations), Nuclear Engineering (radiological engineering concentration), or Safety Education.

Students who enroll in these programs must be admitted to The Graduate School of UT Knoxville. Information and application forms may be obtained from the University Evening School, 451 Communications Bldg., Knoxville, TN 37996-0341, or Website at http://www.acad.utk.edu/evening.

Psychological Clinic

(College of Arts and Sciences)

Leonard Handler, Director

The Psychological Clinic supports graduate research and training in clinical psychology. Psychological assessment and psychotherapy are offered on an outpatient basis to the general public as well as to University students and staff.

Research Consortiums

The University of Tennessee is a member of three not-for-profit research consortiums: Oak Ridge Associated Universities (ORAU), Southeastern Universities Research Association (SURA), and Universities Research Association, Inc. (URA).

1. ORAU is a nonprofit consortium of colleges and universities and a management operating contractor for the U.S. Department of Energy (DOE) for the design, construction, and operation of the Fermi National Accelerator Laboratory (Fermilab) located near Batavia, Illinois. ORAU provides funds to support courses for graduate students at Fermilab. Member institutions have graduate study programs in science and are active in particle physics and astrophysics.

For more information about ORAU and its programs, SURA, and URA, Inc., contact Dr. Michael D. Devine, Vice Chancellor for Research and ORAU Council member at 423-974-3466 or mdevine@utk.edu, or contact Bonnie E. Champion, ORAU Corporate Secretary at 423-576-3306. Additional information may also be found on World Wide Web sites at http://www.orau.gov and http://cebaf.gov/ura.
Textiles and Nonwovens Development Center
(College of Human Ecology)
Carl Dyer, Director of Resources and Technology Development
Larry C. Wadsworth, Director of Marketing and Technology

The Textiles and Nonwovens Development Center (TANDEC) was officially dedicated in October 1990. TANDEC was made possible through a grant from Exxon Chemical Company.

Nonwovens products boom large in a number of markets and TANDEC booms 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, elastomeric polymer, engineering thermoplastics and recycled plastics; mechanism of melt blown web formation; modeling of the melt blowing and spunbonding processes; development of on-line optical measurements for control of the critical properties of melt blown webs; electrical measurement of fiber alignment and bonding in nonwoven webs; thermal bonding and characterization of cotton/synthetic fiber nonwovens; computational analysis of heat transfer behavior in thermal calendaring; study of protective apparel for agricultural, industrial and medical uses; and finishing of nonwovens. In addition to the basic research, technology transfer has been accomplished during the past several years by assisting companies in applied projects, primarily in the melt blowing area.

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.

Tourism Institute
(College of Human Ecology)
Nancy Fair, Director

The Tourism Institute at UTK uses a systems approach to enhance economic development in Tennessee and the Southeast Region. Conducted in the Department of Consumer and Industry Services Management, the Institute integrates faculty expertise from the hotel and restaurant administration program, the recreation and tourism management program, and the retail and consumer sciences program to address emerging issues and needs. The Institute is also supported by the Graduate School of Planning and the College of Agricultural Sciences and Natural Resources.

Successful tourism requires attractions to draw tourists and supporting businesses that provide high quality food, lodging and related consumer goods and services. The mission is to deliver research, development, and training projects that will promote sustainable tourism in Tennessee and the Southeast Region. The Institute pursues research studies to better understand the needs of the state's and region's tourist customers to enable the industry to provide the goods and services that will increase and diversify the tourist base. It works with agencies and businesses to develop strategies for creating and expanding tourism enterprises. It also provides management-level personnel to the tourism industry through the degree programs in the department and assists the industry in workforce training.

Transportation Center
(Office of Vice Chancellor for Research)

Stephen H. Richards, Executive Director

The Transportation Center was created in 1970 to foster and facilitate interdisciplinary research, public service, and outreach 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, 800 Henley St., Suite 309, is a University-level organization administratively positioned within the Office of the Vice Chancellor for Research at UT Knoxville. The Center’s multidisciplinary staff includes over 100 full-time researchers and technicians augmented with numerous faculty and students. The Center is presently organized into four major divisions: Logistics and Systems Analysis; Infrastructure and Environment; Safety and Traffic Operations; and Mobility Services and Policy.

The Center has three goals. The first is to conduct a program of research in transportation that is recognized for its excellence, comprehensiveness, innovation, productivity, and national leadership. The second is to develop and sustain the technical expertise for high quality transportation research by the faculty and students within the various departments and colleges of UT. The third goal is to serve the transportation research, service, and training needs of state and local government, business, and industry in Tennessee, the southeast region, and the nation.

University Evening School
(Office of Vice Chancellor for Academic Affairs)

Dr. John Muldowny, Associate Dean of Undergraduate Academic Affairs and Director of Summer, Evening and Special Programs

The University Evening School, in conjunction with academic colleges and departments, administers credit programs for those students attending classes on and off campus in a variety of nontraditional formats. Support services are provided to assist students in their educational pursuits.

