### Table of Contents

Inside front cover - Catalog/Responsibility/Contacts

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>University Calendar for 1994-95</td>
<td>4</td>
</tr>
<tr>
<td>The University Administration</td>
<td>5</td>
</tr>
<tr>
<td>The Graduate School Administration</td>
<td>6</td>
</tr>
<tr>
<td>The Graduate Council</td>
<td>6</td>
</tr>
<tr>
<td><strong>The Graduate School</strong></td>
<td></td>
</tr>
<tr>
<td>Introduction</td>
<td>9</td>
</tr>
<tr>
<td>Majors and Degree Programs</td>
<td>10</td>
</tr>
<tr>
<td><strong>Admission Requirements</strong></td>
<td></td>
</tr>
<tr>
<td>Application Procedures</td>
<td>12</td>
</tr>
<tr>
<td>Admission Classifications</td>
<td>12</td>
</tr>
<tr>
<td>Admission of International Students</td>
<td>13</td>
</tr>
<tr>
<td>English Certification</td>
<td>13</td>
</tr>
<tr>
<td>Admission of Faculty and Staff Members</td>
<td>13</td>
</tr>
<tr>
<td>Readmission</td>
<td>13</td>
</tr>
<tr>
<td>Revision of Admission Classification</td>
<td>13</td>
</tr>
<tr>
<td><strong>Registration and Enrollment Requirements</strong></td>
<td></td>
</tr>
<tr>
<td>Graduate Credit</td>
<td>14</td>
</tr>
<tr>
<td>Undergraduate and Professional Students</td>
<td>14</td>
</tr>
<tr>
<td>Law Courses</td>
<td>14</td>
</tr>
<tr>
<td>Senior or Disabled Citizens</td>
<td>14</td>
</tr>
<tr>
<td>Auditors and Audited Courses</td>
<td>14</td>
</tr>
<tr>
<td>Short Courses and Workshops</td>
<td>14</td>
</tr>
<tr>
<td>Correspondence Study</td>
<td>14</td>
</tr>
<tr>
<td>Proficiency Examinations</td>
<td>15</td>
</tr>
<tr>
<td>English Proficiency</td>
<td>15</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>15</td>
</tr>
<tr>
<td>Advisor/Major Professor</td>
<td>15</td>
</tr>
<tr>
<td>Departmental Liaison</td>
<td>15</td>
</tr>
<tr>
<td>Registration</td>
<td>15</td>
</tr>
<tr>
<td>Conditional Registration</td>
<td>15</td>
</tr>
<tr>
<td>Registration for Use of Facilities</td>
<td>15</td>
</tr>
<tr>
<td>Course Description</td>
<td>15</td>
</tr>
<tr>
<td>Change of Registration</td>
<td>16</td>
</tr>
<tr>
<td>Course Loads</td>
<td>16</td>
</tr>
<tr>
<td>Grade-Point Average and Grades</td>
<td>16</td>
</tr>
<tr>
<td>Academic Standards</td>
<td>16</td>
</tr>
<tr>
<td>Academic Honesty</td>
<td>17</td>
</tr>
<tr>
<td>Appeals Procedure</td>
<td>17</td>
</tr>
<tr>
<td><strong>Degree Program Requirements</strong></td>
<td></td>
</tr>
<tr>
<td>Definition of Graduate Terms</td>
<td>17</td>
</tr>
<tr>
<td>Minors</td>
<td>17</td>
</tr>
<tr>
<td>Transfer Credits</td>
<td>17</td>
</tr>
<tr>
<td>Theses and Dissertations</td>
<td>18</td>
</tr>
<tr>
<td>Master's Degrees</td>
<td>18</td>
</tr>
<tr>
<td>Specialist in Education Degree</td>
<td>19</td>
</tr>
<tr>
<td>Doctoral Degrees</td>
<td>19</td>
</tr>
<tr>
<td>Summary of Procedures for Master's Degree</td>
<td>21</td>
</tr>
<tr>
<td>Degree and Specialist in Education Degree</td>
<td>21</td>
</tr>
<tr>
<td>Summary of Procedures for Doctoral Degrees</td>
<td>22</td>
</tr>
<tr>
<td><strong>Fees and Financial Assistance</strong></td>
<td></td>
</tr>
<tr>
<td>Residency Classification for Tuition Purposes</td>
<td>23</td>
</tr>
<tr>
<td>University Fees</td>
<td>23</td>
</tr>
<tr>
<td>Financial Assistance</td>
<td>26</td>
</tr>
<tr>
<td><strong>Special Federal and State Laws and University Policies</strong></td>
<td></td>
</tr>
<tr>
<td>Family Educational Rights and Privacy Act</td>
<td>26</td>
</tr>
<tr>
<td>Use of Social Security Number</td>
<td>26</td>
</tr>
<tr>
<td>EEO/Title IX/Section 504 Statement</td>
<td>27</td>
</tr>
<tr>
<td>Security Information</td>
<td>27</td>
</tr>
<tr>
<td>Drug-Free Campus and Workplace</td>
<td>27</td>
</tr>
<tr>
<td>Policy for the Administration of Graduate Assistantships</td>
<td>27</td>
</tr>
<tr>
<td><strong>Student Services</strong></td>
<td></td>
</tr>
<tr>
<td>Black Cultural Center</td>
<td>30</td>
</tr>
<tr>
<td>Career Services</td>
<td>30</td>
</tr>
<tr>
<td>Center for International Education</td>
<td>30</td>
</tr>
<tr>
<td>Child Care</td>
<td>30</td>
</tr>
<tr>
<td>Disabled Student Services</td>
<td>30</td>
</tr>
<tr>
<td>Food Service Facilities</td>
<td>31</td>
</tr>
<tr>
<td>Graduate Student Association</td>
<td>31</td>
</tr>
<tr>
<td>Hearing and Speech Services</td>
<td>31</td>
</tr>
<tr>
<td>Housing</td>
<td>31</td>
</tr>
<tr>
<td>Minority Student Affairs</td>
<td>31</td>
</tr>
<tr>
<td>Ombudsmen Office</td>
<td>31</td>
</tr>
<tr>
<td>Religious Resources</td>
<td>31</td>
</tr>
<tr>
<td>Student Counseling Services Center</td>
<td>31</td>
</tr>
<tr>
<td>Student Health Service</td>
<td>32</td>
</tr>
<tr>
<td>Vehicle Operation and Parking</td>
<td>32</td>
</tr>
<tr>
<td>Women's Center</td>
<td>32</td>
</tr>
<tr>
<td><strong>Colleges</strong></td>
<td></td>
</tr>
<tr>
<td>College of Agricultural Sciences and Natural Resources</td>
<td>35</td>
</tr>
<tr>
<td>College of Architecture and Planning</td>
<td>35</td>
</tr>
<tr>
<td>College of Business Administration</td>
<td>36</td>
</tr>
<tr>
<td>College of Communications</td>
<td>36</td>
</tr>
<tr>
<td>College of Education</td>
<td>36</td>
</tr>
<tr>
<td>College of Engineering</td>
<td>37</td>
</tr>
<tr>
<td>College of Human Ecology</td>
<td>37</td>
</tr>
<tr>
<td>College of Law</td>
<td>38</td>
</tr>
<tr>
<td>College of Liberal Arts</td>
<td>38</td>
</tr>
<tr>
<td>College of Nursing</td>
<td>39</td>
</tr>
<tr>
<td>College of Social Work</td>
<td>39</td>
</tr>
<tr>
<td>College of Veterinary Medicine</td>
<td>39</td>
</tr>
<tr>
<td><strong>Fields of Instruction</strong></td>
<td></td>
</tr>
<tr>
<td>Accounting and Business Law</td>
<td>43</td>
</tr>
<tr>
<td>Advertising</td>
<td>44</td>
</tr>
<tr>
<td>Agricultural and Extension Education</td>
<td>45</td>
</tr>
<tr>
<td>Agricultural Economics and Rural Sociology</td>
<td>45</td>
</tr>
<tr>
<td>Agricultural Engineering</td>
<td>47</td>
</tr>
<tr>
<td>Agriculture</td>
<td>48</td>
</tr>
<tr>
<td>Animal Science</td>
<td>48</td>
</tr>
<tr>
<td>Anthropology</td>
<td>50</td>
</tr>
<tr>
<td>Architecture</td>
<td>52</td>
</tr>
<tr>
<td>Art</td>
<td>53</td>
</tr>
<tr>
<td>Audiology and Speech Pathology</td>
<td>55</td>
</tr>
<tr>
<td>Aviation Systems</td>
<td>57</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>58</td>
</tr>
<tr>
<td>Biomedical Sciences</td>
<td>59</td>
</tr>
<tr>
<td>Botany</td>
<td>60</td>
</tr>
<tr>
<td>Broadcasting</td>
<td>61</td>
</tr>
<tr>
<td>Business Administration</td>
<td>62</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td>66</td>
</tr>
<tr>
<td>Chemistry</td>
<td>67</td>
</tr>
<tr>
<td>Child and Family Studies</td>
<td>68</td>
</tr>
<tr>
<td>Civil and Environmental Engineering</td>
<td>70</td>
</tr>
<tr>
<td>Classics</td>
<td>73</td>
</tr>
<tr>
<td>Communications</td>
<td>73</td>
</tr>
<tr>
<td>Comparative and Experimental Medicine</td>
<td>75</td>
</tr>
<tr>
<td>Computer Science</td>
<td>75</td>
</tr>
<tr>
<td>Curriculum and Instruction</td>
<td>76</td>
</tr>
<tr>
<td>Ecology</td>
<td>80</td>
</tr>
<tr>
<td>Economics</td>
<td>81</td>
</tr>
<tr>
<td>Education</td>
<td>82</td>
</tr>
<tr>
<td>Educational and Counseling Psychology</td>
<td>83</td>
</tr>
<tr>
<td>Educational Leadership</td>
<td>85</td>
</tr>
<tr>
<td>Electrical and Computer Engineering</td>
<td>87</td>
</tr>
<tr>
<td>Engineering Science and Mechanics</td>
<td>91</td>
</tr>
<tr>
<td>English</td>
<td>93</td>
</tr>
<tr>
<td>Entomology and Plant Pathology</td>
<td>96</td>
</tr>
<tr>
<td>Environmental Practice</td>
<td>96</td>
</tr>
<tr>
<td>Finance</td>
<td>97</td>
</tr>
<tr>
<td>Food Science and Technology</td>
<td>97</td>
</tr>
<tr>
<td>Forestry, Wildlife and Fisheries</td>
<td>98</td>
</tr>
<tr>
<td>Geography</td>
<td>100</td>
</tr>
<tr>
<td>Geological Sciences</td>
<td>102</td>
</tr>
<tr>
<td>Germanic and Slavic Languages</td>
<td>103</td>
</tr>
<tr>
<td>Health, Leisure, and Safety</td>
<td>105</td>
</tr>
<tr>
<td>History</td>
<td>108</td>
</tr>
<tr>
<td>Home Economics</td>
<td>109</td>
</tr>
<tr>
<td>Home Economics Education</td>
<td>109</td>
</tr>
<tr>
<td>Human Ecology</td>
<td>109</td>
</tr>
<tr>
<td>Human Performance and Sport Studies</td>
<td>110</td>
</tr>
<tr>
<td>Industrial and Organizational Psychology</td>
<td>112</td>
</tr>
<tr>
<td>Industrial Engineering</td>
<td>113</td>
</tr>
<tr>
<td>Interdisciplinary Programs</td>
<td>115</td>
</tr>
<tr>
<td>Journalism</td>
<td>115</td>
</tr>
<tr>
<td>Law</td>
<td>116</td>
</tr>
<tr>
<td>Library and Information Science</td>
<td>119</td>
</tr>
<tr>
<td>Life Sciences</td>
<td>121</td>
</tr>
<tr>
<td>Management</td>
<td>122</td>
</tr>
<tr>
<td>Management Science</td>
<td>123</td>
</tr>
<tr>
<td>Marketing, Logistics and Transportation</td>
<td>125</td>
</tr>
<tr>
<td>Materials Science and Engineering</td>
<td>126</td>
</tr>
<tr>
<td>Mathematics</td>
<td>127</td>
</tr>
<tr>
<td>Mechanical and Aerospace Engineering</td>
<td>130</td>
</tr>
<tr>
<td>Medical Biology</td>
<td>134</td>
</tr>
<tr>
<td>Microbiology</td>
<td>134</td>
</tr>
<tr>
<td>Music</td>
<td>135</td>
</tr>
<tr>
<td>Nuclear Engineering</td>
<td>138</td>
</tr>
<tr>
<td>Nursing</td>
<td>139</td>
</tr>
<tr>
<td>Nutrition</td>
<td>141</td>
</tr>
<tr>
<td>Ornamental Horticulture and Landscape Design</td>
<td>143</td>
</tr>
<tr>
<td>Pathobiology</td>
<td>144</td>
</tr>
<tr>
<td>Philosophy</td>
<td>144</td>
</tr>
<tr>
<td>Physics and Astronomy</td>
<td>146</td>
</tr>
<tr>
<td>Planning</td>
<td>148</td>
</tr>
<tr>
<td>Plant and Soil Science</td>
<td>149</td>
</tr>
<tr>
<td>Political Science</td>
<td>150</td>
</tr>
<tr>
<td>Psychology</td>
<td>152</td>
</tr>
<tr>
<td>Religious Studies</td>
<td>155</td>
</tr>
<tr>
<td>Romance and Asian Languages</td>
<td>155</td>
</tr>
<tr>
<td>Rural Practice</td>
<td>158</td>
</tr>
<tr>
<td>Social Work</td>
<td>158</td>
</tr>
<tr>
<td>Sociology</td>
<td>161</td>
</tr>
<tr>
<td>Special Programs</td>
<td>163</td>
</tr>
<tr>
<td>Special Services Education</td>
<td>163</td>
</tr>
<tr>
<td>Speech Communication</td>
<td>165</td>
</tr>
<tr>
<td>Statistics</td>
<td>166</td>
</tr>
<tr>
<td>Technological and Adult Education</td>
<td>168</td>
</tr>
<tr>
<td>Textiles, Retailing and Interior Design</td>
<td>169</td>
</tr>
<tr>
<td>Theatre</td>
<td>172</td>
</tr>
</tbody>
</table>
Facilities for Research and Service

Urban Practice 173
Veterinary Medicine 174
Zoology 175

Bureau of Educational Research and Service 181
Center for Business and Economic Research 181
Center for Information Studies 181
Centers of Excellence 181
Child Development Laboratories 182
Communications Research Center 182

Computing Center 182
Continuing Education and Public Service 183
Energy, Environment, and Resources Center 184
Institute of Agriculture 184
Learning Research Center 185
Libraries 185
Management Development Center 185
Measurement and Control Engineering Center 186
Nutrition Institute 186
Oak Ridge Associated Universities 186
Off-Campus Graduate Centers 186

Psychological Clinic 187
Statistical Consulting Center 187
Textiles and Nonwovens Development Center 187
Transportation Center 187
University of Tennessee Space Institute 187
Water Resources Research Center 188

Index

Map
University Calendar for 1994-95

**Summer Term 1994**

- June 2 (Thursday) Classes Begin
- July 4 (Monday) Independence Day
- July 6 (Wednesday) First Session Ends
- July 7 (Thursday) Second Session Begins
- August 10 (Wednesday) Second Session Ends
- August 12 (Friday) Commencement

**Fall Semester 1994**

- August 24 (Wednesday) Classes Begin
- September 5 (Monday) Labor Day
- October 20-21 (Thursday-Friday) Fall Break
- November 24-25 (Thursday-Friday) Thanksgiving
- December 8 (Thursday) Classes End
- December 9 (Friday) Study Period
- December 10, 12-15 (Saturday, Monday-Thursday) Final Exams
- December 18 (Sunday) Commencement

**Spring Semester 1995**

- January 11 (Wednesday) Classes Begin
- January 16 (Monday) Martin Luther King Holiday
- March 20-24 (Monday-Friday) Spring Break
- April 14 (Friday) Spring Recess
- May 1 (Monday) Classes End
- May 2-3 (Tuesday-Wednesday) Study Period
- May 4-6, 8-9 (Thursday-Saturday, Monday-Tuesday) Final Exams
- May 12 (Friday) Commencement

**Summer Term 1995**

- June 1 (Thursday) Classes Begin
- July 4 (Tuesday) Independence Day
- July 5 (Wednesday) First Session Ends
- July 6 (Thursday) Second Session Begins
- August 9 (Wednesday) Second Session Ends
- August 11 (Friday) Commencement

Late registration normally begins two days before classes.

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

## Board of Trustees

<table>
<thead>
<tr>
<th>Ex Officio Members</th>
<th>From Congressional Districts</th>
<th>DISTRICT</th>
<th>TERM EXPIRES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governor, State of Tennessee</td>
<td>Joe Fuller, Kingsport</td>
<td>First</td>
<td>June 1, 1999</td>
</tr>
<tr>
<td>Commissioner of Education</td>
<td>William B. Sansom, Knoxville</td>
<td>Second</td>
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<tr>
<td>Commissioner of Agriculture</td>
<td>Roger Dickson, Chattanooga</td>
<td>Third</td>
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</tr>
<tr>
<td>President of the University of Tennessee</td>
<td>William M. Johnson, Sparta</td>
<td>Fourth</td>
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</tr>
<tr>
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<td>Roy C. Flowers, Nashville</td>
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</tr>
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<td>Carl Johnson, Brentwood</td>
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</tr>
<tr>
<td></td>
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</tr>
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<td>Tom Elam, Union City</td>
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</tr>
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<td>J. Houston Gordon, Esq., Covington</td>
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</tr>
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<td>Ronald Terry, Memphis</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
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<td>From Anderson, Bedford, Coffee, Franklin, Lincoln, Moore, and Warren Counties</td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>J. Steven Ennis</td>
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</tr>
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<td></td>
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<td></td>
</tr>
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<td>Clayton McWhorter</td>
<td></td>
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<td></td>
</tr>
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<td></td>
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<td></td>
</tr>
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<td>Paul J. Kinsar</td>
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</tr>
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<td>From Knox County</td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>Donald M. Leake</td>
<td></td>
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<td></td>
</tr>
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<td>James A. Haslam, II</td>
<td></td>
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<td></td>
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<td></td>
</tr>
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<td>King W. Rogers, III, Esq.</td>
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<td></td>
</tr>
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<td>Edward W. Reed</td>
<td></td>
<td>June 1, 1996</td>
<td></td>
</tr>
</tbody>
</table>

## University of Tennessee Administration

Joseph E. Johnson, A.B., M.A., Ed.D., President, The University of Tennessee
Emerson H. Fry, B.S., CPA, Executive Vice President and Vice President for Business and Finance
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Beauchamp E. Brogan, B.S., M.S., CPA, CCM, Treasurer
Charles M. Peccolo, Jr., B.S., M.Acc., CPA, CCM, Treasurer

## UT, Knoxville Administration

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Jack E. Williams, B.S., Vice Chancellor for Development and Alumni Affairs
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J. William Rudd, B.A., M.A., Dean of the College of Architecture and Planning
C. Warren Neel, B.S., M.B.A., DBA, Dean of the College of Business Administration
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Richard Wisniewski, B.S., M.E., Ed.D., Dean of the College of Education
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Jacquelyn O. Degrange, B.S., M.A., Ph.D., Dean of the College of Human Ecology
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Lorman A. Rainey, A.B., M.A., Ph.D., Dean of the College of Liberal Arts
Jean T. Uhi, B.S.N., M.S.N., Ph.D., Dean of the College of Nursing
Unice O. Shatz, B.A., M.S., Ph.D., Dean of the College of Social Work
G. Michael H. Shires, B.V.Sc., M.R.C.V.S., Dean of the College of Veterinary Medicine
Laverne B. Lindsey, B.S., M.Ed., Ed.D., Associate Vice Chancellor and Dean of the Division of Continuing Education
Gerald D. Bowker, B.A., M.A., Dean of Admissions (Undergraduate) and Records
Raymond A. Popp, B.S., M.A., Ph.D., Director of the UT-Oak Ridge Graduate School of Biomedical Sciences
John-Mari Griffiths, B.Sc., Ph.D., Director of the Graduate School of Library and Information Science
Paula T. Kaufman, A.B., M.S., MBA, Dean of Libraries
# The Graduate Council

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Mr. Jim Spencer, College of Architecture and Planning  
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## College or Unit

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GRADUATE
STUDY
Rules, policies, fees, and courses described in this catalog are subject to change without notice. Refer to inside front cover.
The Graduate School

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

The University of Tennessee is the official land-grant institution for the State of Tennessee, with its main campus in Knoxville. UT Knoxville is the state's oldest, largest, and most comprehensive institution, and is the only state-supported "Research University I" (Carnegie classification) in Tennessee. A wide range of graduate programs leading to Master's and doctoral degrees is available. The University offers Mast er's programs in 85 fields and doctoral work in 52. More than 7,500 graduate and professional students are enrolled on and off campus under the tutelage of 1,617 faculty members.

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

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

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

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

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

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

Graduate education has been conducted at The University of Tennessee since 1821. The first known Master's degree was awarded in 1827. In 1879 the Board of Trustees created a graduate department with authority to confer the Master of Arts, the Doctor of Philosophy, Civil Engineer, and Mining Engineer degrees. The Graduate Department was renamed The Graduate School in 1912. Although a Ph.D. degree was awarded in 1886 and in 1887, formal doctoral programs were not instituted until 1929 for Biological Sciences at Memphis and 1943 for Chemistry on the Knoxville campus. A Committee on Graduate Study was appointed in 1904 and coordinated the graduate programs until the Graduate Council was formed in 1948. More than 7,100 doctoral degrees and 40,700 Master's degrees have been awarded to date.

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

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*Non-degree and provisional students must obtain permission from the department/program head to register for courses in these fields.

*Available for the Academic Common Market to residents of reciprocal states. See Fields of Instruction.
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a International applicants only.
b American applicants only.
c G.S. Rating Form submitted to Department.
d Forms obtained from & returned to Department.
e Foreign or computer language.
Admission Requirements

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

The Graduate School requires a minimum grade-point average of 2.7 out of a possible 4.0, or a 3.0 during the senior year of undergraduate study. Applicants with previous graduate work must have a grade-point average of 3.0 out of a possible 4.0 or equivalent on all graduate work. Many programs require a higher average. The equivalent of a minimum B average is required for international students.

An applicant whose GPA falls between 2.5 and 2.7 may be admitted on probation, but the program will not make formal application for admission to The Graduate School or apply for transient status. No action is taken until a file is complete. The applicant will be notified by mail of the action taken.

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

Application forms for the above tests can be obtained by writing:
   Educational Testing Service
   Princeton, NJ 08540

UT Knoxville is an approved testing center for the Graduate Record Examination. UT Knoxville students are required to take the Graduate Record Examination if English is not their native language.

Admission to The Graduate School requires that a person meet the minimum requirements of The Graduate School (see Admission Requirements). A major area must be declared if the intent is to seek an advanced degree. If no degree is desired, a major area need not be declared, but some departments do not permit non-degree students to register for graduate courses (see Majors and Degree Programs chart for information on restricted programs).

A student must maintain a minimum GPA of 3.0 during the senior year of undergraduate study. Applicants will require a minimum grade-point average of 2.5 out of a possible 4.0, or equivalent on all graduate work. Many programs require a higher average. The equivalent of a minimum B average is required for international students.

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.

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A student must maintain a minimum GPA of 3.0 during the senior year of undergraduate study. Applicants will require a minimum grade-point average of 2.5 out of a possible 4.0, or equivalent on all graduate work. Many programs require a higher average. The equivalent of a minimum B average is required for international students.
The graduate application, a $15 application fee, and proof of a Bachelor's degree from a college or university accredited by the appropriate regional accrediting agency are required. Copies of official proof are acceptable. A major area need not be declared, but some departments do not permit provisional students to register for graduate courses (see Majors and Degree Programs chart for information on restricted programs).

Every graduate student must meet with an academic advisor at least once each semester to discuss his/her program. For students with a declared major, the advisor must be from the appropriate academic unit. If no advisor has been assigned, the department head or designee is the advisor. For a provisional student who has no declared major, the Associate Dean of The Graduate School or designee is the advisor. Any student admitted to the provisional status who has exceeded six hours of graduate credit must receive permission from The Graduate School to register for a second or succeeding semester if admission to the non-degree or degree status has not been obtained. To be admitted to the non-degree or degree status, the student must earn at least a 3.0 grade-point average in all coursework (graduate and undergraduate) taken in provisional status, to include at least six hours of graduate work. Provisional students failing to meet this requirement will be denied registration.

The Office of Graduate Admissions and Records will process the change to non-degree status if all requirements are met. To apply for a specific degree program, the student must submit the Request for Change of Graduate Program form to the Office of Graduate Admissions and Records. Provisional admission does not assure admission to a non-degree or degree program. A student who wishes to enter a degree program will be directed to the appropriate department. An international student on a non-immigrant visa may not enroll in the provisional status.

TRANIENT ADMISSION

A student 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 upon submission of a completed Graduate Application for Admission, the $15 application fee, and a Transient Student Certification 10 days prior to registration. Only one semester, or a maximum of 12 hours, of coursework can be taken in transient status. Necessary forms may be obtained from the Office of Graduate Admissions and Records.

Admission of International Students

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

- 3.0 and 3.5 on 4.0 scale;
- 14 and 15 on 20 point scale;
- 80.0 from Taiwanese institutions;
- 1.7 and 1.9 on 4.3 scale;
- 3.0 and 3.5 on 4.0 scale;
- 14 and 15 on 20 point scale;
- 80.0 from Taiwanese institutions;
- 1.7 and 1.9 on 4.3 scale;

Admission Requirements

1. Class or Division from Indian institutions;
2. Upper 2nd Class Honors on various British systems.

Other grading systems are evaluated, upon receipt of transcripts, in accordance with standard recommendations. Many departments require a higher average than that established by The Graduate School.

An international student may apply for admission any semester, but normally enters the summer or fall semester. Deadlines for submission of applications are:

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

The Office of Graduate Admissions and Records must be notified of any change in entering date after admission has been granted. The following items must be received before admission will be considered:

1. A completed application form accompanied by a $15 non-refundable processing fee. Payment should be made in United States dollars by a cashier's check, money order, or personal check. If payment is by personal check, the check must be drawn on a United States bank to be honored in United States currency. Checks drawn on overseas banks are not accepted. International money orders are suggested.
2. Official or attested university records, with certified translations if the records are not in English. Notarized copies are not accepted.
4. Documented evidence of financial resources sufficient to support the student as stated on the financial statement form supplied to the applicant.
5. Additional departmental/program requirements (refer to Majors and Degree Programs chart in front of Graduate Catalog).

- Reference letters or rating forms. Forms obtained from the college or department should be returned to the same source.
- Scores from the Graduate Record Examination (GRE) or Graduate Management Admission Test (GMAT).

Admission must be granted, and financial documentation and degree confirmation must be received, prior to issuance of an I-20 or IAP-66 form needed to obtain a visa. The Graduate School will not issue these forms after the following dates:

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

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

An international student may not enroll as a non-degree or provisional student.

Application for Change of Graduate Program

A student who has not attended The Graduate School at UT Knoxville for more than three semesters (including summer) must apply for readmission. A readmission application should be submitted to the Office of Graduate Admissions and Records at least two weeks prior to the desired reentry date. A student who has attended another institution since enrollment at UT Knoxville must submit an 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
Registration and Enrollment Requirements

Graduate Credit

To earn graduate credit, a student must be admitted by the Dean of The Graduate School and enrolled in an appropriate status as a graduate student. The registration must reflect the desire for graduate credit, and the course must have been approved by the Graduate Council. Coursework taken in any other status is unacceptable for graduate credit and cannot be changed retroactively to graduate credit.

Special privileges are accorded UT Knoxville seniors and professional students as stated in the section on Undergraduates and Professional Students.

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

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

Undergraduate and Professional Students

UT KNOXVILLE SENIORS

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

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

UT KNOXVILLE VETERINARY MEDICINE STUDENTS

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

1. The student's advisor must approve in advance the student's enrollment in each course.

2. The student may take a maximum of 10 semester hours of graduate courses during the D.V.M. program.

3. Approval must be obtained each semester at registration through the Office of Graduate Admissions and Records. The student's progress is subject to review and approval each semester by the Associate Dean, College of Veterinary Medicine.

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

UT KNOXVILLE LAW STUDENTS

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

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

Law Courses

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

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

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

Senior or Disabled Citizens

Legislation gives Tennessee citizens who are 60 years of age or older, or those who are totally disabled, the opportunity to attend credit and non-credit courses at the University at no charge on an audit, space available basis. Legal verification of either of these conditions is required for enrollment. Students who are 65 or over, or who are totally disabled, and who desire to receive UT credit for their courses, may pay a reduced charge of $7 per credit hour up to a maximum of $75 for a full-time load. Registration for day and evening classes is handled by the Evening School, 451 Communications and University Extension Building, (615) 974-5361 or 1-800-676-8657.

Auditors and Audited Courses

Persons who wish to attend certain classes regularly, without taking examinations or receiving grades or credit, may do so by completing a graduate application, paying the application fee, registering as an auditor, and paying regular fees. Graduate students paying regular fees also are entitled to audit courses. The names of all auditors properly registered will appear on the intermediate class rolls, and will be removed from the final grade report. No record of audited coursework will appear on the permanent record.

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

Short Courses and Workshops

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

1. The number of contact hours should never be fewer than the equivalent of one hour per week during the term for each hour of credit awarded, i.e., 15 hours per semester hour.

2. For every contact hour, there should be at least two hours of student preparation.

3. For each hour of graduate credit under the semester system, there should be a minimum of three credits during a one-week period.

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

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

Correspondence Study

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

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

English Proficiency

Any person whose native language is not English must pass an English proficiency examination given by the University prior to initial registration. Students whose performance on the examination indicates a need for additional English study must enroll immediately for English 121 English Grammar Review for Foreign Students (or another course assigned by the English Department) for undergraduate credit and pass with a grade of C or better. A student may not take more than 6 additional hours of course work while enrolled in English 121. Those students whose scores indicate that they are not prepared to enter English 121 will be referred to a program of intensive English study prior to enrolling in an academic program. Persons whose native language is not English must pass an oral test in English (the SPEAK Test) before they can be assigned to classroom duties in connection with their assistantships. The SPEAK Test is administered on campus by the Learning Research Center. Scores from the Test of Spoken English (TSE) may be accepted in place of the SPEAK Test.

Prerequisites

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

Advisor/Major Professor

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

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

Registration

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

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

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

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

Conditional Registration

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

Registration for Use of Facilities

Students using University facilities, services or faculty time must be registered. Normally, students are registered for coursework or thesis/dissertation credit. Non-thesis students or those who have not begun research, both of whom have completed all coursework requirements, must register for course 602.

Course Description

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

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

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

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 602 and Registration for Use of Facilities 602. 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. "SNC only" indicates that the course may be taken only for Satisfactory/No Credit grading. Refer to section on Grades.
Course Loads

The maximum load for a graduate student is 15 hours, and 9 to 12 hours are considered a full load. Students holding a one-half time assistantship normally should enroll for 6-11 semester hours. A one-fourth time graduate assistant normally should take 9-13 semester hours. A student on a one-half time assistantship who takes six semester hours will be considered full time. Refer to the Policy for the Administration of Graduate Assistantships for the additional information.

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

Students receiving financial aid should consult with the department/program head concerning appropriate course loads. Courses audited do not count toward 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 incompletes. No more than 12 hours are permissible in the summer term without prior approval.

Grade-Point Average and Grades

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

Grades in the Graduate School have the following meanings:

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), average performance.
C- (1.5 quality points per semester hour), unsatisfactory performance.
D (1 quality point per semester hour), clearly unsatisfactory performance and cannot be used to satisfy degree requirements.
F (no quality points), extremely unsatisfactory performance and cannot be used to satisfy degree requirements.
I (no quality points), a temporary grade indicating that the student has performed satisfactorily in the course but, due to unforeseen circumstances, has been unable to finish all requirements. An I is NOT given to enable a student to do additional work to raise a deficient grade. All incompletes must be removed within one semester, excluding the summer term. If a supplementary grade report has not been received in the Office of Graduate Admissions and Records at the end of the semester, the I will be changed to an F. The course will not be counted in the cumulative grade average until a final grade is assigned. No student may graduate with an I on the record.

S/NC (carries credit hours, but no quality points), S is equivalent to a grade of B or better, and NC means no credit earned. Courses where NC is received may be repeated for a grade of S. A grade of S/NC is allowed only where indicated in the course description in the Graduate Catalog. The number of S/NC courses in a student’s program is limited to one-fourth of the total credit hours required.
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.

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

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

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

ACADEMIC PROBATION

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

**DISMISSAL**

If a student is on academic probation, the degree or non-degree status will be terminated by The Graduate School if the student's semester GPA falls below a 3.0 in a subsequent semester. When the particular circumstances may be deemed to justify continuation, and upon recommendation of the appropriate academic unit and approval of The Graduate School, a student on probation whose semester GPA is below 3.0 may be allowed to continue on a semester-by-semester basis. Dismissal of a graduate student by a department or program is accomplished by written notice to the student, with a copy to The Graduate School. In those cases where the department's requirements for continuation are more stringent than Graduate School requirements, The Graduate School will evaluate the student's record to determine whether the student is eligible to apply for a change of status and register in another area of study. Registration for courses in a department from which a student has been dismissed will not be permitted, except by written authorization from that department.

**Academic Honesty**

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

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

Webster's Ninth New Collegiate Dictionary (1983) defines plagiarism as "stealing or passing off ideas or words of another as one's own"; the use of a created production without crediting the source. Anything taken from another source must be documented, and in no case should one present another person's work as one's own. Extreme caution should be exercised by students involved in collaborative research to avoid questions of plagiarism. If in doubt, students should check with the major professor and The Graduate School about the project. Plagiarism will be investigated when suspected and prosecuted if established.

**Appeals Procedure**

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

**Degree Program Requirements**

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

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

**Definition of Graduate Terms**

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

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

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

**Option:** The means of designating thesis/non-thesis requirements.

**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.

Two interdisciplinary minors are available, at the Master's and doctoral levels, in Statistics (Business Administration) and in Gerontology (Human Ecology). See Fields of Instruction for specific requirements and approval provisions. The minor area must be approved by the major and minor academic units, and a member from the minor unit must serve on the graduate committee.

**Transfer Credits**

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

To be transferred into The University of Tennessee academic units for credit, courses must:

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

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

**M A S T E R ' S D E G R E E**

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.

**E D . S . D E G R E E**

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

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 typographical errors and of the correct format, suitable for binding, and reflects credit upon the University and The Graduate School. If the thesis or dissertation is not accepted, the student must make corrections and resubmit the material.

The student, major professor, and committee share responsibility for the accuracy and professional presentation of the final product of the student's research. The student should confer with the Thesis/Dissertation Consultant regarding problems and questions in advance of preparing the final copy. The UT Knoxville Guide to the Preparation of Theses and Dissertations (7th ed.) provides the correct format for theses or dissertations. Theses and dissertations are prepared and held periodically throughout the academic year. The dates for each workshop are 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 of the Department Head and Dean of the College, for 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. The research should be classified in the course of a project, these same persons should be notified immediately so that proper procedures can be assured. Failure to comply with these requirements may lead to the rejection of a thesis or dissertation manuscript.

Master's Degrees

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

COURSE REQUIREMENTS

A candidate for a Master's degree must complete a minimum of 30 hours of graduate credit in courses approved by the student's Master's committee. In thesis programs, 6 semester hours of credit in the major (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 fewer than 6 nor more than 12 hours of graduate credit.

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

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

SECOND MASTER'S DEGREES

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

MASTER'S COMMITTEE

A committee composed of the major professor and at least two other faculty members, all of which are the student's thesis committee, must contain all courses and carry out research, and to assure fulfillment of the degree requirements. If the student has a minor, one committee member must be from the minor department.

ADMISSION TO CANDIDACY

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

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

THESIS REGISTRATION

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

THESIS

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

FINAL EXAMINATION FOR NON-THESIS STUDENTS

Each non-thesis student must pass a final comprehensive written examination. A department may require an additional oral examination. The examination is not merely a test of coursework, but a measure of the student's ability to integrate material in the major and related fields, and assess and evaluate research on the degree. The major professor must submit the results of the defense by the dissertation 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 of coursework, but a measure of the student's ability to integrate material in the major and related fields. Except with prior approval from The Graduate School, the examination must be given in University facilities. This examination must be approved by The Graduate School. The major professor must submit the results of the defense by the dissertation deadline. In case of failure, the candidate may not apply for reexamination until the following semester. The result of the second examination is final.
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TIME LIMIT

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

Specialist in Education Degree

The Specialist in Education (Ed.S.) degree is offered with majors in Curriculum and Instruction, Educational Administration and Supervision, Educational Psychology and Guidance, Safety Education and Service, and Vocational-Technical Education.

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

COURSE REQUIREMENTS

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

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

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

ED.S. COMMITTEE

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

RESIDENCE REQUIREMENTS

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

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

ADMISSION TO CANDIDACY

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

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

RESEARCH REQUIREMENTS

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

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

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

FINAL EXAMINATION

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

TIME LIMIT

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

Doctoral Degrees

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

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

PROGRAM OF STUDY

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

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

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

DOCTORAL COMMITTEE

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

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

DOCTORAL EXAMINATIONS

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

Diagnostic Examination

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

Qualifying Examination

A written and/or oral qualifying examination may be given during the early stages of the student's first year in the doctoral program. Qualifying examinations are designed to test the student's 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 at different times) is normally taken when the doctoral student has completed all or nearly all prescribed courses. Thus, its successful completion indicates that, in the judgement of the faculty, the doctoral student can think analytically and creatively, has a comprehensive knowledge of the field and the specialty, knows how to use academic resources, and is deemed capable of completing the dissertation. The comprehensive examination must be passed prior to admission to candidacy. A written examination is required, and an oral examination is encouraged.

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

Defense of Dissertation Examination

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

LANGUAGE REQUIREMENTS

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

Satisfactory completion (grade of B or better) of German 332 or French 302 may be substituted for a language examination. Some programs may accept a computer language in lieu of a foreign language.

RESIDENCE REQUIREMENTS

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

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

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

ADMISSION TO CANDIDACY

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

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

CONTINUOUS REGISTRATION

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

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

DISSERTATION

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

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

Two copies of the dissertation (prepared according to the regulations in the UT Knoxville Guide to the Preparation of Theses and Dissertations, 7th ed.) must be submitted and accepted by The Graduate School. Each copy must include an approval sheet, signed by all members of the doctoral committee, which certifies to The Graduate School that they have examined the final copy and found that its form and content demonstrate scholarly excellence.

Doctoral forms and a thesiss card are also submitted at this time. The student should check with the department head concerning additional required copies of the dissertation.

TIME LIMIT

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

### PROCEDURES

<table>
<thead>
<tr>
<th>Step</th>
<th>Under Direction Of</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admission as a potential degree candidate</td>
<td>Office of Graduate Admissions and Records and Major Department</td>
<td>Prior to completing 15 hours of graduate courses</td>
</tr>
<tr>
<td>Formation of Master's/Ed.S. committee</td>
<td>Advisor/Major professor</td>
<td>Prior to application for admission to candidacy</td>
</tr>
<tr>
<td>Submission of application for admission to candidacy</td>
<td>Master's/Ed.S. committee</td>
<td>At least one semester prior to graduation*</td>
</tr>
<tr>
<td>Approval of admission to candidacy</td>
<td>The Graduate School</td>
<td>Prior to graduation</td>
</tr>
</tbody>
</table>

### GRADUATION REQUIREMENTS FOR NON-THESIS OPTION

<table>
<thead>
<tr>
<th>Step</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Placement of name on graduation list</td>
<td>Student</td>
<td>Indicate on registration materials</td>
</tr>
<tr>
<td>Application for diploma</td>
<td>Office of Graduate Admissions and Records</td>
<td>Deadline available at registration*</td>
</tr>
<tr>
<td>Payment of graduation fee</td>
<td>Bursar's Office</td>
<td>Deadline available at registration*</td>
</tr>
<tr>
<td>Scheduling of Final Examination</td>
<td>Student and Office of Graduate Admissions and Records</td>
<td>Not later than one week prior to Final Examination*</td>
</tr>
<tr>
<td>Final Examination</td>
<td>Master's/Ed.S. Committee</td>
<td>Not later than three weeks prior to Commencement*</td>
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<tr>
<td>Removal of Incomplete(s)</td>
<td>Instructor of course</td>
<td>Not later than one week prior to Commencement*</td>
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### GRADUATION REQUIREMENTS FOR THESIS/PROBLEMS OPTIONS

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<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>
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<td>Final Examination</td>
<td>Master's/Ed.S. Committee</td>
<td>Not later than four weeks prior to Commencement*</td>
</tr>
<tr>
<td>Approval and acceptance of final copy of thesis and thesis card</td>
<td>Master's/Ed.S. committee and The Graduate School</td>
<td>After Final Examination and not later than two weeks prior to Commencement*</td>
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<td>Removal of Incomplete(s)</td>
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*Deadlines are printed in the Graduate School News each semester.*
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<td>The Graduate School on recommendation of department head</td>
<td>Preferably during the first year of graduate study, but at the latest, prior to application for admission to candidacy</td>
</tr>
<tr>
<td>*Comprehensive Examination</td>
<td>Major department</td>
<td>Prior to admission to candidacy</td>
</tr>
<tr>
<td><em>Foreign language examination(s)</em>*</td>
<td>Office of Graduate Admissions and Records</td>
<td>Prior to admission to candidacy</td>
</tr>
<tr>
<td>Submission and approval of application for admission to candidacy</td>
<td>Doctoral committee and The Graduate School</td>
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### GRADUATION REQUIREMENTS

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</tr>
<tr>
<td>Submission of dissertation to doctoral committee</td>
<td>Student</td>
<td>At least two weeks prior to Defense of Dissertation Examination ***</td>
</tr>
<tr>
<td>Scheduling of Defense of Dissertation Examination</td>
<td>Student and Office of Graduate Admissions and Records</td>
<td>Not later than one week prior to Defense of Dissertation Examination ***</td>
</tr>
<tr>
<td>Defense of Dissertation Examination</td>
<td>Doctoral committee</td>
<td>Not later than four weeks prior to Commencement ***</td>
</tr>
<tr>
<td>Approval and acceptance of final copy of dissertation, doctoral forms, and dissertation card</td>
<td>Doctoral committee and The Graduate School</td>
<td>After Defense of Dissertation Examination and not later than two weeks prior to Commencement ***</td>
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*The order of these items varies with individual programs.

**Not required in some programs.

***Deadlines are printed in the Graduate School News each semester.
**Fees and Financial Assistance**

**Residency Classification for Tuition Purposes**

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

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

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

**RULES OF RESIDENCY CLASSIFICATION**

**Intent**

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

**Definitions**

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

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

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

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

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

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

**Rules for Determination of Status**

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

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

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

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

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

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

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

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

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

**Presumption**

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

**Evidence to be Considered for Establishment of Domicile**

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

**Appeal**

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

**Effective Date for Reclassification**

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

**University Fees**

University fees and other charges are determined by the Board of Trustees and are subject to change without notice. All student fees are due in advance. All charges and refunds will be made to the nearest even dollar. All changes are subject to subsequent audit and verification. The University reserves the right to correct any error by appropriate additional charges or refunds.

All students are required to have a validated fee receipt to complete the registration procedure. This includes graduate assistants, teaching assistants, teaching associates, research assistants, staff, and others whose fees may be billed, prepaid, or waived. Delayed registration service fees are also applicable to such students. No student is authorized to attend classes who has not obtained a computerized class schedule and a validated fee receipt. The University is authorized by statute to withhold diplomas, grades, transcripts, and
registration privileges on any students until their debts and obligations (other than Student Loan Funds notes which have not matured) owed to the University are satisfied.

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

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

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

<table>
<thead>
<tr>
<th>IN-STATE FEES</th>
<th>Fall 1993</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MAINTENANCE FEE</strong></td>
<td>Per Semester</td>
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<table>
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<tr>
<th>OUT-OF-STATE FEES</th>
<th>Fall 1993</th>
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</thead>
<tbody>
<tr>
<td><strong>MAINTENANCE FEE AND TUITION</strong></td>
<td>Per Semester</td>
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</table>

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

**In-State**
- $135 per semester hour or fraction thereof; minimum charge $135.
- Out-State $332 per semester hour or fraction thereof; minimum charge $332.

**UNIVERSITY PROGRAMS AND SERVICES FEE**

| PER SEMESTER | $111 |

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

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

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

Knoxville campus day students taking a course load of 3-8 hours may elect to pay the student health fee ($35) plus the appropriate part-time programs and services fee. The University programs and services fee is not refundable. The fee for the summer term is $65.

**LATE PAYMENT FEE**

Graduated Late Service Fee

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

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

Additional Late Service Fees

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

After 10 regular business days, students will be charged a second additional $10 late service fee (total $30). After 15 regular business days, students will be charged a third additional $10 late service fee (total $40). After 20 regular business days, students will be charged a fourth additional $10 late service fee (total $50). After 25 regular business days, students will be charged a fifth additional $10 late service fee (total $60). After 30 regular business days, students will be charged a sixth additional $10 late service fee (total $70). After 35 regular business days, students will be charged a seventh additional $10 late service fee (total $80). After 40 regular business days, students will be charged an eighth additional $10 late service fee (total $90). After 45 regular business days, students will be charged a ninth additional $10 late service fee (total $100). After 50 regular business days, students will be charged a tenth additional $10 late service fee (total $110).

**RETURNED CHECK SERVICE FEES**

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

**RETURNED CHECK SERVICE FEE POLICY**

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

Any student who does not respond within seven days from the date of the first notice will be assessed an additional $10 Service Fee.

Fees and Financial Assistance

**MUSIC FEE**

One half-hour lesson per week per semester ................................ $45

One hour lesson per week per semester .................................. $90

Payable at registration by students receiving instruction in music.

**GRADUATION FEE**

Master’s degree candidates ........................................ $30

Doctoral degree candidates .......................................... $75

Doctoral hood rental (optional) ..................................... $5

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

**PROFICIENCY FEES**

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

**TUITION PAYMENT PLANS**

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

**Prepayment Plan**

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

**Deferred Payment Plan**

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

Room and Board Payment 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 registration check-in. The remaining installments are due every four weeks. For more information and an application, contact the Bursar’s Office.

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

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

It is the student’s responsibility to pay all obligations promptly.

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

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

FEES FOR COURSES NOT TAKEN FOR CREDIT

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

REFUND OF FEES FOR WITHDRAWAL

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

The effective date of withdrawal is the date of the Office of Graduate Admissions and Records.

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

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

For a regular academic semester, withdrawal within 5 business days beginning with the first day following registration check-in permits a 90 percent fee refund. Withdrawal between 6 and 10 business days following registration check-in permits an 80 percent fee refund. Withdrawal between 11 and 15 business days following registration check-in permits a 70 percent fee refund. Withdrawal between 16 and 20 business days following registration check-in permits a 60 percent fee refund. The above withdrawal refund policy does not apply to the off-campus Graduate Centers. Refunds, in accordance with the withdrawal refund policy, will be made after the drop deadline. If financial aid has been received for the term, the refund will be applied to financial aid repayment before the student receives any refund.

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

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

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

Refunds and repayments to the Title IV programs are determined according to the formula published in the "1993-94 Federal Student Financial Aid Handbook."

The Bursar’s Office is responsible for calculating the amount of the refund and/or repayment and distributing the correct amount to the financial aid programs according to the Refund/Repayment Allocation Policy.