ON CAMPUS EVENING PROGRAM

Classes are offered during late afternoon and evening hours for those students who work or have other commitments during the day. The College of Business Administration offers the M.S. degree program in Economics in the evening. The College of Communications offers the M.S. degree program in Environmental Engineering or in Civil Engineering. The College of Human Ecology offers the M.S. degree program in Human Resource Development or in Retail and Consumer Sciences. Some departments within the Colleges of Agricultural Sciences and Natural Resources, Business Administration, and Education offer courses required for an advanced degree during the evening. For a specific major, consult the appropriate department.

MINI-TERM

The University Evening School offers a Mini-Term during May. Students may enroll in one concentrated credit course during the Mini-Term period.

Courses and instructors listed for the Mini-Term are carefully selected to reflect a broad academic base of individualized offerings suited to an intensive program of study. Courses cover material and information included in regular semester offerings.

OFF CAMPUS PROGRAMS

The Evening School makes arrangements for departments to conduct undergraduate and graduate courses in a number of locations away from the Knoxville campus. The courses are scheduled in response to requests and identifiable needs of adult part-time students who live some distance from the UT Knoxville location. All course offerings and instructors are approved by the appropriate academic departments, and the credit awarded is resident credit.

The following graduate programs are available: Master of Science with a major in Human Resource Development in Nashville; Master of Arts with a major in Speech Pathology in Chattanooga and Tullahoma (State Department of Education contract program).

The Evening School offers courses at Oak Ridge leading to advanced degrees in science and engineering (see listing under Off-Campus Graduate Centers).

WORKSHOPS

Credit workshops are coordinated through various academic departments of the University and give students the opportunity to participate in short periods of intensive study. Workshops offer flexibility of timing, location, and content. Summer workshops are particularly popular with teachers and school administrators. Although most workshops are held on the UT Knoxville campus, geography is not a limiting factor.
STUDENT SERVICES

A comprehensive program of services including academic advising and financial aid information is provided by the University Evening School for both on and off campus students.

REGISTRATION

Priority registration by touchtone phone, mail, FAX, or regular phone is offered as a convenience to current Evening School students. Final registration at both on and off campus locations is available by phone or in person.

Fee Waiver Program for Senior and/or Disabled Citizens

The Evening School administers this state legislated program for UTK. Senior or totally disabled Tennessee citizens who wish to take UT credit courses may audit these free of charge or, upon admission, pay a reduced rate to receive regular credit. Specific information about the program may be obtained in the Evening School office.

For information, contact the UT Evening School, 451 Communications Bldg, University of Tennessee, Knoxville, TN 37996-0341, or telephone (423) 974-5361 or 1-800-676-3687, FAX (423) 974-2027; email: utevingschool@gateway.utk.edu; Website: http://www.acad.utk.edu/evening.

University of Tennessee Space Institute

T. Dwayne McCoy, Vice President

The Space Institute is a graduate education and research institution located on a 365 acre lakeshore campus in Middle Tennessee. UTSI was established in 1964 and has evolved into an internationally recognized institution for graduate study and research in engineering, physics, mathematics, and computer science. The accredited academic programs and educational policies of the Space Institute have their origins in appropriate departments of The University of Tennessee, Knoxville. The more than 40 faculty members of the Institute carry out these accredited academic programs through classroom teaching, informal seminars, active research, and directing the research of their students in areas of their expertise and current interest. 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 emphasis in Aerospace Engineering, Avionics Systems, Chemical Engineering, Computer Science, Electrical Engineering, Engineering Science, Industrial Engineering (engineering management concentration), Mathematics, Mechanical Engineering, Metallurgical Engineering, and Physics. In addition to the fundamental studies characteristic of each discipline, research opportunities are available in many areas including aerodynamics, fluid mechanics, advanced space propulsion, neural networks, energy conversion processes, superconducting materials, thermal sciences, coal combustion, magnetohydrodynamics, plasma physics, space systems, propulsion, computational fluid dynamics, and other aspects of atmospheric and space flight.

The Institute has an established Center of Excellence in Laser Applications and offers graduate studies and research opportunities in laser diagnostics, laser materials interactions, pico-second processes, and coherent and non-linear optics.

The Institute was established in part to increase the research and engineering resources of Tennessee through education and practice in relevant scientific and technical areas and in part to interface University faculty and student research with the Air Force Arnold Engineering Development Center. The faculty, research activities, and facilities of the Institute, and those available at Arnold Center through appropriate contractual arrangements, provide students an unusual opportunity for significant research in these areas. Students who enroll at UTSI are admitted to The Graduate School, The University of Tennessee, Knoxville. Graduate Research Assistantships are available for qualified students. Further information may be obtained from the Dean for Academic Affairs, The University of Tennessee Space Institute, Tullahoma, Tennessee 37388.

Water Resources Research Center

(Office of Vice Chancellor for Research)

Timothy R. Gangaware, Associate Director

The Water Resources Research Center, 600 Henley Street, Suite 311, is a federally designated institute for coordinating water research for the state. The purposes of the Center are: (1) to assist and support the academic institutions of the state, public and private, in pursuing water resources research which addresses the 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 related to water resources and to encourage the entry of promising students into careers in these fields. The Center maintains a technical library which includes numerous water resources-related databases on CD-ROM.
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