REFUND OF FEES FOR DROPPED COURSES

Part-time students may pay fees computed at the appropriate semester-hour rate as indicated above. No charge is made for courses dropped between 9 and 10 business days following registration check-in. A 20 percent charge is made for courses dropped between 9 and 10 business days following registration check-in. A 40 percent charge is made for courses dropped between 11 and 15 business days. A 60 percent charge is made for courses dropped between 16 and 20 business days. A 100 percent charge is made for courses dropped after 20 days. Students who drop courses are eligible for a refund only if the sum of charges computed at the semester-hour rate for the hours continued, plus the percentage assessed for the hours dropped, results in an amount less than that paid. A course on a student’s schedule is officially dropped, and the drop becomes effective, on the date that the charge of registration form is processed on a drop/add terminal. Any refund due for dropped courses will be made after the final audit at the end of the semester.

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

SUMMER TERM FEES AND EXPENSES

Fees and expenses for the summer semester are the same as for other semesters during the academic year, except for University programs and services fees as noted above.

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

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

WAIVER OF FEES

Graduate assistants, teaching assistants and associates, research assistants, staff, and others whose fees are billed, prepaid, waived, or partially waived must complete their registration with the Bursar’s Office, where they should have their fee receipts validated and supply necessary details concerning fee payment. Fee receipts must be validated before classes begin to avoid late registration fees. If an appointment terminates during the term, the student owes the appropriate fees from the termination date until the end of the term.

Graduate students are not eligible for spouse/dependent discounts.

STUDENT HEALTH INSURANCE

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

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

IDENTIFICATION CARD

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

FEES FOR SPONSORED INTERNATIONAL STUDENTS

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

Financial Assistance

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

ASSISTANSHIPS

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

FELLOWSHIPS

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

ACADEMIC COMMON MARKET

The Academic Common Market is an agreement among Southern states for sharing unique programs. Participating states can make arrangements for their residents who are fully admitted to a program 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 include Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia. Twenty-four doctoral, two Specialist in Education, and thirty 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 or the Southern Regional Educational Board, 592 Tenth Street, N.W., Atlanta, GA 30318-5790 (404) 875-9211.

EMPLOYMENT

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

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

LOANS

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

Five types of loan programs are administered by the Financial Aid Office: 1) Federal Perkins Loan, formerly National Direct Student Loan; (Student Aid Report, SAR, must be on file); 2) subsidized Federal Stafford Loan, formerly Guaranteed Student Loan; (SAR must be on file); 3) unsubsidized Federal Stafford Loan; 4) PLUS Loan (requires appropriate loan papers on file); and 5) The University of Tennessee Loan. Processing time varies from one loan program to another. Interested students should contact the Financial Aid Office for more information.

Students must apply through the Financial Aid Office for all loan programs. Loans are limited to U.S. citizens and certain permanent residents.

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

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

VETERANS BENEFITS

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

Special Federal and State Laws and University Policies

Family Educational Rights and Privacy Act

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

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

Use of Social Security Number

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

EEO/Title IX/Section 504 Statement

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

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

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

Security Information

In accordance with the Tennessee College and University Security Information Act of 1989 and the Student 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, distribution, dispensing, or possession of "controlled substances" as defined in the Controlled Substances Act, 21 U.S.C. 812) and alcohol on University property or during University activities.

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

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

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

ALCOHOL ABUSE HEALTH RISKS

Liver disease--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 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--infection, hepatitis, AIDS, death

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

Policy for the Administration of Graduate Assistantships

PREAMBLE

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

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

- Tennessee Conference of Graduate Schools

TYPES OF ASSISTANTSHIPS

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

Graduate Teaching Assistant

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

Graduate Teaching Associate

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

**Graduate Assistant**

Graduate Assistants are appointed to perform various types of duties other than those related directly to teaching or research. Most commonly, these duties relate to supervisory or administrative functions of the University. The annual stipend is payable in either nine or twelve monthly installments. [In addition to the stipend, the Graduate Assistant is entitled to a waiver of fees for the period of appointment in accordance with university policy.]

**Graduate Research Assistant**

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

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

**WORK ASSIGNMENTS AND RELATED FACTORS**

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

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

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

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

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

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

**QUALIFICATIONS OF GRADUATE ASSISTANTS**

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

**SACS Requirement**

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

Regulations specifically addressing the 18-hour requirement are found in Section 4.4.10 and 4.4.2 of the SACS publication, Criteria for Accreditation, (Atlanta, December 1984, p.25 and p.18) and read as follows:

[Graduate teaching associates] who have primary responsibility for teaching a course for credit and/or for assigning final grades for such a course, and whose professional and scholarly preparation does not satisfy the provisions of Section 4.4.2 [which relate to exceptions] must be under the direct supervision of a faculty member experienced in the teaching field, receive regular in-service training, and be regularly evaluated. They must also have at least 18 graduate semester hours in their teaching field.

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

[Exceptions are also discussed.]

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

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

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

**COMPETENCY IN ENGLISH**

The University of Tennessee requires all students 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 Assistants whose first language is not English are required to demonstrate an appropriate level of comprehensibility for classroom teaching by taking the SPEAK Test administered by the Learning Research Center. The Test of Spoken English (TSE) may be taken in lieu of the SPEAK Test. The results of this test will be communicated by the Learning Research Center to the appropriate department to be used in determining the nature and extent of instructional or other duties assigned the Graduate Teaching Assistants or Graduate Teaching Associates. Suggested modes of remediation will be given to the department and graduate student when appropriate.

New international students who have been offered an appointment as Graduate Teaching Assistant or Graduate Teaching Associate will take the SPEAK test after their arrival at UTK, and the results of the test will be used to determine the nature of their assignment. The student who has already taken the TSE and received acceptable scores may be excused from the 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. The University of Tennessee has specific rules and procedures in place for determining the competency of graduate assistants in English. These procedures are detailed in the appropriate university form (APR FORM 1-89).

**RIGHTS/RESPONSIBILITIES OF GRADUATE ASSISTANTS**

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

2. In cases where graduate assistants feel that they have a legitimate complaint about any aspect of carrying out their assignments (work hours, duties assigned, pay, work conditions, etc.), they have a right to pursue all established channels to resolve the conflict. In the order that follows, the student should speak to his/her immediate supervisor, the appropriate Department Head, the appeals committees in the home unit or College, and the Dean of the College/School involved. If the student feels that a resolution should be sought beyond the Department/College level, the Graduate School should be contacted. The Graduate School will follow established procedures outlined in the Graduate Council Appeals Procedure and/or 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 will receive benefits of less than statutorily required payments which include Workers' Compensation" (Section 100105-Pr2-3).

4. Graduate student assistantship appointment (Graduate Assistants, Graduate Teaching Assistants, Graduate Teaching Associates and Graduate Research Assistant) are of two types: "academic year" and "twelve month or other." Students on academic year appointments for the Fall and Spring terms receive 12 equal monthly payments for the 9 months of service and a waiver of fees for three terms (including the Summer). Students appointed to an academic year appointment beginning in the Spring term have the option of receiving 7 equal monthly payments for the January-July period or 6 equal payments for the February-July period. In both cases a fee waiver is provided for Spring and Summer terms. Graduate students appointed on "academic year" appointments have no assistantship responsibilities in the Summer term. Students appointed to "12 month or other" appointments receive equal monthly payments for the months of the appointments and have assistantship responsibilities for the appointment. For these appointments a waiver of fees is provided only for those terms included within the appointments (i.e., a waiver of fees for the Summer term requires an appointment which encompasses the Summer term in its entirety.) In some situations, a graduate assistant may be appointed for a period shorter than a year (e.g., a semester).

Graduate assistants who are performing satisfactorily are normally reappointed up to the maximum time limit as stated below. In situations where the demands of the department do not call for a job to be continued, reappointment may not be made. In cases where a department has a rotational plan for assistantships, graduate assistants likewise may not be reappointed.

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

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

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

EVALUATION/SUPERVISION OF GRADUATE ASSISTANTS

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

In most cases, a graduate assistant's supervisor shares results of the evaluation with the assistant and takes appropriate follow-up action.

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

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

The chain of command within each department is indicated to the graduate assistants. Thus, each graduate assistant should know that the immediate supervisor is the person to whom the first contact is to be made in job related questions/directions; followed, if necessary, by the department head, dean of the college, and the Graduate School officials.

ORIENTATION/TRAINING OF GRADUATE TEACHING ASSISTANTS AND GRADUATE TEACHING ASSOCIATES

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

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

ORIENTATION/TRAINING OF GRADUATE ASSISTANTS AND GRADUATE RESEARCH ASSISTANTS

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

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

ACCEPTING/DECLINING AN ASSISTANTSHIP

The University of Tennessee, Knoxville adheres to the following resolution by the Council of Graduate Schools: Acceptance of an offer of financial aid (such as graduate scholarship, fellowship, traineeship, or assistantship) for the next...
providing career-related assistance to UT Knoxville students through a wide range of programs and services. Included in the services offered are a Career Carnival, an annual career fair providing opportunity to speak informally with representatives from 60-80 different companies about their entry level jobs and hiring practices; a Graduate School Information Day, an annual fair to which a number of graduate schools provide information for advanced study; employer information which includes types of majors sought, job descriptions, career profiles, annual reports and other pertinent information for hundreds of companies that recruit at UT; and workshops providing instruction in skills and tactics for successful interviewing, resume preparation, business and dining etiquette, and other topics. On-campus interviews are scheduled during the year, and require an orientation workshop for registration and participation. Thousands of interviews are scheduled each year which include approximately 275 companies, government agencies and school systems. Two job newsletters are published biweekly, one for positions in education and one for business, industry, and government. Career Services also administers a Credentials Service. Setting up a credential file is a simple process involving the submission of a resume and academic transcript, along with letters of recommendation. An alumni placement service offers assistance in the job search after graduation.

Center for International Education

The Center for International Education (CIE), 201 Alumni Hall, telephone 974-3177, promotes and supports all aspects of international education and international exchange at UT Knoxville, both for American students and faculty and for students and faculty from other countries. The administration of official linkage agreements between UT Knoxville and institutions of higher education in other countries is coordinated by CIE.

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

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

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

The International House, 1515 Cumberland Avenue, is CIE's on-campus social, recreational, and programming center that serves as a meeting place for international and U.S. students, faculty and staff.

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

Child Care

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

Disabled Student Services

Disabled Student Services provides counseling and academic support services to ensure that disabled students have access to educational opportunities provided at The University of Tennessee. Any student having a disability which restricts participation in academic life is eligible for services. Services include personal and career counseling, interpreters, reader referral, and other services designed to meet the student's individual needs. Assistance is available for making arrangements for on-campus class assistance. Information regarding transportation and housing is provided. The office serves in a liaison capacity with the Tennessee Division of Vocational Rehabilitation. Registration and other forms of administrative assistance and academic support are provided through the Office of the Dean of Admissions and Records. Participation in the services program is on a voluntary basis; confidentiality is maintained. Students desiring any services are encouraged to contact the Office of Disabled Student Services so that necessary arrangements can be made. The office is located at 144 Student Services Building.

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

These services include assistance during registration (preregistration, collection of class schedules, payment of fees, drop and add), adjustment of schedules to assure classroom accessibility; securing special parking permits, elevator keys, tickets for special events; and similar efforts to relieve special mobility problems of the students. The Physical Plant Office coordinates efforts to eliminate physical barriers to the extent possible, with priority
Food Service Facilities

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

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

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

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

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

Graduate Student Association

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

Hearing and Speech Services

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

The Center serves as a clinical observation and educational 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 Office of Rental Properties, Stadium Hall.

RESIDENCE HALLS

The Department of Residence Halls provides housing on-campus for single graduate students. Graduate students are given the same priority for housing in residence halls as undergraduate students. All of the residence halls are conducive to academic achievement and personal development. However, many graduate students choose to live in Melrose or the Apartments Residence Halls, since they remain open between the Fall and Spring semesters. Melrose Hall is arranged into smaller communities of six to ten students with personal responsibility emphasized. The Apartments Residence Hall provides apartment-style living for four students. A graduate student wing has been reserved in the Apartment Residence Hall. It is the responsibility of each resident to maintain the apartment to University standards.

Applications and further information can be obtained from the Department of Residence Halls, 405 Student Services Building.

Minority Student Affairs

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

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

The office is located at 812 Volunteer Boulevard.

Ombudsman Office

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

Religious Resources

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

Student Counseling Services Center

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

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

An initial session is available on a walk-in basis, daily from 10:00 - 11:30 and 1:00 - 3:30. Emergencies will be seen any time during the regular hours of 8:00 a.m. to 5:00 p.m., Monday through Friday. The Counseling Center is located at 800 Volunteer Blvd., 974-2196.
Student Health Service

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

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

Those students requiring allergy injections may arrange to receive them at the Clinic.

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

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

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

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

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

Vehicle Operation and Parking

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

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

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

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

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

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

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

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

Women's Center

The Women's Center provides essential informational services and referral services to UT Knoxville students and faculty. The library's specialized collection provides books, journals, and brochures about issues and concerns of women from both a current and historical perspective. Information is available on a variety of topics ranging from racism, violence against women, spirituality, and sex roles. The Women's Center is located in 301 University Center.
COLLEGES
Colleges
The College of Agricultural Sciences and Natural Resources began in 1869 when the University was designated as Tennessee’s Federal Land-Grant Institution. As such, the University was enabled for the first time to offer instruction in agriculture. Graduate instruction began as early as 1889. The College is not only an academic unit of The University of Tennessee, Knoxville campus, but is also (with the Agricultural Experiment Station, the Agricultural Extension Service and the College of Veterinary Medicine) one of the four administrative units of The University of Tennessee’s Institute of Agriculture.

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

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

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

MASTER OF SCIENCE PROGRAMS

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

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

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

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

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

The College of Business Administration 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. The College of Business Administration has facilities for research and service in the fields of research and economic development. The Center for Business and Economic Research is located in the College of Business Administration. The School of Commerce, which was originally the School of Commerce, dating back to 1966 and the doctoral program in 1971. The faculty and students of both units cooperate in a variety of ways, including joint field projects, guest lectures, service on thesis projects, etc. This expands the resources of talent available to students. The college also has a research and public service arm, the Center for Research, Service and Inquiry.

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

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 basis of performance and other criteria. 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 May 1 for consideration of assistantships and fellowships to be awarded for the following fall term.

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

Viewing the business firm as operating in dynamic social, political, and economic environments that demand leaders capable of dealing with innovation and rapid change, the College places central importance on development of students’ thought processes and leadership potential. Emphasis is focused on flexibility of mind, receptivity to new ideas, and capacity to adapt one’s reasoning powers. Our objective is to encourage the student to develop the ability to reason analytically and logically, and to develop a commensurate plan of action. Above all else, we strive to instill the 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, Economics, and Management Science; the Master of Arts with a major in Economics; the Master of Science with a major in Statistics; the Master of Accounting; and the Doctor of Business Administration. The Department of Management and the Department of Psychology in the College of Liberal Arts jointly offer an interdisciplinary program in Industrial and Organizational Psychology leading to the Master of Science in Industrial and Organizational Psychology. Also, the Department of Management Science coordinates an interdisciplinary program leading to the Master of Management Science (see Management Science). The two College-wide programs, the MBA and the Ph.D. in Business Administration, are described in Business Administration, Fields of Instruction. Descriptions of other degree programs are under the appropriate department or program heading.

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College of Communications

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

Departments and Schools
Advertising
Broadcasting
Journalism

Facility for Research and Service
Communications Research Center (CRC)

The College of Communications grew out of the School of Journalism, which was originally located in the College of Business Administration. The Master’s program began in 1968 under Journalism and was changed to Communications after the School gained College status in 1970. The doctoral program was initiated in 1974.

A chair of excellence was established in 1987 to support a distinguished professorship in communications, science, technology, and medical writing. Communications media are a vital force in today’s complex society. Specialization, gaps among segments of society, and the nature of world conflict point to the need for a more comprehensive understanding of how people communicate. Educating men and women in the perceptive understanding of the communications media is a necessity. The graduate programs in the College acquaint students with the nature of communications and prepare them for professional work in many fields.

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

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

For application forms and other information about the M.S. and Ph.D. programs in Communications, write to Associate Dean for Graduate Studies, College of Communications, R.26 Communications Building, The University of Tennessee, Knoxville, TN 37996-0347.

College of Education

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

Departments
Curriculum and Instruction
On February 25, 1994, the Board of Trustees approved the College of Education's newly-developed organizational structure, thus opening the way for the new structure to become operational on July 1. On this date, the seven departments listed above and discussed elsewhere in this catalog are phased out. For updated information on the new structure (which consists of eleven units) and how courses in this catalog have been redistributed across the new college units, please write to the Associate Dean for Graduate Studies, College of Education, 212 Claxton Education Bldg., University of Tennessee, Knoxville, TN 37919-3400, or call the Associate Dean's Office at 615 974-2201 and ask that the updated catalog materials be sent to you. They will be sent in their entirety, upon request.

Facilities for Research and Service
Bureau of Educational Research and Service
Center for Environmental/Energy/Science Education
Center for Physical Activity and Health
Institute for Teacher Education
Instructional Services Center
Public Schools for Cooperative Research
Reading Center
State Testing and Evaluation Center

Education programs were first offered at the graduate level in 1905 by the School of Engineering. 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 faculty of the College of Education is committed to performing three major functions:
(1) to provide professional preparation for teachers, administrators, school service personnel, and other professionals such as health and recreation personnel at the undergraduate and graduate levels;
(2) to collaborate with school personnel, educational agencies, professional groups, and others interested in the evaluation and improvement of educational opportunities, programs, and services; and
(3) to promote and conduct research and development in education and other areas of responsibility.

The College of Education holds membership in the American Association of Colleges for Teacher Education and in the Holmes Group. All certification and degree programs through the doctoral level are fully accredited by the National Council for Accreditation of Teacher Education, the Southern Association of Colleges and Schools, and the Tennessee State Department of Education.

MASTER OF SCIENCE PROGRAMS

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

Students in the College of Education’s five-year preparatory program must meet all criteria for admission to The Graduate School. Admission to Graduate School must be prior to or during the semester that the first graduate credit is to be earned.

SPECIALIST IN EDUCATION PROGRAMS

This degree may be earned in Educational Administration and Supervision, in Educational Psychology and Guidance, in Curriculum and Instruction, in Safety Education and Service, or in Vocational-Technical Education.

DOCTORAL PROGRAMS

The College of Education offers programs of advanced study leading to the Doctor of Education in the major areas listed on the Majors and Degree Programs chart.

Ph.D. in Education requirements are available under Education, Fields of Instruction.

TEACHER CERTIFICATION

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

College of Engineering

Jerry E. Stoneking, Dean
Donald R. Pitts, Associate Dean

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

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

The College had its beginnings in the University when surveying was introduced into the curriculum in 1838. The first two professional degrees, Civil Engineer and Mining Engineer, were established in 1875 at the same time that the Board of Trustees authorized the establishment of a graduate school. Known as Mechanic Arts originally, Engineering became a college in 1904.

The purpose of the College of Engineering is to educate men and women to the high levels of research, technical competence, and social understanding that will enable them to fulfill their responsibilities as professional engineers.

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

GRADUATE PROGRAM AT THE UT SPACE INSTITUTE

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

CENTER OF EXCELLENCE FOR MATERIALS PROCESSING

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

The Center is located in 102 Estabrook Hall, 974-0816.

College of Human Ecology

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

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

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

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

The University of Tennessee was one of the first institutions of higher education in the South to offer home economics, with the first class being offered in 1897. Initially called a School of Home Economics, it combined with Agriculture
in 1947 to become the College of Agriculture and Home Economics. In 1953, the two colleges became separate units, although they continue to share resources. In 1956 the name was changed to Human Ecology, reflecting its focus on people interacting with their environments.

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

The Master of Science degree is offered with majors in Child and Family Studies, Home Economics, Interior Design, Foodservice and Lodging Administration, Nutrition (including public health nutrition), and Textiles, Retailing, and Consumer Sciences; the Doctor of Philosophy degree is offered with a major in Human Ecology and concentrations in child development, family studies, nutrition science, textile science and consumer environments. For additional information, contact the Associate Dean of Graduate Studies, College of Human Ecology, The University of Tennessee, Knoxville, TN 37996-1900, (615) 974-5224.

FACILITIES FOR RESEARCH AND SERVICE

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

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

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

College of Law

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

The University of Tennessee College of Law commenced operation in 1890 and has continuously sought to provide high-quality legal education in a university community. While the principal objective of the college is to prepare students for the private practice of law, its total mission is more broadly conceived. The college exposes students to the legal issues of our society enabling them to develop analytical skills with respect to decisional law and statutes, the ability to communicate effectively their knowledge of the law, an awareness of the historical growth of the law, a knowledgeable appreciation of the interrelationship of law and society, and the ability to use law as an implement of societal control and development. Students are also equipped to serve their communities not only as advocates and counselors, but as policy makers and active, responsible citizens.

THE PROFESSIONAL PROGRAM

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

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

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

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

GRADUATE PROGRAM

Two dual degree programs are available in conjunction with the College of Law: the J.D.-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 Liberal Arts

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

Departments

Anthropology
Art
Audiology and Speech Pathology
Biochemistry
Botany
Chemistry
Classics
Computer Science
English
Geography
Geological Sciences

Germanic and Slavic Languages
History
Mathematics
Microbiology
Music
Philosophy
Physics and Astronomy
Political Science
Psychology
Religious Studies
Romance and Asian Languages
Sociology
Speech Communication
Theatre
Zoology

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
James R. Stokely Institute for Liberal Arts Education
Joint Institute for Heavy Ion Research
Latin American Studies Institute
Psychological Clinic
Science Alliance
Social Science Research Institute

The University of Tennessee began as a liberal arts institution. Before the turn of the century, less emphasis was placed on the liberal education. However, the liberal arts continued to thrive, emerging as a college in 1904. Thus, the College of Liberal Arts is one of the oldest established colleges in the University. The College of Liberal Arts consists of a wide array of academic disciplines and interdisciplinary programs. The central purposes of a liberal education include the encouragement of intellectual tolerance, a dedication to the quest for knowledge as a worthwhile goal in and of itself, and the cultivation of a responsible, creative individual mind. These qualities enable one to develop an ability to reason and to express oneself clearly, an incentive to absorb emerging knowledge, and a competence to confront the uncertainties of human experience. Faculty research and creative activity is the foundation on which education in this College is built. As a result of that endeavor, the lives of students are enriched and the world's body of knowledge grows.

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

GENERAL INFORMATION

Foreign Study Courses

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

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

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

College of Nursing
Joan Uhlt, Dean
Mildred M. Fenske, Associate Dean for Academic Programs
Inez Tuck, Director of Master’s Program
Sandra P. Thomas, Director of Doctoral Program
Sandra McGuire, Director of Undergraduate Program

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

The College of Nursing was established in July 1971. The Master’s program was initiated in 1976 and approval for the doctoral program was granted in 1988. More specific information about the programs may be obtained under Nursing, Fields of Instruction, or by contacting the Director of M.S.N. or Ph.D. Program. The University of Tennessee, College of Nursing, 1200 Volunteer Blvd., Knoxville, TN 37996-4110, (865) 974-4151.

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

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

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

The College of Social Work began as the Nashville School of Social Work, founded in 1942 under the auspices of Vanderbilt University, Scarritt College, and George Peabody College. It joined the University of Tennessee in 1951. By 1974 the three branches, located in Nashville, Memphis and Knoxville, offered the two-year Master's program. The doctoral program was inaugurated in 1980. In 1996 the B.S.S.W. program was added, and the School achieved college status. The University of Tennessee College of Social Work is the only graduate professional social work education program in Tennessee and offers the full continuum of social work education degrees at the baccalaureate, Master’s and doctoral levels.

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

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

A special bulletin describing facilities, admission, fees, and degree requirements is available from the College of Social Work, Henson Hall, Knoxville, TN 37996-3333.

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

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

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

Excellent research opportunities exist for veterinary students in the United States and are engaged exclusively in pet or companion animal practice. A growing number of veterinarians are concerned with the health problems of zoo animals, laboratory animals, wildlife, and aquatic species. A number of veterinarians are involved in the health care of food and fiber animals ensuring the supply of safe and healthy food. Veterinarians also find rewarding careers in the U.S. Public Health Service, the Armed Forces, and in state, county, or local health agencies.

A number of veterinarians are employed by the U.S. Department of Agriculture and by state departments of agriculture for important work in livestock disease control, meat and poultry inspection, serum and vaccine production, and the protection of our country against the importation of foreign animal diseases.

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

Accounting and Business Law
(College of Business Administration)

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

Keith G. Stanga, Head

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

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

Assistant Professors:
Bentley, Denise D., J.D. ...................................... Vanderbilt
Carcillo, Joseph V., CPA, Ph.D. ........................................... Georgia State
Galian, Amy W., Ph.D. ......................................................... VPI
Hethco, Kathleen B., Ph.D. ................................. Oklahoma
Letzinger, M. Clyde (Emeritus), CPA, M.S. ................................................... Tennessee
Murphy, Daniel, CPA, Ph.D. ........................................ North Carolina
Stabaugh, Michael D., CPA, Ph.D. ........................................ Indiana

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

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

THE MASTER OF ACCOUNTANCY PROGRAM

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

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

To qualify for the degree, a student must maintain a B average (3.0) or above in the core and concentration area accounting courses and a B average or higher in the overall program. The student must satisfactorily demonstrate his/her ability to recognize, analyze, and solve accounting policy problems and integrate concepts from the various areas of accounting by passing a comprehensive written examination. This examination is included in the capstone courses in each concentration as follows: 519, Research in Financial Accounting
and Auditing; 539, Tax Policy and Special Topics; and 546, Systems Policy.

**BUSINESS ADMINISTRATION CONCENTRATIONS**

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

**Ph.D. Concentration: Accounting**

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

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

**ACADEMIC STANDARDS**

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

**Accounting**

**GRADUATE COURSES**

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

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

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

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

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

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


521 Seminar in Advanced Managerial Cost Accounting (3) Analysis of conceptual and current issues; impact on developments and practices of managerial and cost accounting. Approaches to management accounting, decision and control models, and planning and control under conditions of uncertainty. Prereq: Cost and Managerial Accounting and admission to a graduate business program or consent of instructor.

522 Budgetary Planning and Control Systems (3) Alternative approaches to formulation and use of planning and control systems to meet organizational objectives. Control systems and corporate structure, discretionary expense centers, profit centers, transfer pricing, and control in manufacturing, service, and non-profit organizations. Prereq: Admission to a graduate business program or consent of instructor.

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

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

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

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

539 Tax Policy (3) Basic concepts of tax policy: complexity, equity, efficiency, administration, and political process. Current issues in tax policy and strategy: organizational form, implicit taxes, arbitrage, tax rates, and related tax topics. Prereq: 431 and admission to M.Acc. program.

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

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

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

540 Advertising Planning (3) Analysis of decision-making in budgeting, creative strategy, media strategy, and advertising.
Aerospace Engineering
See Mechanical and Aerospace Engineering

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

MAJOR DEGREE

Agricultural and Extension Education .......... M.S.
Roy R. Lessly, Head

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

Todd, John D., Ed.D. ................................ Illinois

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

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

THE MASTER’S PROGRAM

Thesis Option
A candidate for the Master’s degree who elects the thesis option must successfully complete:
1. A minimum of 30 hours of graduate credit in courses approved by the student’s advisory committee. Six hours of thesis may be counted toward this requirement.
2. A minimum of 20 hours of graduate credit in courses numbered at or above the 500 level.

3. A minimum of 12 hours of graduate credit in courses appropriate to the area of concentration taught in the department and a minimum of 6 hours taught from outside the department.

4. A minimum of 36 hours of graduate credit in courses approved by the student’s advisory committee.

5. A minimum of 24 hours of graduate credit in courses numbered at or above the 500 level.

6. A minimum of 12 hours of graduate credit in courses appropriate to the area of concentration taught in the department and a minimum of 6 hours taught from outside the department.

7. A minimum of 3 hours of graduate credit in coursework in each of the research methodology or statistics.

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

9. A written and oral comprehensive examination.

GRADUATE COURSES

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

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

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

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

522 Extension Teaching Methods (2) Teaching methods and techniques applicable to extension work. Interpersonal relationships and related effectiveness. Prereq: 411 or consent of instructor. Sp

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

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

525 Curriculum Planning in Agricultural Education (3) Models, principles and procedures for developing curricula in agricultural education and scheduling learning activities for planned instructional programs. Prereq: 435, 436 or consent of instructor.

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

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

531 Extension History, Philosophy and Objectives (2) Historical and philosophical foundations of adult education in American agriculture, key figures, issues, legislative, movement, farmer organizations and programs, Cooperative Extension Service, origin, legislation and growth and nature of present-day objectives and programs. Prereq: 411, 436 or consent of instructor. Sp

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

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

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

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

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

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

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

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

Agricultural Economics and Rural Sociology
(College of Agricultural Sciences and Natural Resources)

MAJOR DEGREE

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

Professors:
Badenhop, M. B. (Emeritus), Ph.D. .......... Purdue
Brooker, J. R. (Liaison), Ph.D. .......... Florida
Cleland, C. L., Ph.D. ...................... Wisconsin
Eastwood, D. B., Ph.D. .................... Tufts
Engel, B. C., Ph.D. ....................... Iowa State
Keller, L. R. (Emeritus), Ph.D. .......... Kentucky
Klinert, T. H., Ph.D. ....................... Purdue
Kreiling, T. H., Ph.D. ...................... Wisconsin
Kreiling, T. H., Ph.D. ...................... McMullan, B. R. (Emeritus), Ph.D. ......... Purdue
Martin, J. A. (Emeritus), Ph.D. ........... Minnesota
Mundy, S. S., Ph.D. ...................... Tennessee
Orr, R. H., Ph.D. ......................... Illinois
Park, W. M., Ph.D. ....................... Virginia Tech
Pantosti, B. R., J. D. ....................... Tennessee
Ray, Darryl E. (Distinguished Prof.), Ph.D. .......... Iowa State
Roberts, R. K., Ph.D. ..................... Iowa State
Sappington, C. B. (Emeritus), Ph.D. .......... Illinois
Whaley, T. J. (Emeritus), Ph.D. .......... Purdue
Williamson, H., Ph.D. ..................... Missouri

Associate Professors:
Jensen, K. L., Ph.D. ...................... Oklahoma State
Pompelli, G. K., Ph.D. ..................... California (Davis)
Assistant Professors:
Davis, George C., Ph.D. .............. NC State
Jaku, Paul M., Ph.D. .............. NC State
Larson, J. A., Ph.D. .................. Oklahoma State
Siegel, Paul B., Ph.D. .............. Virginia Tech

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

THE MASTER'S PROGRAM
Thesis Option
A candidate for the Master's degree must complete a minimum of 33 hours of graduate credit in courses approved by the student's Master's committee. Six hours of thesis may be counted toward this requirement. At least 27 hours of graduate credit must be earned in courses numbered at or above the 500 level. In the agricultural economics concentration, 15 hours of agricultural economics, 6 hours of economic theory and 6 hours of quantitative methods are required. In the rural sociology concentration, 12 hours in the department (9 hours rural sociology, 6 hours of sociological theory, 3 hours of research methods and 3 hours of statistics are required. Each student must successfully complete a final oral examination.

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

Minor
A minor will include 6 hours of coursework in the department, with at least 3 hours in 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 in macroeconomic and microeconomic theory. Comprehensive exams include three written exams and one oral exam. The written exams are in general agricultural economics, quantitative methods, and the area of concentration.

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

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

Agricultural Economics

GRADUATE COURSES
412 Agricultural Finance (3) Micro-finance, financial objectives, acquisition of debt and equity funds, capital investments, capital allocation, credit analysis, borrower and lender decision making, financial statements, insurance, management of agricultural organizations. Prereq: Intermediate Agricultural Economics or consent of instructor. F
420 International Agriculture Trade and Marketing (3) Real and monetary aspects of international trade and effect of agricultural commodity flows; partial equilibrium analysis of international trade in agricultural products; institutional aspects of international marketing of agricultural products. Prereq: Intermediate Agricultural Economics or consent of instructor. F
430 Agricultural Policy (3) Values, goals and policy priorities; economic and political efficacy and welfare. Prereq: Intermediate Agricultural Economics or consent of instructor. F
440 Agricultural Production Economics (3) Application of microeconomic theory to problems of resource allocation, enterprise selection, scale of operation of agricultural firms; economic interpretation of technical agricultural production relationships. Prereq: Intermediate Agricultural Economics or consent of instructor. F
442 Agribusiness Management (3) Advanced decision analysis in farm and agribusiness settings. Planning and organizing functions, analyzing investment alternatives, evaluating economic benefits, analyzing financial statements, assessing profitability and solvency, use of computers in business decisions. Prereq: Farm Business Management, Microcomputer Applications to Problem Solving, Statistical Methods, and Principles of Managerial Accounting or consent of instructor. F
450 Agricultural Price Analysis (3) Analysis of demand and supply mechanisms in agriculture; price determinations; spatial equilibrium; temporal price patterns; pricing institutions. Prereq: Intermediate Agricultural Economics, Marketing of Agricultural Products and Statistical Methods. F
460 Rural Economic and Community Development (3) Historical and theoretical perspective on problems facing rural communities; linkages between farm and nonfarm sectors; models and tools for analyzing rural development. Prereq: 210 or consent of instructor. F
470 Natural Resource Economics (3) Nature of natural resources; economic efficiency as basis for natural resource use; externality in natural resource use; factors influencing environmental quality; alternative public policy tools to influence natural resource use; improving environmental quality. Prereq: 210 or consent of instructor. Sp
500 Thesis (1-15) P/NP only. E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/N only. E
505 Microeconomic Analysis (3) Theory of utility maximization and demand, production, cost, firm behavior, and supply. Price in production and factor markets, efficiency and welfare. Prereq: Calculus and Intermediate Microeconomic Equilibrium or equivalent. F
520 Research Methodology (1) Nature of scientific methodology and research processes; role of assumptions, hypotheses, theory and models, methodological problems of social sciences; establishing research priorities. Prereq: Consent of instructor. F
522 Mathematical Programming Methods in Agricultural Economics (3) Linear, integer and quadratic programming techniques with empirical applications to problems of firm and region; profit maximization, cost minimization, transportation, risk, allocation over space and time. Prereq: Consent of instructor. Sp
524 Econometric Methods in Agricultural Economics (3) Application of statistical methods to agricultural economic models; estimation of supply, demand and production functions; microeconomic forecasting models; interpretation of results. Prereq: Statistics 461 or consent of instructor. F
530 Agricultural Policy Analysis (3) Evaluation of public policy as related to agricultural industry and rural areas. Prereq: 505 and Economics 513 or consent of instructor. F
540 Advanced Agricultural Production Economics (3) Theoretical and empirical concepts in agricultural resource allocation; evaluation of both static and dynamic decisions; supply, demand and production functions. Prereq: Agricultural Economics 511 or consent of instructor. Sp
542 Agricultural Policy Analysis (3) Theoretical and empirical concepts in agricultural resource allocation; evaluation of both static and dynamic decisions; supply, demand and production functions. Prereq: Agricultural Economics 511 or consent of instructor. Sp
550 Advanced Natural Resource Economics (3) Analysis of natural resource allocation issues; applied welfare economics, external effects and evaluation of public policy. Prereq: 470 and Economics 511 or consent of instructor. F
553 Special Topics in Agricultural Economics (1-3) Topics to be announced. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. S/N only. E
600 Doctoral Research and Dissertation (3-15) P/NP only. E
620 Advanced Quantitative Methods (3) Discussion and evaluation of advanced statistical and mathematical techniques in current agricultural economics research. Prereq: 522, 524, and Economics 581-582, or consent of instructor. Sp, A
640 Agricultural Supply Analysis (3) Critical evaluation of both theoretical basis and empirical procedures used for estimating supply relations in agriculture, with emphasis on regression analysis, production functions, mathematical programming, growth models, and simulation in supply analysis. Prereq: 540 or consent of instructor. F
650 Analysis of Agricultural Markets (2) Advanced theory and application of market analysis. Analysis of technical and pricing efficiency and examination of issues in agricultural and food markets. Prereq: 450 and 550 or consent of instructor. Sp, A
652 Consumer Demand and Food Consumption (2) Simultaneity of consumer demand making; food demand. Constraints on demand. Complete demand system modeling. Prereq: Economics 511 and 512 or consent of instructor. Sp, A
660 Seminar in Rural Economic Development (2) Current topics in economic development of rural areas. Current literature, evaluation of issues in both international and domestic development. Prereq: 560 or consent of instructor. Sp, A

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

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

THE MASTER'S PROGRAMS

Agricultural Engineering

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

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

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

Program electives 6 hours

Thesis 500 6 hours

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

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

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

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

Program electives 6 hours

Coursework in special emphasis area 6 hours

Capstone Experience (project and report, typically 508) 3 hours

In addition to completing the 33 semester hours, non-thesis students must pass a comprehensive oral examination covering the graduate program, including the capstone experience. At the discretion of the candidate's committee, an oral examination may also be required.

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 agricultural engineering and supporting areas (engineering, computational methods, agricultural and biological sciences, and other related areas). Of the 75 hours, 48 must be in courses numbered greater than 500 (including 24 hours of course 600) and 6 hours of courses at UK 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
Agricultural Engineering

GRADUATE COURSES

413 Component Design and Machine Synthesis (3) Synthesis of design: structural, kinematic, power, control system development; preparation of design drawings, specifications, models of products; design of report on project. Prereq: Engineering Design Fundamentals. 1 hr and 2 labs. Sp

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

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

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

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

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

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

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

505 Professional Communications Seminar (1) Reviews and discussion of current topics, recent advances and current issues, presentations by students. Prereq: 504. May be repeated in different programs. Maximum 5 hrs. (Same as Agricultural Engineering Technology 505). S/NC only. F, Sp

510 Similitude in Design and Research (3) Dimensional analysis; governing equations; theory of models; true, distorted, similar, virtual models; prediction equations; interpretation of data; applications to machine design, soil and water structures, agricultural buildings and other agricultural engineering problems. Prereq: Engineering Science and Mechanics 521. 3 hrs and 1 lab. A

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

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

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

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

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

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

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

620 Computer Simulation of Agricultural Systems (3) Scientific approach to digital simulation; system definitions and boundaries, formulation of models, algorithms and solution techniques, encoding of prediction equations into simulation models, and system response. Types of control, frequency response, system compensation, and system analysis. Application to agricultural systems. Prereq: 451, Mathematics 231. Basic Engineering 101, 201 or equivalent. 2 hrs and 1 lab. F, A

630 Feedback and Control Systems (3) Differential equations for physical systems; solutions, transforms, and system response. Types of control, frequency response, system compensation, and system analysis. Application to agricultural systems. Prereq: 506. Basic Engineering 101, 201 or equivalent. 2 hrs and 1 lab. F, A

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

Agricultural Engineering Technology

GRADUATE COURSES

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

432 Agricultural Machinery and Tractors (3) Agricultural machinery and power units; adaptation to agricultural practices; management considerations; field efficiencies; capabilities; adjustments, and servicing. Prereq: Calculus A. 2 hrs and 1 lab. Sp

442 Agricultural Waste Management and Pollution Control (3) Waste renovation fundamentals; characteristics of animal wastes; collection, transport, and utilization of livestock waste; pollution control. Prereq: Mathematics 121. 2 hrs and 1 lab. F

452 Internal Combustion Engines (3) Theory, concepts, and mechanics of small internal combustion engines; cycle analysis; selection and operation; troubleshooting and repair of single-cylinder engines. Prereq: Introductory Physics or consent of instructor. 2 hrs and 1 lab. F

462 Chemical Agricultural Application Technology (3) Equipment for application of liquid, solid, and gaseous agricultural chemicals; system components; operational characteristics; calibration; selection, and management; safety considerations; material handling and application methods. Prereq: Physics 121 or consent of instructor. 2 hrs and 1 lab. Sp

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

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

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

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

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

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

512 Agricultural Machinery Systems Analysis (3) Analysis of current field machinery, adaptation planning for new equipment and alternate production and harvesting systems. Operational management. Prereq: 432 and 506. 2 hrs and 1 lab. F, A

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

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

542 Simulation of Agricultural Systems (3) Synthesis and analysis of agricultural systems using computer simulation, philosophy of system simulation, critical path, discrete and continuous systems. Prereq: 506 and scientific computer programming. 2 hrs and 1 lab. F, A

546 Automation and Control 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, A

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

Agriculture

(College of Agricultural Sciences and Natural Resources)

GRADUATE COURSES

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

Animal Science

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

MAJOR DEGREES

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

Kelly Robbins, Head

Professors
Barth, K. M. (Emeritus), Ph.D. ..... Rutgers Animal Science Bell, M. C. (Emeritus), Ph.D. ..... Oklahoma State Bletner, J. K. (Emeritus), Ph.D. ..... Ohio State Chamberlain, G. C. (Emeritus), Ph.D. ..... Iowa State Erickson, B. H., Ph.D. ..... Kansas State
The Department of Animal Science offers graduate programs leading to the Master of Science and Doctor of Philosophy with a major in Animal Science. At the M.S. level, areas of concentration are nutrition, breeding, physiology (reproductive, mammalian, and metabolic), and management with orientation towards beef cattle, dairy cattle, swine, and poultry. Since the department is also a part of the College of Veterinary Medicine, the areas of anatomy, systematic physiology (blood, cardiovascular, and neural), and histology are also available. The Ph.D. program offers concentrations in animal nutrition, animal breeding, animal physiology, animal anatomy, and animal management. For specific information, contact the department head.

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

THE MASTER'S PROGRAM

For admission to the M.S. program, a student must have obtained a 3.0 grade-point average on a 4.0 scale (or a 3.0 each term during the junior and senior years) in a completed undergraduate degree program in one of the animal sciences or in a related area. The student must submit evidence (letters of recommendation, personal interview, etc.) that indicates ability to complete requirements for the M.S. Prerequisite courses may be required if the student has an unsatisfactory grade-point average, acceptance may be on a provisional (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 are 1 hour of Agriculture 512 and a minimum of 3 hours in statistics. These statistics courses must be chosen from the 400, 500, or 600 level of courses approved for use in the Intercollegiate Graduate Statistical Program (ICGSP). The remainder of the coursework will be selected jointly by the student and the major professor depending on the student’s area of concentration and professional objectives.

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

THE DOCTORAL PROGRAM

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

1. A minimum of 16 hours in related fields outside of animal science.
2. At least 24 hours credit at the 500 and 600 level, exclusive of doctoral research and dissertation, of which a minimum of 12 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 concentrations for a total of 12 hours (including 581).
3. A minimum of 1 hour of Agriculture 512 in addition to that required at the M.S. level.
4. A minimum of 6 hours in 400-, 500-, or 600-level statistics courses approved for the ICGSP.

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

GRADUATE COURSES

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

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

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

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

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

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

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

486 Lamb and Wool Production and Management (3) Integration of principles of selection, nutrition, breeding, physiology, and marketing into complete production and management programs. Structure of industry, enterprise establishment, systems of production, production responses and economic returns. Prereq: 300-level core courses or equivalent or consent of instructor: 2 hrs and 1 lab. Sp

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

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

511 Special Problems in Animal Science (1-4) Prereq: Consent of instructor and department head. May be repeated. Maximum 8 hrs. E

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

523 Advanced Mammalian Reproduction (3) Current topics and "new frontiers" in reproductive biology. Prereq: 322. Sp, A
534 Advances in Mammary Physiology (3) Devel-
opment, anatomy, and function of mammary glands; en-
dermic interactions associated with mammary de-
velopment and function; factors affecting yield and com-
position of mammary secretions. Preq: 522 or consent of
instructor. Sp.A

530 Animal Nutrition and Metabolism (4) Compa-
native digestive physiology, digestion, absorption and
metabolism of nutrients in ruminant and nonruminant spe-
cies. Concepts and methodologies of animal growth and
nutrient requirements; interrelationships, availability and
deficiencies of nutrients. Preq: Animal Nutrition, Feeds,
and Ration Formulation or consent of instructor. F

531 Analytical Techniques in Animal Science (Prin-
cepts, methods applied to characterize and
characteristic study of cells, organelles and
biologically active molecules. Demonstration of meth-
ologies: nutrient analyses, histology and ultrastructural
morphology, immunoperoxidase staining, competitive
binding assays, protein biochemistry and molecular biology. Preq: Or-

532 Ruminology (2) Anatomy, physiology, and micro-
oblogy of rumin eystem: ruminal fermentation and
metabolism of polyunsaturated fatty acids and nitrogen.
Preq: 530 or consent of instructor. Sp.

541 The Genetics of Populations (2) Application and
extension of principles and concepts learned in basic
population genetics and genetic methodology to convey
useful comprehension of the genetics of populations.
Preq: Basic courses in genetics, breeding and statis-
tics. 1 hr and 1 lab. F, Sp, A

542 Applied Animal Breeding (3) Procedures for esti-
mat ing population parameters; determination of response to
various selection methods and breeding system, estima-
tion of genetic and phenotypic interrelationships
among metric traits, estimation of breeding values, spe-
cific methods of simultaneously altering several metrics
characters. Industrial application of animal breeding
methodology. Preq: 541 or equivalent. Sp, A

571 Design and Analysis of Biological Research (3) Ex-
pertimental design and procedures; selection of ex-
perimental units, analysis and interpretation of data;
statistical models and contrasts, analyses of variance;
covariances, treatment arrangements, mean separation
and regression. Prereq: Plant and Soil Science 471 or equivalent;
knowledge of software packages or micro-
computer, microcomputer software. (Same as Plant and Soil Science
571.) Sp

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

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

595 Colloquium in Animal Science (1) Orientation;
teaching, research and extension programs. Guidance in
preparation of student's course of study and research
plan s. Required of beginning graduate students in animal
science program. S/N only. F

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

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

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

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

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

Animal Science-Veterinary Medicine
See Veterinary Medicine for program
description.

GRADUATE COURSES

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

502 Registration for Use of Facilities (3-15) Required
for the student not otherwise registered during any
semester when student uses University facilities and/or
classroom during any semester when student uses University facilities and/or
classroom during any semester when student uses University facilities and/or
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classroom during any semester when student uses University facilities and/or

521 Advanced Mammalian Physiology I (4) Mem-
brane, neuron, central nervous system, muscle, cardio-
vascular system, and endocrine system. Prereq: gen-
eral undergraduate anatomy and physiology and Bio-
chemistry 410 or equivalent or consent of instructor.
Recommended preq: Biochemistry 410. (Same as Zoology 521.) 3 hrs and 1 lab.

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

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

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

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

554 Comparative Hematology (3) Morphology, physi-
yology and development of blood and blood forming
organs: similarities and differences of major domestic
and laboratory species. Prereq: Undergraduate physi-
ology or consent or instructor. 2 hrs and 1 lab. Sp,A

651 Advanced Topics in Animal Anatomy (1-4) Cur-
rent and future research on anatomy, laboratory sit-
uation, recent advances in quantitative techniques for
gross and microscopic anatomy. Prereq: Consent of in-
structor. May be repeated. Maximum 6 hrs. E

652 Disorders of the Endocrine System (2) Patho-
logical and physiological aspects of diseases of endocrine
glands of various animal species. Preq: 521 or consent of
instructor. Sp,A

Anthropology

(College of Liberal Arts)

Major

Anthropology

DEGREES

Jan F. Simek, Head

Professors:
Bass, William M., Ph.D. .................. Pennsylvania
Faulkner, Charles H., Ph.D. .......... Indiana
Jantz, Richard L., Ph.D. .................. Kansas
Klippel, Walter E., Ph.D. .............. Missouri
Parmalee, Paul W. (Emeritus), Ph.D. ................. Texas A&M

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

Associate Professors:
Harrison, Faye V., Ph.D. ............. Stanford
Harrington, Ira E., Ph.D. .......... Syracuse
Howell, Benita J., Ph.D. .......... Kentucky
Logan, Michael H., Ph.D. .......... Pennsylvania
Schroeder, Gerard F., Ph.D. ....... Washington State
Simek, Jan F., Ph.D. ................. SUNY Binghamton

Assistant Professors:
Kongsberg, L., Ph.D. ............... Northwestern
Kramer, A. (Liaison), Ph.D. .......... Michigan

Research Associate Professor:
Chapman, Jefferson, Ph.D. .......... North Carolina

Research Assistant Professor:
Elam, Michael, Ph.D. .............. Missouri
Frankenberg, Sison, Ph.D. .......... Northwestern
Tardif, Suzette D., Ph.D. .......... Michigan State

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

THE MASTER’S PROGRAM

For admission, an applicant must provide
a minimum of 24 of these hours must be
in anthropology, including the following:
a. 510 and 560
b. one of the following courses: 512, 513, 514, 515
c. one of the following courses: 520, 531, 561, 564
d. two of the following courses: 580, 581, 582, 583

Other requirements must be met prior to
taking the Graduate Evaluation Examination.

2. Successful completion of the depart-
mentally developed Graduate Evaluation
Examination (GEE). It is expected that it will be
taken at the end of the third semester in
residence. The GEE is given each year in
January.

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

4. Successful completion of the thesis and
final oral examination.

THE DOCTORAL PROGRAM

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

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

ACADEMIC COMMON MARKET

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

GRADUATE COURSES

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

411 Linguistic Anthropology (3) Basic linguistic concepts applied to research in cultural anthropology; investigation of relationships between language and culture. Prereq: 130 or Linguistics 200. (Same as Linguistics 411.)

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

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

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

431 Ethnographic Research (3) Conceptual and practical exploration of methods and techniques cultural anthropologists use in fieldwork. Prereq: Cultural Anthropology or consent of instructor.

425 Historical Archaeology Laboratory (3) Laboratory procedures for processing, identification, and interpretation of artifacts from historical sites. Artifactual material from historic East Tennessee sites used for class projects. Recommended prereq: Historic Archaeology.

440 Cultural Ecology (3) Concepts and methods in studying dynamic interaction between prehistoric and present day cultures and their environments; ecological theory, methods of review of selected cases, and review of selected textbook studies. Prereq: 120, 130, 410, or consent of instructor.

450 Current Trends in Anthropology (3) Analytical, integrative review of current directions of research and theory in anthropology.

459 Selected Topics in Anthropology (3) Theoretical issues in anthropology for undergraduate students. Topics may include practical experience or laboratory study of anthropological materials. Prereq: Either Human Origins, Prehistoric Archaeology, Cultural Anthropology, or consent of instructor. May be repeated. Maximum 6 hours.

461 African Prehistory (3) African cultural history from earliest evidence of human activity to times of European contact. Study of African stone tool traditions. Prereq: 120 or consent of instructor. (Same as African Studies 461.)

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

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

464 Principles of Zoologiae (3) Basic biological principles of major vertebrate groups; aboriginal use of animals in subsistence and culture. Identification and interpretation of archaeologically deposited remains of vertebrate remains; introduction to laboratory use of comparative collections. Prereq: 120 or consent of instructor.

465 Urban Anthropology (3) Field anthropology and interpretation of archaeological remains on historic urban sites in U.S. Lectures and laboratory research on urban sites in East Tennessee. Recommended prereq: Historic Archaeology.

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

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

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

494 Museology III: Field Projects (1-12) (Same as Art 494.)


494 Primate Behavior (3) Social organization and behavior of selected primates: group composition, size, and structure; patterns of social interaction; communication; and cultural behavior: application of primates studies to human ethology. Prereq: 110 or consent of instructor.

499 Human Response to Environmental Stress (3) Physiological perception of stress from physical environment and psychological, anatomical and behavioral responses to stress.

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

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

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

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

511 Special Topics in Cultural Anthropology (3) Seminars for advanced students on topics of special interest: ethnomedicine, psychological anthropology, comparative social organization, religion, and art. Prereq: Consent of instructor.

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

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

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

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

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

517 Forms of Social Inequality (3) Anthropological perspectives on societies stratified along lines of rank, caste, race, ethnicity, age, class, and sex. Production and social structure under sex role structure. Construction of social distinctions before and after rise and consolidation of modern world systems. Interactions of race and ethnicity with class and gender.

520 Seminar in Zoologiae (3) Approaches to analysis and interpretation of archaeological fauna. In-tensive 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 Zoologiae (3) Examination and comparison of skeletons of major vertebrate groups; shells of terrestrial and aquatic molluscs, in relation to animal remains in archaeological contexts. Basic osteology and shell characters of species encountered in aboriginal sites; use of comparative collections. May be repeated. Maximum 8 hrs.

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

530 Fieldwork in Archaeology (3-9) Practicum in surveying, excavating, processing, and analysis of archaeological data. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

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

560 Theory in Archaeology (3) Detailed consideration of theory in contemporary archaeology; methods of scientific explanation, research design, and methodologies for archaeology: process and problem formulation, processes of analysis and interpretation.

561 Archaeological Resource Management (3) Federal legislation and regulations affecting identification, protection, and management of archaeological resources. Professional ethics and responsibilities and relationship of federal and state agencies, public interest groups, academic and professional arenas, and requirements of federally sponsored archaeology. May be repeated. Maximum 8 hrs.
Arts.

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

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


583 Skeletal Biology (3) Practical and theoretical approaches to analysis of prehistoric human skeletal remains. Demography, vital statistics, pathology, nutrition, and measures of biological relationships as related to population as adaptive unit. Prereq: 480.

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

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

587 Laboratory in Forensic Anthropology (3) Discussion and lab experience with forensic anthropological techniques: radiographic analysis, dental examination, hair analysis, bone microstructure. Prereq: Human Origins, 480, 581 or consent of instructor. 2 hrs and 1 lab.

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

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

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

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

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

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

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

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

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

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.

625 Gross Human Anatomy (9) Muscle, nerves, and cardiovascular system. Dissection of cadavers. Prereq: 480 or Human Biology. 5 hrs and 6 labs.

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

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

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

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

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

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

695 Gross Human Anatomy (9) Muscle, nerves, and cardiovascular system. Dissection of cadavers. Prereq: 480 or Human Biology. 5 hrs and 6 labs.

Arts.

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

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


583 Skeletal Biology (3) Practical and theoretical approaches to analysis of prehistoric human skeletal remains. Demography, vital statistics, pathology, nutrition, and measures of biological relationships as related to population as adaptive unit. Prereq: 480.

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.

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

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

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

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

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

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

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

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

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

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

695 Gross Human Anatomy (9) Muscle, nerves, and cardiovascular system. Dissection of cadavers. Prereq: 480 or Human Biology. 5 hrs and 6 labs.

Academic Regulations

400 Service Practicum (0) Experience in architectural or equivalent office for a minimum of 3 months to be completed prior to fifth year entry. E.

400 Service Practicum (0) Experience in architectural or equivalent office for a minimum of 3 months to be completed prior to fifth year entry. E.

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

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


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

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

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

Academic Regulations

400 Service Practicum (0) Experience in architectural or equivalent office for a minimum of 3 months to be completed prior to fifth year entry. E.

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

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


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

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

410 History and Theory of Urban Form (3) Patterns of community development. Selected historical and contemporary examples. Basic urban design issues and exemplary design approaches through lectures, readings, essays, and sketch studies. Historical change in urban form and design.
412 Non-Western and Indigenous Architecture (3): Building responsive to climate, material availability, and economic level, as designed by anonymous builders. Prehistoric times to present throughout world. Felice Certain, Indus Valley; Hindu, Buddhist, and Mogul architecture of India, China, and Japan.

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

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

415 Medieval Architecture (3): History of architecture from decline of Rome to beginning of Renaissance.


417 The International Style (3): Survey of architecture of early modern movement, primarily in Europe and America, 1900-1940.


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

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

428 Special Topics in Architecture (1-4): Individual projects under direction. Credit adjusted to project complexity and level of effort. May be repeated. Maximum 6 hrs.

429 Special Topics in History, Theory and Criticism (1-4): Special topics in history-related subjects. May be repeated. Maximum 8 hrs.


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

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

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

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


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

500 Thesis (3-15): P/NP only. E

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

511 Graduate Seminar: Environmental Influences (3): Environmental factors which influence regional character of architecture. Natural forces associated with these factors, cultural interpretation and response regarding importance and impact. Coreq: 571.


513 Graduate Seminar: Cultural Aesthetics (3): Principles underlying cultural character of architecture. Role of social, political and economic forces which influence interpretation of designs created by building's character. Coreq: 571.

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

521 Principles of Architectural Form (3): Historical and contemporary architectural theory through investigation of literature and related examples. Theorists and understandings and theories of related generation of architectural form and space in response to both cultural and environmental focus. Coreq: 571.


552 Application of Research Methods (3): Projects and case studies applied to methods of architectural research and scholarship identified in 551.

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

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


573 Architectural Design Studio/Seminar III: Cultural Aesthetics (6): Role of cultural influences on architectural form. Investigations into relationship between place and culture and impact on architectural character. Readings and discussions; process of formal synthesis in design studio. Prereq: Design II. 1 hr and 5 labs.


591 Foreign Study (1-9)

592 Off-Campus Study (1-9)

593 Independent Study (1-9)

Art (College of Liberal Arts)

MAJOR

DEGREE

Art

M.F.A.

Norman Magden, Head

William C. Kennedy, Associate Head

Professors:

Blain, Sandra J., M.F.A. .................................. Wisconsin

Brakke, P. M., M.F.A. .................................. Yale

Clarke, R. A. (Emeritus), M.S. ...................... Wisconsin

Cleaver, Dale G. (Emeritus), Ph.D. .............. Chicago

Daehnert, R. H., M.F.A. ............................. Wisconsin

Falsetti, Joseph S., M.S. ............................. Ohio State

Goldenstein, M. B., M.F.A. .......................... Nebraska

Kennedy, William C., M.F.A. ...................... Wisconsin

Lee, B., M.F.A. ........................................... Yale

Lefevre, Richard, M.F.A. ......................... Rochester IT

Longobardi, Pamela, M.F.A. ........................ Montana State

Lyons, B., M.F.A. ........................................ Arizona State

Magden, Norman, Ph.D. Case Western Reserve

Metros, Susan S., M.F.A. ........................... Michigan State

Moffett, F., Ph.D. ........................... Chicago

Neff, A., Ph.D. ....................................... Pennsylvania

Staples, Carolyn, M.F.A. ............................. Michigan State

Wilson, D., M.F.A. ..................................... California (San Diego)

Assistant Professor:

Hiles, Timothy, Ph.D. .................................. Penn State

The Master of Fine Arts is the terminal degree in studio art. It is offered in the concentration areas of ceramics, graphic design/illustration, drawing, fiber-fabric painting, printmaking, sculpture, and watercolor. Interdisciplinary 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 assistance, 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 inter-area program must be approved by the graduate faculty only after the second semester in residence. Ten hours of concentration must be in second year courses (512, 514, etc.).
2. A minimum of 9 hours of art history for graduate credit.
3. Eleven hours of electives which may consist of any combination of courses offered by the University for graduate credit.
4. Art 599, Project in Lieu of Thesis (20 hours). A third year of semi-independent study. Student must have completed all other coursework prior to registration.
5. A student with the permission of the area faculty can petition to take 3 hours of outside graduate courses as a substitute for 3 hours of art history or 3 hours of concentration area. The petition is to be presented to the graduate committee for final approval and should directly address the need and relevance of this substitution to the student’s concentration.

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

The candidate’s committee will consist of a minimum of 3 members and a maximum of 6 members and will be appointed prior to registration. Three members of the committee shall be as follows: one from the candidate’s concentration area who shall be the major professor, one from art history, and one from a studio discipline outside the concentration area.

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 courses, the student must present for evaluation by the faculty and receive permission to register for Project in Lieu of Thesis.
3. If, in a review by the student’s major area faculty, the student’s progress is deemed insufficient, the faculty may recommend a work period without advancement toward the degree, probation with specific goals set for a specific time, or dismissal.

ACADEMIC COMMON MARKET
An agreement among southern states for sharing graduate programs allows legal residents of 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) or Arkansas (concentration in graphic design/illustration 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.

GRADUATE COURSES
400 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 medium for artistic expression.
401 Individual Class Projects in Fabric (3-6) Prereq: Two-Dimensional Fabric, Three-Dimensional Fabric or consent of instructor. May be repeated. Maximum 12 hrs.
402 Individual Class Projects in Fiber (3) Prereq: Two-Dimensional Fiber, Three-Dimensional Fiber or consent of instructor. May be repeated. Maximum 12 hrs.
404 Computer Enhanced Design (3) Exploration of computer systems, software and techniques. Prereq: Introduction to Computer Enhanced Design or consent of instructor. May be repeated. Maximum 6 hrs.
405 Advanced Computer Enhanced Design (3) Prereq: 404 or consent of instructor. May be repeated. Maximum 6 hrs.
410 Special Topics in Fiber/Fabric (3) Prereq: Two-Dimensional Fiber, Three-Dimensional Fiber or consent of instructor. May be repeated. Maximum 12 hrs.
411 Drawing IV (6) Individualized pursuit of personal drawing techniques and concepts; supplemented by individual and group critiques; weekly life drawing sessions. Prereq: 311. May be repeated. Maximum 12 hrs.
413 Painting IV (6) Individual concepts and personal expression with varied media. Prereq: 313. May be repeated. Maximum 12 hrs.
417 History of Modern Architecture in Europe and America (3) 19th-century styles, Sullivan and the skyscraper. 20th century: Viennese leaders, the Bauhaus, Gropius, Van der Rohe, Le Corbusier, and Wright. Aalto to Kahn, Tange and Metabolism, Archigram, Soleri, and Venturi.
418 History of North American Art (3) Landmarks in painting, sculpture, and design from prehistory to 1900.
419 Special Topics in Painting (3) Prereq: Determined by department. May be repeated. Maximum 12 hrs.
420 Advanced Ceramics I (3) Prereq: 320. May be repeated. Maximum 12 hrs.
424 Ceramics: Clay and Glazes (3) Clay chemistry, clay bodies, glaze theory, glaze calculation, intensive formulating; mixing of clay bodies and glaze formulas. Prereq: 321 and 322.
425 History of Ceramics Seminar (3) Ceramics from ancient through contemporary. Ceramics sculpture, and vessel aesthetic. Slide lectures and individual presentations. May not be used toward art history requirement. Prereq: 321 and 322.
426 Klimt: Design, Construction and Operation (3) Designing kilns, traditional and modern refractories, construction methods, and operation of wood, gas, and electric kilns. Prereq: 321 and 322.
428 Special Topics in Ceramics (3) Student- or instructor-initiated course offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 12 hrs.
431 Photography III (3-6) Prereq: 321 and 331. May be repeated. Maximum 12 hrs.
433 Special Topics in Photography (3) Prereq: Determined by department. May be repeated. Maximum 12 hrs.
434 Special Topics in Sculpture (3) Prereq: Determined by department. May be repeated. Maximum 12 hrs.
440 Advanced Sculpture (3-6) Prereq: 331. May be repeated. Maximum 12 hrs.
441 Advanced Design (3-6) Prereq: 331. May be repeated. Maximum 12 hrs.
443 Advanced Graphic Design II (3) Advanced investigation into visual systems and their impact on visual designs. Design project. Prereq: 451.
444 Advertising Illustration (3) Advertising illustration media and techniques as applied to product illustration. Prereq: 354.
448 Graphic Design/Illustration Practicum (1-12) Practical experience in design or illustration field. Only by arrangement with department. Prereq: Senior standing and consent of instructor. May be repeated. Maximum 12 hrs.
449 Special Topics in Graphic Design/Illustration (3) Prereq: Determined by department. May be repeated. Maximum 12 hrs.
450 Special Topics in Printmaking (3) Prereq: Determined by department. May be repeated. Maximum 12 hrs.
451 History of North American Art (3) Landmarks in painting, sculpture, and design from prehistory to 1900.
452 History of 20th-Century American Art (3) Development in architecture, painting, and design from 1900.
453 19th-Century American Painting (3) From West and Guppy to emergence of "The Eight."
454 History of Modern Architecture in Europe and America (3) 19th-century styles, Sullivan and skyscraper. 20th century: Viennese leaders, the Bauhaus, Gropius, Van der Rohe, Le Corbusier, and Wright. Aalto to Kahn, Tange and Metabolism, Archigram, Soleri, and Venturi.
541 Museology I: Museums, Purpose and Function (3) Development of museums of art, history, natural and applied science. (Same as Anthropology 481.)

542 Museology II: Exhibition Planning and Installation (3) Exhibition concept development and implementation. Exhibition design and installation techniques. Prerequisites: M.F.A. candidate or consent of instructor. May be repeated. Maximum 10 hrs. (Same as Anthropology 482.)

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

485 History of Printmaking (3) Prints from 15th century to present: 20th century in Europe and U.S. Prerequisites: 482 and 173.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

563 Graduate Painting/Intro/ Illustration I (2-6) May be repeated. Maximum 10 hrs.

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

590 Seminar in Art Criticism (3) Theory and practice. Prerequisite: M.F.A. candidate or consent of instructor.

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

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

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

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

597 Projects in Lieu of Thesis (20) Prerequisite: May be repeated. Maximum 20 hrs.

598 Art History Seminar (1-20) May be repeated. Maximum 20 hrs. (Same as Anthropology 598.)

599 Projects in Lieu of Thesis (10) Prerequisite: May be repeated. Maximum 10 hrs.

Astronomy
See Physics and Astronomy

Audiology and Speech Pathology

(College of Liberal Arts)

MAJORS

DEGREES

Speech Pathology ........................................... M.A.

Speech and Hearing Science ........................ Ph.D.

Audiology ................................................... M.A.

Speech and Hearing Science ........................ Ph.D.

Speech Pathology ........................................... M.A.

Patrick J. Carney, Head

Professors:

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

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

Luper, Harold L., Ph.D. ................................ Ohio State

Nableek, Igor V., Sc.D. ................................... Connecticut

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

Associate Professors:

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

Farrell, Charles J., M.A. ................................. Tennessee

Thein, J. W., Ph.D. ........................................ Iowa

Wallace, Gloriana L., Ph.D. ......................... Northwestern

Assistant Professors:

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

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

THE MASTER'S PROGRAM

A major is offered in Audiology or in Speech Pathology. A minor is offered in each of the two areas when approved by the department. The intent of each major program is to provide the student with the scholarly and professional skills necessary for functioning as an independent professional clinician in any clinical environment.

Students majoring in either of the two areas are expected to complete the academic requirements for clinical certification from the American Speech-Language-Hearing Association, including the required number of clock hours of clinical practicum (minimum 250 hours). Completion of the master's program is a prerequisite for application to a master's program in audiology. The program is designed to provide students with the knowledge and skills necessary for functioning as an independent professional clinician in any clinical environment.

Students majoring in either of the two areas are expected to complete the academic requirements for clinical certification from the American Speech-Language-Hearing Association, including the required number of clock hours of clinical practicum (minimum 250 hours). Completion of the master's program is a prerequisite for application to a master's program in audiology. The program is designed to provide students with the knowledge and skills necessary for functioning as an independent professional clinician in any clinical environment.

Students majoring in either of the two areas are expected to complete the academic requirements for clinical certification from the American Speech-Language-Hearing Association, including the required number of clock hours of clinical practicum (minimum 250 hours). Completion of the master's program is a prerequisite for application to a master's program in audiology. The program is designed to provide students with the knowledge and skills necessary for functioning as an independent professional clinician in any clinical environment.
speech-language pathology or a minimum of 33 semester hours of approved graduate credit in audiology, including 6 hours of practicum. Students in the nonthesis option program must present a total of 36 semester hours in the speech-language pathology program or 39 semester hours in the audiology program of approved graduate credit and pass a final written examination.

THE DOCTORAL PROGRAM

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

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

The program 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 course work 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 topics of related interest;
   c. 2 semester hours in 611; and
   d. 3 semester hours in supervised teaching experience.
5. A comprehensive examination to demonstrate scholarly knowledge of audiology, speech and language pathology, and speech and hearing science; and advanced knowledge of the specific area of concentration.
6. A final oral examination.

ACADEMIC COMMON MARKET

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

GRADUATE COURSES

493 Observation of Clinical Practice (1) Prereq: Speech and Language Development, Articulation Disorders, or consent of instructor. (Same as Special Education 433.)
494 Technical Skills in Instrumentation (3) Prereq: Consent of instructor. (Same as Special Education 473.)
495 Problems in Speech Pathology (1-3) Prereq: Consent of instructor.
496 Speech and Language of the Culturally Different Child (3) Prereq: Consent of instructor. Differences of children of various minority groups, different ethnic and class membership and from different geographic regions.
473 Audiology I (3) Basic principles of clinical audiology; pure tone, speech, masking and overview of special auditory tests.
454 Aural Habilitation/Rehabilitation of the Hearing Impaired (3) Psychosocial aspects, amplification components/characteristics, assistive devices, speech acoustics, speech perception, speech reading, parent-infant, preschool school years, children, communication impairments/handicaps/remediation of adults, effects of aging/rehabilitation, the elderly, and case studies. Prereq: Programming and Acoustics of Speech and 473, or equivalents or consent of instructor.
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S: N: C: only. E
504 Appraisal of Research and Language Disorders (3) Diagnostic procedures for children and adults with speech and language problems including observation and practice with diagnostic tests. Prereq: Communication Disorders, Phonetics and Acoustics of Speech, and 433, or equivalents or 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: 306.
507 Anatomy and Physiology of Hearing (3) Structure and function of the peripheral and central auditory systems, and their roles in mediating auditory processes. Prereq: 473 or equivalent or consent of instructor.
511 Introduction to Research in Speech and Hearing (3) Analysis of research techniques, fundamentals of statistics, application of statistics, and completion of a proposal and hypothetical pilot research project.
512 Clinical Practice in Audiology (1-4) Prereq: 473 and 494. May be repeated. Maximum 6 hrs.
513 Clinical Practice in Audiology: Off-Campus Sites (1-4) Prereq: Consent of instructor.
514 Practicum in Verbal-Tonal Habilitation (1-4) Prereq: 494, 555, or consent of instructor. May be repeated. Maximum 6 hrs.
515 Practicum in Aural Rehabilitation (1-4) Prereq: 473 and 494. May be repeated. Maximum 6 hrs.
517 Instrumentation in Audiology and Speech Pathology (3) Principles of instrumentation in audiology and speech pathologies; assignments for instrumentation of students with instruments for measuring speech and hearing processes.

520 Aphasia (3) Historical review of aphasia literature, theories of brain functioning, aphasic classification and terminology, tests and rationale for testing, etiology, therapy considerations and prognosis for recovery. Prereq: 506 or equivalent or consent of instructor.
522 Seminar: Articulation and Voice Disorders (3) Current theoretical diagnosis and management of articulation and voice disorders. Undergraduate courses in articulation and voice disorders or consent of instructor.
531 Seminar on Stuttering (3) Current significant research in stuttering. Prereq: 431 or consent of instructor.
532-33-34 Advanced Clinical Practice in Speech-Language Pathology (1-4, 1-4, 1-4) Prereq: 434 or equivalent and consent of instructor. 534 may be repeated. Maximum 6 hrs. Enrollment for less than 2 hrs. must have prior departmental approval.
535-36-37 Advanced Clinical Practice in Speech-Language Pathology: Field Clinical (1-4, 1-4, 1-4) Prereq: 100 hrs clinical experience, consent of instructor. May be repeated. Maximum 6 hrs each. Enrollment for less than 2 semester hrs must have prior departmental approval.
536 Advanced Clinical Practice in Speech-Language Pathology: Public Schools (1-4) May be repeated. Maximum 6 hrs. Enrollment for less than 2 hrs. must have prior departmental approval.
539 Motor Speech Disorders (3) Neurophysiological organization for speech production; types of motor speech disorders and associated neuromuscular symptomatology; diagnosis and management of motor speech disorders. Prereq: 520.
542 Hearing Disorders (3) Effects of hearing loss, development, hearing diseases, and physical agents on hearing. Prereq: 473 or equivalent or consent of instructor.
543 Amplification Technology (3) Description of hearing devices, components and function, hearing characteristics. Electroacoustic and real-ear analysis of hearing aids. Coupler material and geometry effects. Practical experience in troubleshooting, repair, and construction of hearing aids. Prereq: 473 and 507 or equivalents or consent of instructor.
545 Sound Measurement Techniques and Hearing Conservation (3) Techniques of measurement and analysis of sound; hearing conservation in schools and industry. Prereq: Consent of Instructor.
546 Advanced Audiology (3) Theoretical bases for behavioral and acoustic immittance measurement. Prereq: 473 or equivalent or consent of instructor.
547 Special Problems in Audiology (1-3) Prereq: 473 or equivalent or consent of instructor. May be repeated. Maximum 6 hrs.
548 Special Study in Audiology (1-3) Special reading, consultation, and research activities. Prereq: Research work in audiology. May be repeated. Maximum 6 hrs.
549 Hearing Science (3) Study of psychoacoustic phenomena and how they relate to perception and diagnosis of hearing. Prereq: 473, 507, and 546 or equivalents or consent of instructor.
550 Seminar in Audiology (1-3) Significant research in various areas of audiology. Prereq: Consent of instructor. May be repeated. Maximum 10 hrs.
552 Seminar in Speech Pathology (2-3) Current significant research in speech pathologists. Topics vary. Prereq: Research work in speech pathology. May be repeated provided prior departmental approval. Maximum 9 hrs.
554 Seminar in Multicultural Issues in Communication Disorders (3) Discussion of current research relevant to cultural language differences. Prereq: 465 or equivalent or consent of instructor.
555 Special Problems in Speech-Language Pathology (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

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

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

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

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

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

576 Electrophysiological Assessment of Auditory Function (3) Auditory-evoked potentials and their anatomical origin. Use of various evoked potentials in evaluation of auditory function and determination of site(s) of lesion. Prereq: 473, 507, and 548, or equivalents or consent of instructor.


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

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

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

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

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

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

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

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 nonspeech and speech stimuli. Prereq: 517.

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


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

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

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

650 Advanced Seminar in Audiology (2) Topics vary. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

652 Advanced Seminar in Speech and Language (2) Topics vary: aberrations of voice, articulation, speaking time and rhythm, language development or use, and language symbolization. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

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

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

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

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

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

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

### Aviation Systems

**Aviation Systems (UT Space Institute)**

**MAJOR**

**DEGREE**

Aviation Systems ........................................... M.S.

R. D. Kimberlin, Program Chair

**Professors:**


**Associate Professors:**

Kimberlin, R. D. (Liaison), Ph.D. ............... RWTH (Germany)

**Assistant Professor:**

Sollies, U., Ph.D. ......................... Tennessee

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

To qualify for admission to this program, the applicant must possess a Bachelor's degree in engineering or science from an accredited institution, show evidence of ability to pursue and benefit from the program, and fulfill The University of Tennessee Graduate School admission procedures and grade-point standards. It is expected that the student will have a basic knowledge of computer utilization and statistics; an understanding of aerodynamic fundamentals, aircraft propulsion, and performance; and some understanding of economics. Both thesis and non-thesis programs are available. The thesis program involves a minimum of 30 semester hours credit while the non-thesis program involves a minimum of 33 semester hours credit.

**THESIS OPTION**

The thesis program involves satisfactory completion of the following requirements:

**Research and Development Specialization**

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

**Administration Specialization**

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

**NON-THESIS OPTION**

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

**Research and Development Specialization**

1. Twelve hours of 500-level courses in the major field of aviation systems.
2. Six hours in industrial engineering (engineering management).
3. Three hours in economics or finance.
4. Six hours of electives from the major field, mathematics or engineering.

**Administration Specialization**

1. Twelve hours of 500-level courses in the major field of aviation systems.
2. Three hours in industrial engineering (engineering management).
3. Three hours in economics or finance.
4. Three hours of Aviation Systems 500 demonstrating the ability to conduct and report on an independent investigation.
5. Three hours of an assigned project under Aviation Systems 550.

6. A comprehensive final written examination on all coursework submitted for the degree and defense of the project course paper.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. program in Aviation Systems is available to residents of the states of Arkansas, Kentucky, 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

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

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

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

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

504 Airports and the Community (3) Structure of airports and their communities. Technology and economics of cargo, baggage, ticket and passenger handling. Airport management, economics and logistics. Interfaces with community, plans, programs and developments for collecting and distributing freight and passengers from various types of airports. Types of airport developments and their projections. Prereq: 501.

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

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

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


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

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

599 Measurement Science II (3) (Same as Nuclear Engineering 588 and Engineering Science and Mechanics 589).
516 Experimental Techniques II (3) Laboratory rotations. Student works in laboratory of faculty member on clearly defined project. Written proposal and oral report. Prereq: 515. S,Sp

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

561 Environmental Toxicology (3) Basic concepts in toxicology; molecular toxicology and detoxification; reproductive toxicology; mutagenesis, teratogenesis, carcinogenesis; pathologic changes and environmental impact. Prereq: 410. Consent of instructor. S/NC only. F

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

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

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

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

605 Current Topics in Regulation of Protein Function (1) Covalent modifications of proteins by phosphorylation-dephosphorylation allosteric interactions. Prereq: 410 or equivalent. May be repeated. Maximum 5 hrs. S/NC only. F,Sp

606 Current Topics in Biological Membrane Research (1) Membrane proteins. May be repeated. Maximum 6 hrs. (Same as Microbiology 606). S/NC only. F,Sp

621 Advanced Topics (1-3) Biochemical and biophysical methods; mechanisms of enzyme catalysis, gene expression, membrane structure and function, metabolic regulation, physical biochemistry. Prereq: 511-12 or consent of instructor. May be repeated. Maximum 5 hrs.

Biomedical Sciences
(Office of the Vice Chancellor for Academic Affairs)

MAJOR DEGREES
Biomedical Sciences ................. M.S., Ph.D.

Raymond A. Popp, Director

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

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

Research Assistant Professor:
Foote, Robert S., Ph.D. ............. Duke

Hauser, Loren, Ph.D. .................. California (Irvine)

Uberbacher, Edward C., Ph.D. .......... Pennsylvania

Shared Faculty:
Not all faculty listed are necessarily available in teaching and/or research roles in every academic year.

Cook, John S., Ph.D. ................. Princeton

Fry, R. J., M.D. .................... Dublin

Godfrey, Virginia L., D.V.M., Ph.D. ... Tennessee

Hartman, Fred C., Ph.D. ........... Tennessee

Jacobson, K. Bruce, Ph.D. ........... Johns Hopkins

Kannel, Steve, Ph.D. ............... California (San Diego)

Larimer, Frank W., Ph.D. .......... Florida State

Lee, Kui-Lin, Ph.D. ................. Tulane

Littlefield, Gayle, Ph.D. ............ Georgia

Mazur, Peter, Ph.D. ................ Harvard

Mural, Richard, Ph.D. ............. Georgia

Niyogi, Sall K., Ph.D. .............. Northwestern

Popp, Raymond A. (Liaison), Ph.D. ... Michigan

Russell, Jane B., Ph.D. .............. Chicago

Shugart, Lee H., Ph.D. .............. North Dakota

Solomon, A., M.D. ................. Duke

Stevens, Audrey L., Ph.D. ......... Western Reserve

Stubbs, Lisa J., Ph.D. ............. California (San Diego)

Terzaghi-Howe, Peggy, D.Sc. ........ Harvard

Vo-Dinh, Tuan, Ph.D. ............. Swiss Fed IT

Waters, Larry C., Ph.D. .......... Georgia

Woychik, Richard P., Ph.D. ....... Case Western

Yang, Wen K., M.D., Ph.D. ........ Tulane

The University of Tennessee-Oak Ridge Graduate School of Biomedical Sciences, located within the Biology Division of Oak Ridge National Laboratory, offers programs leading to the Master of Science and the Doctor of Philosophy. The National Laboratory is a well-known center of basic research. The school utilizes the staff and facilities of this laboratory and thus brings directly into the mainstream of full-time graduate study in the life sciences the talented and experienced staff, as well as the most advanced research methods and technology.

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

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

The concentration areas available for Master's thesis and Ph.D. dissertation work are biochemistry, biophysics, carcinogenesis, genetics, cellular, developmental and mammalian biology, and radiation biology. Included are such subjects as immunology, protein and enzyme chemistry, nucleic acid chemistry, cytology, radiation and environmental biology, virology, development, pathology, microbial and mammalian genetics, mutagenesis, and problems of aging.

ADMISSION REQUIREMENTS

A Bachelor's degree or its equivalent is required. Students with M.S., D.V.M., or M.D. degrees are also encouraged to apply. Completed applications, Graduate Record Examination scores and letters of reference should be sent to the address below. The student will need preparation in biology, calculus, physics, and organic and physical chemistry. A course in physical chemistry is offered by the school in order to meet the last requirement. It is recommended that 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, Biology Division, ORNL, Box 2009, Oak Ridge, Tennessee 37831-8077.

THE DOCTORAL PROGRAM

1. Satisfactory (B grade or better) completion of the following core courses or their equivalent: Biochemistry (511); Biophysical Biochemistry (514); Genetics (515); Cell Biology (518); Computing for the Life Sciences (525); and Statistics for Biologists (574).

2. Three semesters of Biomedical Sciences Laboratory (531-32-33).

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

7. A final oral examination on the dissertation.

8. A formal seminar presentation of the dissertation research.

SPECIAL MASTER OF SCIENCE DEGREE PROGRAM

The graduate faculty has designed a Master of Science program in Biomedical Sciences primarily to fill the need for such a degree within the Oak Ridge National Laboratories; however, a limited number of students from other institutions may be accepted if qualified and as space is available. The requirements for the degree are:

1. Graduate credit or a proficiency in the following core courses: Biochemistry (511); Biophysical Biochemistry (514); Cell Biology (518-19); plus any three of the following courses: Genetics (515); Molecular Genetics (517); Statistics for Biologists (574); or Computing for the Life Sciences (526).

2. Additional credits may be obtained (6 to 15 hours) with electives.

3. Thirty hours of approved graduate courses including 6 hours for thesis.

4. For admission to candidacy: Completion of any required prerequisite courses and one semester of graduate coursework with a B average. Admission to candidacy forms must be filed at least one full semester prior to receipt of degree.

5. A Master's committee of three approved faculty members upon admission to candidacy.

6. A thesis reporting results of original and significant scientific research.

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

Biomedical Sciences 59
Botany
(College of Liberal Arts)

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

Edward E. Schilling, Head

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

Associate Professors:
Amundsen, C. C., Ph.D. ...................................... Colorado
Bellman, A. S., Ph.D. ......................................... Ohio State
Schwarz, O. J., Ph.D. ........................................ NC State
Smith, D. K., Ph.D. ......................................... Tennessee
Woford, B. E. (Curator), Ph.D. ............................. Tennessee

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

Lecturer:
McFarland, K., 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, phytobiology, physiology, pteridology, and taxonomy.

Educational service is required of each graduate candidate and such service will include teaching and 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 and biology subject portions 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. 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 is considered to be much more important than the particular courses taken as an undergraduate. Accordingly, students lacking specific prerequisite courses but otherwise qualified may be admitted to graduate studies in botany. In such cases, the deficiencies should be removed as soon as possible, typically during the first year of the student's graduate program. The determination of deficiencies and the manner in which they will be removed will be decided upon by the student's pro-temp departmental committee during the first meeting with the student.

THE MASTER'S PROGRAM

The program for the Master of Science is patterned to fit the needs of students who desire a less extensive course of study than the Ph.D. program. However, the applicant must be equally well prepared and display an aptitude and ability for advanced study. The M.S. includes thesis and non-thesis options.

Thesis Option

The thesis program is the usual route taken by botany students for the M.S. It is important that the entering student promptly identify a major professor and a suitable research project. The requirements for the thesis option consist of the following:

1. Satisfactory preparation of a written formulation and an oral defense to the student's committee of a research proposal suitable for a thesis. This must be completed before enrollment in Botany 500.
2. Successful completion of 30 hours of graduate credit, at least two-thirds of which must be at the 500 level or higher.
3. Satisfactory completion of two hours at the 600 level.
5. Presentation of a 30-minute departmental seminar.
6. 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 of 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 study and 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. in Botany.

Requirements for successful completion of the Ph.D. are as follows:

1. Satisfactory presentation of a research problem by means of a written proposal and an oral defense to the student's committee. This must be completed before enrollment in Botany 600.

2. Satisfactory performance on a written comprehensive examination.

3. Presentation of one or more cognate areas outside of the department totaling 6 hours of graduate credit with at least a B average.

4. Satisfactory performance on an examination in one modern foreign language (see Graduate Coordinator) or an A or B in French 302 or German 332.

5. Satisfactory completion of 6 hours at the 600 level (excluding dissertation).


7. Presentation of a departmental seminar near the end of the doctoral program.

Note: The listed requirements for the M.S. and Ph.D. degrees should be interpreted as minimal requirements. Specific stipulations or requirements such as additional foreign languages or an additional oral comprehensive examination may be required by the student's faculty committee.

GRADUATE COURSES

401-02 Field Studies in Botany (3,3) Field experience and taxonomy of special plant groups. Topics vary: bryology, lichenology, phytology, mycology, physiology, aquatic vascular plants, systematics, woody plants, and botany. May be repeated under different topic. Maximum 9 hrs.


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

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

451 Plant Tissue Culture (3) Advanced study of cytokinins, auxins, and their role in tissue culture. Prereq: 310-20, 321, 412, Microbiology 310 or 319; Ornamental Horticulture and Landscape Design 330; and Plant and Soil Science 331.

500 Thesis (1-15) Only toward degree requirements. May be repeated. Maximum 5 hrs. E

502 Mycology (4) Intensive survey of fungi, all major classes. Prereq: laboratory and field information. Occasional field trips. Prereq: 310, 3 hrs and 1 lab. Su, A

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

504 Physiology (4) Comparative study of major animal phyla, both freshwater and marine: morphological, developmental, ecological, taxonomic, and phylogenetic aspects. Field and laboratory studies, identification, classification, experimentation. Prereq: 310 or consent of instructor, 3 hrs and 1 lab. Fa, A

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

509 Morphology and Evolution of Basidiomycetes (4) Structure and function of somatic and sexual life cycles as applied to evolution in group. Cultures and specimens in laboratory. Prereq: 310 or equivalent.

510 Introduction to Electron Microscopy - Transmission Electron Microscopy (4) (Same as Zoology 510)

516 Biosystematics (3) Major experimental methods in systematic and application to specific types of systematic problems. Cytotaxonomy, numerical taxonomy, biometry, and cladistics.


531 Plant Communities and Plant Geography (4) Plants in communities and their classification and ordination; geographic distribution of communities; their climatic and soils relationships. Prereq: 431. (Same as Zoology 536).

544 Seminar in Botany (1-4) Readings and discussion of current literature; selected topics in botany. May be repeated. Maximum 4 hrs. S, NC only.


556 Phytoplankton Ecology (3) Interaction between environment and phytoplankton. Nutrient uptake, primary production, competition, ecological theory applied to phytoplankton communities, and physiological adaptations by populations to environment. Prereq: 310 or consent of instructor.

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

580 Bryophytes and Pteridophytes (4) Taxonomy, phytology, ecology and development of morphology: field studies and current research. Prereq: 310-20 or consent of instructor. 2 hrs and 2 labs. F, A

581 Cytogenetics (3) Chromosome structure and behavior during mitotic and meiotic divisions in relation to structural changes, genetic controls, heredity, specialization, and polyploidy. Laboratory work on normal and aberrant meiotic systems and somatic chromosomes from plants and animals. Prereq: 310 and at least 6 additional hours in biological sciences. (Same as Forestry 581.) Sp, A

582 Methods and Instrumentation in Laboratory Investigation (1) Experience project and theoretical background in various research methods, data analysis, preservation of material, utilization of spectrophotometry, electrophoresis, polyacrylamide gels, and mechanical methods. Prereq: 310, 350, 360: Physics 121, 122. May be repeated. Maximum 5 hrs. S, NC only.

583 The Field Research Problem (3) Conceptualization, planning, and implementation of field research. Criteria for choosing experiments, sampling methods, and locations for studies of populations, communities, and ecosystem. Field practice. Development and critique of formal research proposal by those required by granting and contracting agencies. Prereq: 431, 535 or 573.

585 Methods and Instrumentation in Field Investigation (5) Methods and instrumentation. Topics vary. May be repeated with consent of instructor. Maximum 5 hrs. S, NC only.

590 Developmental Plant Morphology (3) Developmental morphology of plants vegetative and reproductive organs, and of organ differentiation and development. Prereq: 310, 320 or 412 and 321 or 501 or consent of instructor. 2 hrs and 1 lab. Fa, A

600 Doctoral Research and Dissertation (3-15) P, NC only. E

606-07 Graduate Courses in Botany (1-3, 1-3) Experimental botanical science: nomenclature, morphology and systematics of plants, biochemistry, and cell biology, genetics, plant physiology, palynology, and ecology. May be repeated. Maximum 12 hrs.

622 Ecosystems of the World (2) Characterization of world and regional ecosystems. Special characteristics of ecosystem function. F, A

625 Environmental Assessment and Sustainable Development in Third World Countries (3) (Same as Ecology and Planning 625.)

626 Seminar in the History of Botany (2) History of botanical exploration and advances from early civilization to modern periods. May be repeated. Maximum 4 hrs.

Broadcasting

DEGREES

MAJOR

Communications

M.S., Ph.D.

Barbara Moore, Acting Head

Professors:

Holt, Darrel W. (Emeritus), Ph.D. ........................................... Northwestern

Howard, Herbert H., Ph.D. ...................................................... Ohio

Swan, Norman R., Ph.D. ......................................................... Missouri

Associate Professors:

Moore, B. A., Ph.D. ......................................................... Ohio

Ziegler, Dhyana, Ph.D. ......................................................... Southern Illinois

Assistant Professor:

Miller, Evelyn, Ph.D. ......................................................... Ohio State

Wilkinson, Jeffrey, Ph.D. ......................................................... Georgia

Adjunct Professor:

Nelson, Lindsey, B. A. ......................................................... Tennessee

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

GRADUATE COURSES

410 Television News (3) Writing, reporting, and producing news for television. Experience as reporter/producer for television news program. Electronic news gathering equipment and techniques, video editing. Prereq: 310, 1 hr and 4 labs. E

420 Television Sales and Promotion (3) Problems and practices of television and cable sales and promotion. Case studies in sales and sales management; use of
ratings and computers in sales presentations and promotion campaigns. Practical experience in television sales and promotion. Prereq: Radio Sales and Promotion.

430 Producing for Television (3) Principles of television studio and field production, both technical and creative. Writing, producing, shooting, and editing video stories and programs, 3/4 cameras, recorders, and editing system. Prereq: 333. E

440 Corporate Video (3) Special requirements of business, industrial, educational, and medical uses of video. Management, budgeting, and evaluating corporate video productions. Exploration of all technologies used in corporate video including satellite videoconferencing. Production of corporate video projects. Prereq: Introduction to Radio and Television 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, fibre optics cable, high definition television, and others. Prereq: Introduction to Radio and Television or consent of instructor.


490 Radio & Television Management (3) Business policies and practices of broadcasting operations, departmental function, cost and income analysis, leadership styles and techniques, planning, management. Capseone course to be taken in student's last semester. Preq: 275, 310, 320, 330. E


550 International Broadcasting (3) Broadcasting systems in other countries. Analysis of international broadcasting organizations. Intercultural communication and international broadcasting. Development communication and international broadcasting. Prereq: consent of instructor.

560 Radio & Television Law and Regulations (3) Legal problems faced by broadcast managers. Philosophy of regulatory policy, techniques of self-regulation. Sociolegal restraints, effects of laws and regulations, and public pressure on stations, networks, cable and new technologies. Unique situation of broadcasting among media in terms of regulations. Prereq: Consent of instructor or admission to program. F

570 Radio & Television Research (3) Various techniques used by stations and consultants in broadcast research. Application of research to analysis and practical use. Method to use, interpreting results, and applying research to management decision making. Prereq: Communications 512 or 512, or consent of instructor. Sp

580 Seminar in Radio & Television (3) Salient issues in broadcasting. Topics vary. International broadcasting, cable television, new technologies, corporate television, educational and public broadcasting, broadcasting and society, Prereq: Consent of instructor or admission to program. F


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

598 Internship (3) Full-time (30-40 hrs per week) work experience in radio, television, production, or sales and management with non-university professional organization. Educational experience beyond that available at university. Final term paper and no elective credit for previous work experience. Prereq: Senior or graduate standing, completion of at least 15 hrs of broadcasting courses, GPA 3.0 or better, and consent of department head.

Business Administration

MAJOR DEGREES
Business Administration ...... MBA, J.D.-MBA, Ph.D.

The College of Business Administration offers two college-wide programs, the MBA and the Ph.D. with a major in Business Administration. The College of Law leading to the J.D.-MBA. To obtain application materials, write or call: Office of Graduate Business Programs, Suite 527, Stokely Management Center, College of Business Administration, The University of Tennessee, Knoxville, TN 37996-0552. Telephone: (615) 974-5033. For the executive program, telephone (615) 974-1660.

ACADEMIC COMMON MARKET
An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state basis. The Ph.D. in Business Administration is available to residents of Alabama, Florida, or Kentucky (concentration in logistics and transportation only), or West Virginia; the MBA is available to residents of Louisiana (concentration in forest industries management only), Alabama, Florida, Louisiana (concentration in logistics and transportation only), Kentucky (concentration in venture analysis and entrepreneurship only) or Arkansas. 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 required to bring his/her cumulative grade-point average to 3.0 or higher by 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 year-one program and a second year elective courses. The first-year core develops a general management foundation upon which specialization is developed in the second year electives. The objective of the program is to develop leaders able to enhance the success of their organizations.

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

Admission Requirements
Applications are accepted for fall semester only. The application deadlines for fall semester are March 1 for international students and April 1 for others. Applications by U.S. citizens and permanent residents received after April 1 will be considered as space allows. To be considered for admission, the applicant’s file must be complete. A completed file includes the Graduate School Application, transcripts of prior college work, the MBA program application, two completed applicant recommendation forms, and the Graduate Management Admission Test (GMAT) score report. The first item 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) 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 in 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 include a year-long simulation requiring students to learn the functional fundamentals (accounting, finance, management, marketing) when they need to apply them to solving a specific business problem. The topics introduced within this course follow these themes: the functional fundamentals (learned within a cross-functional framework); the role of the firm in society (with attention to stakeholders value, economics, and the ethical and legal environment of the firm); and personal and team development. Students will be exposed to the assessment and delivery
of customer value, statistical process control, continuous systems improvement, and the role of quality in competitive organizations.

Students in the first-year core undertake active learning within a team-based environment. Many core requirements are experiential exercises in which self-discovery within a team setting is an important 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 no later than completion of 15 hours of MBA program coursework. Requests for changes in concentration area must be submitted for approval to the Office of Graduate Business Programs.

Among the 24 credit hours in the concentration/electives block, at least 9 but no 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
- Management
- Management Science
- Marketing
- New Venture Analysis and Entrepreneurship
- Statistics
- Logistics and Transportation

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 two faculty members and the department head in the student's area of concentration and the Associate Dean in the College of Business Administration. It should be submitted to the Graduate Office at least one full semester prior to the date the degree is conferred. Admission to candidacy in the fall semester permits graduation in the following spring semester.

To qualify for the degree, the student must achieve a B average (3.0) or above in MBA core courses required in his/her program, a B average or higher in courses comprising the concentration area, and a B average or higher in the overall program. Each student must write a satisfactory analysis of a comprehensive case administered at the end of the first year.

BUSINESS ADMINISTRATION CONCENTRATIONS

For complete listing of MBA program requirements, see above.


In recognition of the growing globalization of business activity and the importance of the international environment to successful management of every firm, the MBA program offers a concentration in global business. The concentration comprises at least two courses taken from Economics 424, Logistics 507, Management 571, and departmental special topics courses with international content; and at least one but not more than two additional courses from the previous list, or a list of electives as approved by the Director of Graduate Business Programs. Students pursuing a concentration in global business are also encouraged to pursue an international or international 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 interdisciplinarily in nature. This concentration strives to build a strong academic foundation for both entrepreneurial and intrapreneural 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 and 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 571, and Marketing 550. These course descriptions are listed under their fields of instruction.

PRE-MBA PROGRAM

The College offers a joint BA/MBA program with the College of Liberal Arts. Students in this program take their first three years of coursework in Liberal Arts, and their last two years in the College of Business Administration. Within their first three years, students fulfill all general education requirements for the BA degree, both upper and lower division along with a minor offered by one of the Liberal Arts departments. They may use one Economics course only to fulfill distribution requirements, and they are required to take a year of calculus as the only prerequisite to the MBA.

Admission requirements are higher than those normally expected of MBA applicants. Desired qualifications include a minimum 3.4 GPA and a GMAT score of 600 or higher.

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

Admission Requirements

Applicants for the J.D.-MBA program must make separate application to, and be competitively and independently accepted by, the College of Law for the J.D. The Graduate School and College of Business Administration for the MBA degree, and by the Dual Program Committee.

Students who have been accepted by both colleges may apply for approval to pursue the dual program anytime prior to, or after, matriculation in either or both colleges. Such approval will be granted, provided that dual program studies be started prior to entry into the last 28 semester hours of J.D. coursework and prior to entry into the second year of the MBA program. Students interested in entering the dual degree program should submit a letter of application to the Dual Program Committee.

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

Curriculum
A dual program candidate must satisfy the graduation requirements of each college. Students withdrawing from the dual program before completion of both degrees will not receive credit toward graduation from either college for courses in the other college, except as such courses qualify for credit without regard to the dual program. The College of Law will award up to 9 semester hours of credit toward the J.D. for acceptable performance in approved graduate-level courses offered by the College of Business Administration. The College of Business Administration will award up to 9 semester hours of credit toward the MBA for acceptable performance in approved courses offered in the College of Law. The approval of courses is the responsibility of the Dual Program Committee and the student's assigned advisor.

Students may begin their studies in either the J.D. or the MBA program, but may not enroll in MBA coursework while completing the first year of the law curriculum and may not enroll in J.D. coursework while completing the first year of the business curriculum. During the first year in the J.D. program, students register through the College of Law. For any term in which students take MBA courses, even though they are also taking law courses, they must register through The Graduate School. The Graduate School registration form must be approved by the Director of Graduate Business Programs.

Awarding of Grades
Grades for graduate business courses accepted by the College of Law and grades for law courses accepted by the College of Business Administration will be converted to either Satisfactory or No Credit and will not be included in the computation of the student's grade average or class standing in the college in which such grades are so converted. The College of Law will award a grade of Satisfactory for a graduate business course in which the student has earned a B or higher and a No Credit for any lower grade. The College of Business Administration will award a grade of Satisfactory for a law course in which the student has earned a 2.3 grade or higher and a No Credit for any lower grade. Grades earned in courses of either college may be used on a regular graded basis for any appropriate purpose in the college offering the course. The official academic record of the student maintained by the Registrar of the University shall show the actual grade assigned by the instructor without conversion.

Approved Dual Credit
MBA courses to be counted toward the J.D. program must include 9 semester hours approved by the College of Law. Law courses to be counted toward the MBA must be selected from those approved by the Director of Graduate Business Programs.

EXECUTIVE MBA PROGRAM
The executive MBA is designed for professionals holding middle and upper level positions in organizations that wish to support their attainment of an MBA degree for the benefit of both company and individual. 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 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, transcripts of prior college work, the executive MBA program application with a recommendation from his/her company, and the Graduate Management Admissions Test (GMAT) score report. The first items should reach The Graduate School one month before the MBA application deadline to allow for processing.

For admission to this program, primary consideration is given to the applicant's work history and the 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 first of which will be in some international venue.

The core courses are a full-term curriculum with reading and study, case work and problem solving, as well as analyses and applications within the sponsoring organization during the off-campus periods. The topics introduced within these courses follow five major themes: the functional fundamentals (learned within a cross-functional framework); the role of the firm in society (with attention to stakeholders, customers, economics, and the ethical and legal environment of the firm); the role of the firm in the global environment, organizational culture and change management; and personal and team development. Students will be exposed to the assessment and delivery of customer value, statistical process control, continuous quality improvement, and the role of quality in competitive organizations.

The management project, to be carried out as an independent study project, involves the diagnosis and analysis of one significant aspect in the sponsoring organization and will be based on applying major themes in the core courses. The written project and presentation to senior management and faculty serves as the comprehensive examination.

All of the off-campus work will require substantial and regular contact with faculty and other program participants.

Transfer Credits
Because of the integrated nature of the curriculum, no credit hours for courses already taken may be substituted for those in the executive program of the MBA.

Other Requirements
The Application for Admission to Candidacy must be approved by three faculty members and the Associate Dean in the College of Business Administration. It should be submitted to the Office of Graduate Admissions and Records by the end of the fourth residence session, for graduation at the end of the third term.

THE DOCTORAL PROGRAM
The primary objective of the Ph.D. in Business Administration is to prepare a select number of qualified students for careers in university-level teaching and research and for responsible positions in business and government.

Admission Requirements
Students seeking a Ph.D. degree must be recommended for acceptance by the College of Business Administration to The Graduate School. Actual admission is based on the applicant's overall 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 of study is structured for full-time students only. Upon acceptance as a student by a particular departmental faculty, the student is expected to remain in residence until the dissertation has been completed and all requirements are met for completion of the Ph.D.

Since the program focuses on the development of competent scholars, heavy emphasis is placed on both teaching and research skills. As part of the doctoral program, each student is required to serve as a teaching assistant to an undergraduate business class or as a research assistant to a senior faculty member. Typically, the College of Business Administration offers financial support for doctoral students during their tenure in the program.

The Ph.D. program is highly flexible, offering a wide array of concentrations and cognates. Moreover, heavy emphasis is placed on individualized instruction and close student-faculty interaction. Instruction takes the form of regular classes, doctoral seminars, and independent study and research. Students are also encouraged to attend lectures and discussions by visiting scholars throughout the year.

There are five concentrations offered in the Ph.D. program:

1. Accounting
2. Finance
3. Management (Operations Management and Strategic Management)
4. Marketing
5. Logistics and Transportation

More detailed information concerning these specific areas is available by writing directly to the appropriate field of instruction.

Degree Requirements

Doctoral students must file a program of study that has been approved by their temporary doctoral advisory committee and the Associate Dean by the end of the first semester of coursework after entry into the program. This program is approved by the department chairperson in a student's intended area of concentration, subject to the Graduate Council's policies and procedures. Following are specific degree requirements:

1. Students must complete at least three years of full-time coursework beyond the baccalaureate degree, with two years of residence on the Knoxville campus.
2. Students must complete appropriate coursework at the graduate level, or other approved concentrations of coursework, in the following areas:
   - Accounting
   - Finance
   - Behavioral Science
   - Legal Environment
   - Business Policy
   - Management
   - Calculus
   - Marketing
   - Computer Science
   - Statistics
   - Economics

   All work in the above areas is subject to approval by the temporary doctoral advisory committee and the Director of Graduate Business Programs. Specific majors may have prerequisites not listed above.

3. Basic Core: Economics 510 (or approved substitute) is required, except that Management 567 (or equivalent) may be substituted with prior approval.

4. Research Tools: A minimum of 9 semester hours of graduate research methods must be completed. At least 6 semester hours in statistics courses beyond Statistics 531 are required. The remaining 3 semester hours may be completed in additional statistics courses (not to include Statistics 531) or in other areas such as research methodology, management science, computer science, econometrics, and psychometrics.

5. Concentrations: The concentration is the focal point of the Ph.D. program. Students are expected to secure the literature and research techniques in the concentration area and to do quality research as evidenced by the preparation of an acceptable dissertation. A minimum of 12 semester hours of coursework is required, including at least 9 hours of doctoral seminars. Graduate work taken in the concentration at other institutions is considered by the temporary doctoral advisory committee in approving the specific coursework required. Available concentrations are: accounting, finance, management (operations management and strategic management), marketing, and logistics and transportation. See the appropriate fields of instruction for specific course requirements.

6. A minimum of 9 semester hours of graduate coursework is required in an area outside, but complementary to, the concentration. The student may select the cognate from one of the following: one of the five concentration business areas listed above, economics, statistics, or a related area in another school or college of the University.

Comprehensive Examinations

Comprehensive written examinations over the concentration and cognate areas are required of each person seeking candidacy for the Ph.D. The concentration area examination is administered in two sessions of approximately four hours each and the cognate area examination in one session of approximately four hours. Written examinations may be supplemented with oral examinations. For a doctoral student having a cognate area in the College of Law, the results of only an oral examination may be deemed acceptable. Scheduling of comprehensive examinations is coordinated through the Office of Graduate Business Programs. Comprehensive examinations are generally offered during the fall and spring terms. Comprehensive examinations must be taken within five years of matriculation.

When either the concentration or cognate area examination is passed, the remaining examination must be passed within the next 13 months.

Doctoral Committee

A doctoral student is advised to give serious attention early in his or her program to the composition of his or her doctoral committee. In accordance with Graduate School policy, the student and the major professor identify a committee composed of at least four faculty members, three of whom, including the chair, must be approved by the student's doctoral committee. When the doctoral committee has been formed, the temporary doctoral advisory committee ceases to exist.

Admission to Candidacy

Students may request 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. (Application in the fall prior to 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 solve scholarly problems. The dissertation is supervised by the candidate's doctoral committee, which must certify its completion and acceptability after oral defense of the candidate's research effort.

The dissertation normally must be completed within three years of the student's advancement to candidacy.

GRADUATE COURSES

504 Core I (15) Development of roles and responsibilities of business manager. Functional fundamentals (accounting, finance, marketing, operations, human resource management) through year-long case in which knowledge is applied to solution of simulated real-world enterprise. Continuous systems improvement and delivery of customer, role of firm in society (with attention to stakeholder value, economics, and the ethical and legal environment of firm). Personal leadership skills: teambuilding, written and oral communication, and assessment of students' leadership abilities. Prereq: Admission to MBA program or consent of Director of Graduate Business Programs.

505 Core II (15) Continuation of 504. Functional fundamentals through year-long case study-work on organizational, globally, competitive, managing technology, ethics and social responsibility, and strategic planning. Capstone integrated business simulation. Prereq: 504 or consent of Director of Graduate Business Programs.

506 Information Engineering and Management (3) Design and management of information necessary to accomplish organizational objectives using activity blueprints, entity-relationship data design principles, view diagrams and CASE (Computer-Aided Software Engineering) tools.

510 Management of Responsive Service Organizations (3) Management of organizations which respond to customer requests rather than to produce inventory, non-product economics, relationship building and management methods built on enablers, empowering, mentoring and creating value in the process. Prereq: 504 or consent of Director of Graduate Business Programs.

551 Executive Core I (12) Integrated semester course: two 11-day periods in residence with substantial reading, study and analyses during off-site periods. Integration of major business functions through strategic perspective, application of functional knowledge to tactical and strategic issues. Role of firm in society as it treats economic/legals environment and develops purpose of firm as delivering value to customers and other stakeholders. Ethical issues. Personal development for leadership: individual, interpersonal skills of communication, negotiation, problem solving, motivation. Customer value and systems management: determination and delivery of customer value. Cases, simulations and exercises. Prereq: Admission to executive program of MBA. Coreq: 561.
Chemical Engineering

Professor:

Charles F. Moore, Head

Graduate faculty in chemical engineering consists of a representative group of faculty members from the Department of Chemical Engineering, who have demonstrated expertise in chemical engineering. The faculty members are listed below.

Associate Professors:

Basaran, Osman A. (Adjunct), Ph.D., Minnesota
Bruns, Duane D., Ph.D., Houston
Cochran, Henry D. (Adjunct), Ph.D., MIT
Davison, Brian H. (Adjunct), Ph.D., Stanford
Downs, James E. (Adjunct), Ph.D., Tennessee
Scott, Timothy C. (Adjunct), Ph.D., Wisconsin
Vogel, Ernest F. (Adjunct), Ph.D., Texas
Wang, Tse-Wei, Ph.D., MIT
Weber, Frederick E., Ph.D., Minnesota

Graduate programs lead to the degrees of Master of Science and Doctor of Philosophy in Chemical Engineering with concentrations in chemical engineering, 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.


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 candidate must also present a résumé and an oral presentation covering the review paper and related areas.

THE DOCTORAL PROGRAM

Students applying for entrance into the doctoral program must submit evidence of ability to perform and report independent research to the satisfaction of the department. The Master's thesis may be offered as such evidence. Department requirements consist of the satisfactory completion of:

1. Graduate courses in chemical engineering, amounting to approximately 24 semester hours, at least 9 of which must be in 600 series courses.

2. Supporting courses in related scientific and engineering fields amounting to approximately 24 semester hours, subject to approval by the student's faculty committee. These related fields will normally include chemistry, mathematics, physics, and engineering.

The comprehensive examination, consisting of a written part and an oral part. The written part covers thermodynamics, reactor analysis, and transport phenomena and analysis.

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

GRADUATE COURSES

401 Chemical Engineering Data Analysis (3) Experimental data; identification of system extrema; statistical properties of samples; empirical modeling of processes; statistical process control; optimization techniques. Prereq: Math 112.

403 Introduction to Optimization (3) Principles and applications of optimization techniques to chemical processes design, unconstrained and constrained optimization, linear programming, dynamic programming, and geometric programming. Prereq: Mathematics 211 or 212.


440 Transport Phenomena (3) Momentum, heat and mass transfer processes, analogies, differential and macroscopic balances, applications involving molecular diffusion, simultaneous mass transfer and chemical reaction. Prereq: Math 220.

461 Advanced Process Dynamics and Control (3) Process control system simulation and advanced design of industrial system design. Cascade, feedforward, mortality, and nonlinear control system design. Both computer and laboratory work. Lab. Prereq: Math 220.


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

501 Graduate Seminar (1) Prereq: Admission to graduate program. May be repeated. S/NP 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. Not used toward degree requirements. May be repeated. S/NP 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 and PDE problems; finite difference and finite element methods; conformal mapping, variational methods, introduction to numerical methods. (Same as Materials Science and Engineering 505.)

506 Approximate Methods in Chemical Engineering (3) Chemical engineering problems requiring approxi-
mate solution; introduction to some approximate methods. Prereq: 505.

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

531 Advanced Chemical Engineering Thermodynamics (3) Phase equilibria in ideal and non-ideal solutions; composition relationship between phases, solution behavior and application to macromolecules; introduction to microscopic approach to thermodynamics.


541 Fluid Mechanics and Polymer Processing (3) (Same as Materials Science and Engineering 541.)

542 Diffusive and Stagewise Mass Transfer Operations (3) Analysis of mass transfer phenomena; coupled mass and energy transfer operations; packed towers and agitated vessels, membrane separations. Equilibrium stage concepts applied to mass transfer operation, emphasizing nonisothermal and multicomponent systems.

551 Chemical Reactor Analysis (3) Rate models for heterogeneous reactions, properties of porous catalysts, reactor deactivation, fluid-liquid and fluid-solid reactors.

561 Process Modelling and Simulation (3) Theoretical and experimental aspects of modeling and identification of chemical processes, with a strong emphasis on the use of computer tools for simulation and optimization.

575 Applied Microbiology and Bioengineering (3) Crossdisciplinary course combining basic concepts in microbiology, biochemistry, reaction kinetics, and biochemical and environmental engineering. Commercial processes, biodegradations/waste management, analysis of basic bioreactor systems, biosensors, and immunization methods. Fundamental laboratory techniques during 6-week laboratory period. (Same as Environmental Engineering 575, Agricultural Engineering 575 and Microbiology 575.)

576 Principles of Chemical Separations (3) Fundamental aspects of the design and operation of chemical separation processes, with emphasis on unit operations and principles of separation processes in chemical and process engineering.


581 Industrial Pollution Prevention (3) Principles and practical aspects of industrial waste minimization. Regulatory environment, waste minimization strategies, economic analysis, process safety, case study: analysis of alternative waste minimization/management technologies. Prereq: Graduate standing in engineering or consent of instructor.

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.

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


642 Advanced Topics in Polymer Processing (3) (Same as Materials Science and Engineering 542.)


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, identification and development of new experimental methods for data generation, signal resolution and processing, mathematical model development, model development (deterministic, stochastic, phenomenological), and utility and limitations of approach. Prereq: 576 or consent of instructor. (Same as Environmental Engineering 675.)

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

Chemistry

(College of Liberal Arts)

MAJOR

CHEMISTRY

DEGREES

M.S., Ph.D.

Gleb Mamontov, Head

Professors:

Baker, D. C., Ph.D. ......................... Ohio State
Bloom, J. E. (Emeritus), Ph.D. ........... Manchester
Bull, William E., Ph.D. .................. Illinois
Coomer, R. N., Ph.D. .................... Tennessee
Dean, J. A. (Emeritus), Ph.D. .......... Michigan
Eastham, J. F. (Emeritus), Ph.D. ........ California
Fletcher, W. H. (Emeritus), Ph.D. ..... Minnesota
Grimm, F. A., Ph.D. ..................... Cornell
Guglielmo, G. (Emeritus), Ph.D. ....... Ohio State
Reclus, D. (Emeritus), E Cole Polytechnic and Paris VI
Kabalka, G. W. (Distinguished Prof.), Ph.D. Purdue
Kleinfelter, B. D., Ph.D. ............. Princeton
Kovacic, J. D., Ph.D. .................... Yale
Litke, M. H. (Emeritus), Ph.D. ........ Wisconsin
Magid, L. J., Ph.D. ...................... Tennessee
Magid, R. M., Ph.D. ..................... Yale
Mamontov, Gleb (Distinguished Prof.), Ph.D. Louisiana State

Pagni, R. M., Ph.D. ....................... Wisconsin
Peterson, J. L., Ph.D. ....................... California
Schwartz, George K. (Distinguished Prof.), Ph.D. California
Segalman, W. J., Ph.D. ............... Iowa State
Smith, T. W. (Emeritus), Ph.D. ........ Ohio State
Van Hook, W. A., Ph. D. .............. Johns Hopkins
Wehrly, E. L., Ph.D. ................. Purdue
Williams, T. F. (Distinguished Prof.), Ph.D. London
Woods, C., Ph.D. ......................... NC State
Wunderlich, B. (Distinguished Scientist), Ph.D. Northwestern

Associate Professors:

Adcock, J. L., Ph.D. ..................... Texas
Alexandrov, S. D., Ph.D. ............... California
Barnes, O. E., Ph.D. ..................... Stanford
Bartmess, J. E., Ph.D. ................. Wisconsin
Cook, K. D., Ph.D. ....................... Boston
Ferliger, C. S. (Liaison), Ph.D. .......... Colorado
Lane, C. A., Ph.D. ....................... Illinois
Schell, F. M., Ph.D. ...................... Indiana

Assistant Professor:

Xue, Z. B., Ph.D. ......................... California

Students majoring in Chemistry for the Master's or doctoral degree are required to present as a prerequisite one year each of general, analytical, organic, and physical chemistry with a satisfactory record. Students lacking any of these prerequisites may be admitted upon presentation of appropriate deficiencies that must be removed within the first year of graduate study. Applicants are required to take the general Graduate Record Examination. Students minoring in Chemistry are required to present as a prerequisite two years of chemistry including quantitative analysis.

THE MASTER'S PROGRAM

The department offers concentrations in six areas for the M.S.: analytical chemistry, environmental chemistry, inorganic chemistry, organic chemistry, polymer chemistry, and physical chemistry.

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

1. Research and a thesis to give 6 to 12 hours of graduate credit in Chemistry 500.
2. Participation in seminar (Chemistry 501) during the entire period of graduate study, including the presentation of at least one seminar. (No more than 2 hours may be applied toward 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, 590-94-95, or three courses from 510-11-12-20. At least 14 hours of this graduate coursework must be at the 500 level or above.
5. A final oral examination.

THE DOCTORAL PROGRAM

The department offers concentrations in eight areas for the Ph.D.: analytical chemistry, chemical physics (in cooperation with the Department of Physics), environmental...
chemistry, inorganic chemistry, organic chemistry, physical chemistry, polymer chemistry, and theoretical chemistry.

The requirements for the Ph.D. in Chemistry (except for the chemical physics concentration) consist of the satisfactory completion of:

1. Research and a dissertation to give at least 24 hours of graduate credit in Chemistry 600. Registration must be continuous from the beginning of research.
2. Participation in seminar (Chemistry 501) during the entire period of graduate study, including the presentation of at least one seminar.
3. Prescribed remedial courses based on performance on entrance examinations.
4. Completion of the comprehensive examination series and defense of an original research proposal to give 2 hours of credit in Chemistry 600.
5. Eighteen additional hours in courses at the 500 level or above including at least one course above 601 and one of the following sequences: 510-11-12, 530-31-32, 550-51-52-53-54, 570-71-72-73, and 590-94-95.
6. A final oral examination.

The Ph.D. program in concentration in chemical physics is conducted jointly with the Department of Physics. Requirements depend on the choice of the major department. Chemistry departmental requirements include passing the above degree requirements in chemistry with concentration in physics, chemistry plus 6 additional hours in physics at the 500 level or above. Three of the additional physics hours can be used to satisfy the 18 hours requirement in item 5.

GRADUATE COURSES

430 Advanced Inorganic Chemistry (3) Atomic and molecular structure, bonding theories, descriptive chemistry of elements, kinetics and mechanism of inorganic reactions, applications of modern techniques for characterization, coordination and organometallic chemistry. Prereq: 293. Prereq or cons. 382 or 391. Sp.
431 Radioactivity and Its Application (2) Radiation in tracer and therapeutic applications. Radioactive decay, detection apparatus and techniques, tracer procedures, safety precautions in agriculture, biology, medicine, nutrition. For credit not by chemistry or physics majors or minors. Prereq: Mathematics 122 or equivalent and 1 yr of general physics. Sp.
471-81 Biophysical Chemistry (3,3) (Same as Biochemistry 471-81.)
473-83 Physical Chemistry (3,3) Students may not receive credit for both 473 and 473R for both 481 and 483. 473-Properties of gases: first, second, and third laws of thermodynamics; chemical equilibria: simple phase equilibria; properties of solutions; introduction to statistical thermodynamics, 473R-Kinetics of chemical reactions, introduction to quantum mechanics and applications to electronic structure of atoms and molecules, molecular spectroscopy. Prereq: General Chemistry, Fundamentals of Physics, and Calculus III. F.
479-89 Physical Chemistry Laboratory (2,2) Experiments on topics discussed in 473-81 and 473R. Prereq or cons. Corresponding courses 471 or 473R for 479 and 481 or 483 for 489. 1 lab. E.
484 Advanced Physical Chemistry (3) Chemical dynamics, statistical thermodynamics, quantum mechanics of atomic and molecular systems, crystal structure and solid state. Prereq: 481 or 483. Sp.
500 Thesis (1-15) P/NP only. E.
501 Chemistry Seminar (1) Lectures and discussion on current research problems. May be repeated. Registration required for resident graduate students. S/N 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/N only. E.
505 Special Problems (3) Specially assigned theoretical or experimental work on problems not covered in other courses. Prereq: Consent of department. May be repeated. Maximum 5 hrs. S/N only. E.
510 Analytical Spectroscopy (3) Principles and practice of optical and mass spectrometric techniques in quantitative chemical analysis. Prereq: 1 yr of physical chemistry.
511 Analytical Separations (3) Principles and practice of chemical separations based on extraction, chromatographic, and electrophoretic phenomena. Prereq: 1 yr of physical chemistry.
512 Electroanalytical Chemistry (3) Fundamentals of electrochemical processes; principles and practice of electroanalytical techniques in quantitative chemical analysis. 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 orbit theory, covalent, ionic, and metallic bonding, ligand field theories, solid state. Prereq: 1 yr of physical chemistry. F.
532 Experimental Methods of Inorganic Chemistry (3) Electronic, infrared, Raman, microwave, NMR, ESR, nuclear quadrupole, Mossbauer, mass, and photoelectron spectroscopy for characterization of inorganic compounds. Prereq: 530. F.
540 Nuclear and Radiochemistry (3) Nuclear properties, radioactivity, radioactive decay processes, nuclear structure and models, nuclear reactions, radiations and matter, radiation detection. Prereq: 1 yr of physical chemistry.
550 Structure and Reactivity in Organic Chemistry (3) Structure and bonding in organic compounds; molecular orbital theory, stereochemistry, conformational analysis, and molecular mechanics; substituent effects on acidity and reactivity; introduction to reaction mechanisms. Prereq: 360. F.
551 Organic Reactions (3) Organic transformations of use in synthesis; cyclic, aliphatic, organic, and physical chemical principles. Prereq: 1 yr of organic and physical chemistry.
553 Spectroscopic Characterization of Organic Compounds (2) Organic structure elucidation using spectroscopic methods: nuclear magnetic resonance, infrared, ultraviolet and mass spectroscopy. Prereq: 380 or equivalent. F.
554 Organic Spectroscopy Laboratory (1) Use of IR, UV, MS, and multinuclear TFFMR spectrometers. Development of problem-solving ability in area of spectroscopic characterization of organic molecules. Prereq: 360 or equivalent. Coreq: 553. F.
570 Quantum Chemistry and Spectroscopy (3) Basic principles of quantum mechanics and their applications to molecular orbital theory, quantum chemistry, and spectroscopy; introduction to group theory. Prereq: 1 yr of physical chemistry. F.
571 Advanced Quantum Chemistry and Spectroscopy (3) Prereq: 290 or consent of instructor. Sp.
572 Thermodynamics and Statistical Mechanics (3) Macroscopic and microscopic description of equilibrium systems. Basic principles of mechanics and statistical mechanics, and application to selected chemical systems. Prereq: 1 yr of physical chemistry. F.
573 Chemical Kinetics and Transport (3) Time-dependent phenomena in chemical kinetics, chemical dynamics, transport, and polymer chemistry. Prereq: 1 yr of physical chemistry. Sp.
580 Fundamental Topics in Physical Chemistry (3) Quantum chemistry, spectroscopy, chemical kinetics, transport properties, thermodynamics, and statistical thermodynamics. Prereq: 1 yr of physical chemistry. F.
590 Polymer Chemistry (3) Fundamentals of polymer synthesis and characterization through application of organic and physical chemical principles. Prereq: 1 yr of each of organic and physical chemistry.
595 Physical Chemistry of Polymers (3) Conformation of macromolecules, solution and bulk properties, rubber elasticity, kinetics of polymerization, polymer thermodynamics. Prereq: 590 or equivalent. Sp.
660 Doctoral Research and Dissertation (3-15) P/NP only. E.
661 Chemistry Research Proposal (2) Preparation and oral defense of original written research proposal based on thorough survey of chemical literature. Prereq: Consent of department head. S/N only. E.
670 Selected Topics in Analytical Chemistry (3) Topics of current significance. Prereq: consent of instructor. May be repeated. Maximum 12 hrs.
680 Selected Topics in Organic Chemistry (3) Topics of current significance. Prereq: 330-33-32 or consent of instructor. May be repeated. Maximum 12 hrs.
690 Selected Topics in Polymer Chemistry (3) Topics of current significance. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.
670 Selected Topics in Physical Chemistry (3) Topics of current significance. Prereq: 570-72-73 or consent of instructor. May be repeated. Maximum 12 hrs.
690 Selected Topics in Polymer Chemistry (3) Topics of current significance. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

Child and Family Studies (College of Human Ecology)

MAJORS

Child and Family Studies .............................................. M.S.
Constance Steele, Head

Professors:
Blanton, Priscilla, Ed.D. .............. Tennessee
Cunningham, Jo Lynn, Ph.D. ......... Michigan State
Digennaro, Ph.D. ................. Oklahoma State
Ewing, Lisa, Ed.D. ................. Texas Tech
Field, Awesome, Ed.D. ............ Kansas
Foster, Carol, Ed.D. .......... Georgia State
Gay, Leslie, Ed.D. .............. Tennessee
Goldberg, Lynne, Ed.D. .......... Tennessee
Hill, Patricia, Ed.D. .......... Tennessee
Hilliard, Lisa, Ed.D. .......... Tennessee
Hoit, Elizabeth, Ed.D. ........... Tennessee
Humphreys, Mary, Ed.D. ......... Tennessee
Jirka, Michael, Ed.D. .......... Tennessee
Kline, Cheryl, Ed.D. .......... Oklahoma State
Lange, Deborah, Ed.D. .......... Tennessee
Lanfranconi, Tara, Ed.D. ......... Tennessee
Leavitt, Jennifer, Ed.D. ......... Tennessee
Lee, Michelle, Ed.D. .......... Tennessee
Lee, Susan, Ed.D. .............. Tennessee
Lyons, Sarah, Ed.D. .......... Tennessee
Moore, Kristen, Ed.D. ......... Tennessee
Myers, Carol, Ed.D. .......... Tennessee
Myers, Susan, Ed.D. .......... Tennessee
Nordquist, V., Ph.D. ............ Tennessee
Pettit, Sarah, Ed.D. .......... Tennessee
Pikarsky, Jennifer, Ed.D. ....... Tennessee
Schatz, Traci, Ed.D. .......... Tennessee
Simpson, Patricia, Ed.D. ....... Tennessee
Snow, Lucy, Ed.D. .......... Tennessee
Stein, Laura, Ed.D. .......... Tennessee
Towsle, Jennifer, Ed.D. ......... Tennessee
Wojda, Elizabeth, Ed.D. ....... Tennessee
Wright, Jennifer, Ed.D. ....... Tennessee
Associate Professors:
Allen, J., Ph.D. ............... Purdue
Buehler, C., Ph.D. ............. Minnesota
McInnis, Jackie H., Ph.D. ...... Florida State
The Department of Child and Family Studies encompasses two primary concentrations: child development and family studies. Integration of these areas creates a unique perspective for the study of individuals and families. Each graduate student's program of study is carefully planned in conjunction with a faculty committee to establish a program consistent with individual goals. All programs are characterized by a broad array of coursework, varied research experiences, and opportunities for experiences in applied settings.

Because the doctoral degree is a research degree, students at this level receive substantial preparation in statistics and research methodology. Interested students should contact the department head.

ADMISSION REQUIREMENTS

A completed file for review includes a College of Human Ecology application, Graduate Record Examination (GRE) scores for the general section, and completion of three Graduate School Rating Forms by individuals who can attest to the potential for graduate education. Forms may be obtained from the department or Dean's Office, College of Human Ecology.

Admission to the program is contingent upon faculty evaluation of GRE scores, undergraduate/graduate GPA, rating forms, and work experience. Prerequisites for admission to the Master of Science program are 9 semester hours of either upper division undergraduate or graduate social science.

THE MASTER'S PROGRAM

An individual program of study may be designed by the student in collaboration with his or her major professor and committee. The program provides for a concentration in either child development or family studies.

Specializations in the child development concentration consist of early childhood education, early childhood special education, early childhood administration, and child development. Specializations in the family studies concentration consist of family life intervention and family science. Thesis and non-thesis options are available in both concentrations. Students should consider an interdisciplinary minor in gerontology to provide a lifespan perspective to human development or family studies.

All students in the child development concentration must enroll in CFS 510, 533, and 571. At least 6 hours in a cognate area outside the department must be completed. Thesis students are required to take the following: 3 hours of 500-level research methods, 3 hours of 500-level statistics, 6 hours of CFS courses in the area of concentration, 6 hours of thesis credit and an oral comprehensive examination. Non-thesis students are required to take the following: 3 hours of 500-level research methods, statistical methods, or interpretation of methods and statistics; CFS 564, 565, 9 hours of CFS courses in the area of concentration; and a written comprehensive examination.

Students in the child development/early childhood education licensure must enroll in College of Education courses: 574, 575, 591, and C&I 505. Thesis students are required to take the following: 3 hours of 500-level statistics; CFS 510, 512, 570, 571, and 3 hours selected from 520, 521, 530, 540, 590; 6 hours of thesis credit and an oral comprehensive examination. Non-thesis students are required to take the following: CFS 570 or 3 hours of statistical methods or interpretation of methods and research; CFS 510, 512, 570, 571; 12 hours selected from CFS 820, 521, 530, 540, 590; and a written comprehensive exam.

Students seeking the M.S. in Child and Family Studies are required to file a plan of study with the department head after 15 hours of graduate credit have been completed.

THE PH.D. CONCENTRATION

The doctoral program in Human Ecology prepares scholars in the concentration areas of child development and of family studies. The strength of the doctoral program is based on three major components: the interaction of child development and family studies within the context of human ecology and related areas, concentration in child development or family studies, and an emphasis on becoming proficient producers and consumers of research. A doctoral program that is concurrently specialized and integrated in nature reflects the complexity of the disciplinary subject matter, provides a broad context for formulating theoretical questions, and broadens the empirical literature for addressing those questions.

Requirements include:

2. Minimum 12 credits in 500- and 600-level courses in child development or family studies, with at least 3 credits in 600-level courses in addition to the required courses described in #1.
3. Minimum 6 credits in a cognate area.
4. Minimum 9 credits in graduate-level statistics; with at least 3 of these credits in a more specialized area than a sequence of survey courses.
5. Minimum 3 credits of specialized research methods.
6. Pre-doctoral research project approved by student's committee.
8. Minimum 8 credits of electives.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state basis. The M.S. in Child and Family Studies (concentration in family studies only) is available to residents of Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

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

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

510 Survey of Theory and Research in Child Development (3) Theoretical models and research literature in child development (conception through adolescence); application to research intervention and education. Prereq: 9 hrs of either upper division undergraduate or graduate social science or consent of instructor. F

512 Survey of Research in Early Childhood Education (3) Current literature and issues in early childhood education. Prereq: 510 or equivalent or consent of instructor. Sp


521 Organizational Management in Early Childhood Education (3) Designing, implementing, and evaluating physical and human resources in educational environments. Development of skills in environmental organization, interpersonal leadership, and supervision of staff. Prereq: 512 or equivalent or consent of instructor. F

522 Naturalistic Interventions for Parents and Teachers of Young Children (3) Common problems faced by parents and teachers; methods and techniques to modify problem behavior. Prereq: 510 or equivalent or consent of instructor. F, A

525 Seminar on Play (3) Comparison and contrast of theoretical framework and research methodologies on play. Developmental perspective on play.

530 Families of Handicapped Children (3) Developmental nature of families' experiences in caring for handicapped children, especially during infancy and early childhood. Prereq: 510 or equivalent or consent of instructor. F

540 Parent-Child Relations (3) Influence of parents on children, influence of children on parents, reciprocal interaction between parents and children, applications of systems models, child abuse, and impact of divorce on children. Prereq: 550 or equivalent or consent of instructor. F

550 Survey of Theory & Research in Family Studies (3) Research issues and literature in family studies; use of family conceptual frameworks, development of theoretical models and application to research and family life programs. F

552 Family in Contemporary Social Thought (3) Alternative conceptualizations of family in current social thought. Variations of family construction by race, gender, and social class. Sp, A

560 Marital Dyad (3) Communication, power, sexuality, marital stability, and marital crisis. Prereq: 550 or equivalent or consent of instructor. F

563 Family Life Education Programs (3) Planning, implementing, and evaluating programs in marital, parent-child, and family relationships, and parenthood education. Prereq: Consent of instructor. (Same as Home Economics Education 563.) F.A

564 Practicum in Human Development or Family Studies (1-3) School and community programs. Education for human development and family living. Prereq: Consent of instructor. S/N only. E

565 Practicum in Human Development or Family Studies II (3) School and community programs concerned with education for human development and family living. Committee approved and supervised written project. Prereq: 564 and consent of instructor. S/N only. E

566 Approaches to Family Intervention and Counseling (3) Various theoretical approaches to family intervention and counseling. Structural, strategic, experiential, and social learning theories of practice. Effects of intervention from perspective of their impact on family functioning and communication. Prereq: 562. (Same as Educational and Counseling Psychology 566.) Sp.A


571 Research Seminar (1) Presentation and critique of research projects. Prereq: Departmental major or consent of instructor. May be repeated. S/N only. E

572 Analysis of Teaching for Professional Development (2) (Same as Education 572.)

574 Professional Internship in Teaching (1-4) (Same as Education 574.)

575 Clinical Studies (4) (Same as Education 575.)

580 Special Topics in Human Development or Family Studies (1-3) Research, theory, and current issues in child development or family studies: divorce, handicapped children, symbolic interaction, work and family, Piaget, mainstreaming children, theory and research in human sexuality, and cognition. Prereq: 6 graduate hrs in major, or consent of instructor. May be repeated with different topics. Maximum 9 hrs. E

581 Directed Study in Human Development or Family Studies (1-3) Individual learning experiences in specific topics in child development and early childhood education or family studies. Prereq: 6 graduate hrs or consent of instructor. May be repeated with different topics. Maximum 6 hrs. E

585 Development of Intercultural and Supervision Skills (2) Refinement of intercultural skills needed to work with families and other professionals. Supervisory training in communication, active listening, self-disclosure, relationship building, and negotiation.

590 Assessment of Development and Learning in Young Children (3) Theory, empirical research, and practices related to measurement of development and learning in young children. F.A

592 Clinical Studies (4) (Same as Education 591.)

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

610 Advanced Special Topics in Human Development or Family Studies (1-3) Study of research and theory related to current issues. Prereq: 12 graduate hrs in major or consent of instructor. May be repeated with different topics. Maximum 6 hrs. F.A

620 Advanced Direct Study in Human Development or Family Studies (1-3) Advanced, in-depth individualized learning experiences in specific topics in child development, early childhood education, or family studies. May be repeated with different topics. Maximum 6 hrs. F.A

630 Advanced Developmental Processes (3) Social, emotional, cognitive, language development during infancy and childhood. Normative and nonnormative development. Prereq: 510 or equivalent or consent of instructor. May be repeated with different topics. Maximum 6 hrs. F.A

631 Adolescent Development in Families (3) Normative and nonnormative adolescent development; physical, cognitive, moral, social, familial, sexual, and family systems. Prereq: 510 or equivalent or consent of instructor. F.A

632 Advanced Study in Family Interaction (3) Human communication and conflict management within family context. Theoretical perspectives for family processes, adjustment, decision making, and coping. Prereq: 550 or equivalent or consent of instructor. Sp.A

633 Survey Design and Analysis (3) (Same as Sociology 533.)

691 Assessment of Family Behavior (3) Analysis of methods and measurement in family science research. Prereq: 550, 571, 3 hrs graduate statistics, or consent of instructor. S/N only. E

692 Clinical Studies (4) (Same as Education 591.)

693 Directed Study in Human Development or Family Studies (1-3) Individual learning experiences in specific topics in child development, early childhood education, or family studies. Prereq: 6 graduate hrs or consent of instructor. May be repeated with different topics. Maximum 6 hrs. E

694 Survey Design and Analysis (3) (Same as Sociology 694.)

695 Research Seminar (1) Presentation and critique of research projects. Prereq: Departmental major or consent of instructor. May be repeated. S/N only. E


697 Practicum in Human Development or Family Studies (1-3) School and community programs. Education for human development and family living. Prereq: Consent of instructor. S/N only. E

698 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 written project. Prereq: 564 and consent of instructor. S/N only. E

699 SpecialTopics 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 9 hrs. E

700 Professional Internship in Teaching (1-8) (Same as Education 700.)

701 Research Seminar (1) Presentation and critique of research projects. Prereq: Departmental major or consent of instructor. May be repeated. S/N only. E

707 Professional Internship in Teaching (1-4) (Same as Education 707.)

The Department of Civil and Environmental Engineering offers degrees leading to the Master of Science and Doctor of Philosophy with a major in Civil Engineering concentrating in construction engineering, environmental engineering, geotechnical/materials engineering, public works engineering, structural engineering, and transportation engineering; to the Master of Science in Environmental Engineering with concentrations in water quality, water resources, air quality, mixed waste management, and waste management.

THE MASTER'S PROGRAM

The Master of Science programs in Civil Engineering and Environmental Engineering are offered to graduates of recognized undergraduate curricula.

Departmental requirements provide that for a major in Civil Engineering, the Bachelor's degree must be in civil engineering, or certain undergraduate prerequisite courses must be taken before admission to candidacy for the Master of Science in Civil Engineering.

Civil Engineering

The Department of Civil and Environmental Engineering offers two options for the Master of Science with a major in Civil Engineering.

Thesis Option: A minimum of 30 semester hours, including 6 hours of thesis, is required. Non-Thesis Option: A minimum of 33 semester hours, including a 3-hour special problem is required. The special problem will culminate in a written report which must be approved by the student's major professor.

Environmental Engineering

For a Master of Science with a major in Environmental Engineering, normally a Bachelor's degree in a field of engineering is required. For a student who does not have an engineering background, the following minimum prerequisite courses will be required: Basic Engineering or Computer Science 101: Basic Engineering 121, 131; Engineering Science and Mechanics 231; Statistics 251; Civil Engineering 390, 395, 380; Mathematics 141, 142, 231, 241; Chemistry 120, 130. In general, these must be completed with a B average before courses for graduate credit can be taken.

The Department of Civil and Environmental Engineering offers both thesis and non-thesis options for work toward the Master of Science degree in Environmental Engineering.

Thesis Option: The student must present a minimum of 30 semester hours of approved graduate courses. The student shall include 6 semester hours of thesis and a minimum of 12 semester hours of approved environmental engineering coursework. A minor may be selected but is not necessarily required.

Non-Thesis Option: The student must present a minimum of 33 semester hours of approved graduate courses. The major shall include a minimum of 18 semester hours of approved environmental engineering coursework. A minor may be selected but is not necessarily required.

Either option must be approved by the student's major professor. A student's program must include a minimum of 9 semester hours of
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, 332.

452 Traffic Engineering (3) Characteristics of driver, vehicle, and roadway and their interrelationship; traffic studies; basic considerations of traffic circulation and control; lighting, capacity analysis, roadway safety analysis and design. Prereq: 210, 251, 332.

453 Airport/Railroad Planning and Design (3) Airport master planning and railroad engineering. Runway configuration, airport facility, geometric, and terminal layout and design. Railroad capacity, dynamics, and system layout and design. Prereq: 210, 251, 332.

461 Analysis of Framed Structures (3) Maximum stress due to moving loads; use of influence lines; lateral forces due to earthquake and wind; analysis of portal, buildings, frames, and space frames; matrix methods; use of computer in structural analysis. Prereq: Structural Analysis II.

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

476 Reinforced Concrete Design (3) Reinforced concrete continuous beams and floor slabs, columns with combined axial loads and bending, footings and retaining walls. Prereq: 471.

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

490 Water Resources Project Design (3) Coherent development of multipurpose reservoir and dam project; data acquisition, spillway and outlet works design; earth and gravity dam stability analyses; storage and filtration, maintenance and operation principles; and dam safety concepts, dam break analysis. Prereq: 390, 395.

494 Urban Drainage Engineering (3) Design and management of stormwater conveyance and control structures. Application of fundamental engineering and hydraulic principles to design of drainage systems for urban, rural, and highway development; design of inlet structures, culverts, and detention basins; application of commonly-used computer runoff models; evaluation of land-use on streamflow quantity and quality. Prereq: 390, 395.

485 Water Resources Development and Management (3) Principles of water resources project development and management. Institutional framework; water law, evaluation procedures for comparing alternative among water resources development alternatives; decision-making, planning, principles of engineering economics, benefit-cost analysis, and cost allocation methods; environmental impact assessment procedures; decisions concerning integrated water resources development; case studies. Prereq: Senior standing.

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

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

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

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

530 Soar Strength and Earth Slope Stability (3) Stability of slopes of cohesionless soil; slope failure; idealized, simple case; Drained and undrained shear strength and stress-strain behavior of soil. Laboratory testing. Stability of natural and cut slopes and embankments. Prereq: 471.

531 Soil Stabilization (3) Mechanization stabilization of soils by compaction, drainage, and blending; chemical stabilization of soils with admixtures, waterproofing and modifying soils and additives. Reinforced earth and stabilization with geosynthetics. Prereq: Introduction to Soil Behavior.


559 Geomechanics Seminar (1) Seminar topics in materials, geotechnical engineering and geomechanics. Graduate student research contributions and practical applications presented by practicing engineers from companies, government agencies, graduate student and instructor. 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 and organization of heavy and building construction projects. Prereq: Construction Methods and Equipment.

543 Construction Estimating (3) Project cost estimation, takeoff methods, techniques, material cost conditions, and feasibility of design to cost. Prereq: Construction Methods and Equipment.

551 Traffic Engineering-Characteristics (3) Driver-vehicle-highway system; traffic flow modeling; elements of transportation/highway safety. Prereq: Graduate standing.

552 Traffic Engineering-Operations (3) Signs, signals and marketing; short-run operations; controllers; signal timing and phasing; one-way reversible flow; system operation; identification and correction of high-incident locations and system deficiencies. Prereq: Traffic Engineering-Characteristics.

553 Geometric Design and Layout of Roads and Community Facilities (3) Functional and geometric design and rural and urban roads of all classes; subdivision layout; configuration of urban roads of all classes; techniques for access control, interchange and intersection designs; parking. Prereq: 451 or consent of instructor.

554 Urban Transportation Planning (3) Transportation planning in urban areas; systematic planning for identifying existing and future problems; travel surveys and demand models; evaluation of alternatives; implementation tools; special topics: urban goods movement, transportation system management. Prereq: 382 or graduate standing.

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

556 Traffic Accident Reconstruction (3) Data collection and analysis as basis for accident prevention on conventional and urban system; analysis of transportation; roadway design and crash testing. Prereq: 452 or graduate standing.

557 Transportation Planning and Operations with Micro-Computer Applications (3) Transportation systems management techniques and application of micro-computers to analysis of transportation actions. Prereq: 551, 554.

558 Planning and Transportation (3) Preparation of transportation as elements of comprehensive development plans. Analysis of relationship between various transportation modes and between transportation and other community features. Use of planning process to
Environmental Engineering

GRADUATE COURSES

500 Thesis (1-18) P/NP only. E

502 Registration for Use of Facilities (3-15) Required. May not be used during the time before degree is completed. May be repeated. Same as Agricultural Engineering 588 and Aerospace Engineering 588.

508 Seminar (1) Reports on current research in environmental engineering at UT. Prerequisite: Graduate standing.

510 Environmental Protection (3) Managing of water resources, wastewaters, air quality, solid wastes, and hazardous materials to promote efficiency and comfort to safety in natural systems. Prerequisite: Consent of instructor.

520 Open Channel Hydraulics (3) Open channel flow principles, properties, and classifications: uniform and gradually varied flow theory and applications; open channel design; steady flow theory and analysis; dynamic routing; spatially varied flow; non-linear alignment; microcomputer applications, featuring HEC-2 model. Prerequisite: Civil Engineering 390.

522 Floodplain and Urban Flood Management (3) Review of national, regional, and local flood problems; state of the art flood damage reduction alternatives; structural and non-structural; institutional responses; policies, programs, codes, and legal aspects; floodplain hydrology and hydraulics; HEC-1, HEC-2: floodway encroachment, flood hazard zone and damage potential determinations; case studies. Prerequisite: Civil Engineering 390 or consent of instructor for non-majors.

524 Sediment Transport (3) Sediment properties and applications; principles of deposition of suspended and bed sediment transport in erodible channels; erosion, transportation, and deposition of sediment by flowing water; erodible channel design; channel regime theory; common computer models. Prerequisite: CIVIL 390.

525 Soil Erosion and Sediment Yield (3) Theory of soil erosion and sediment yield processes from disturbed land; methods and computer models for estimating sediment yield. Erosion and sediment control theory and management practices. Local and state regulations. Prerequisite: Civil Engineering 395. (Same as Agricultural Engineering 525.)

530 Stormwater Modeling (3) Systems approach to stormwater modeling. Hydrologic components, linear and nonlinear systems integrated into mathematical models. Stormwater systems and their flow characteristics. Review and applications of commonly used deterministic and parametric computer models. Prerequisite: Civil Engineering 395.

533 Ground Water Hydrology (3) Dynamics of flow and contaminant transport in porous media; hydrodynamics, dispersion, anisotropy, layered soils, unsaturated flow and groundwater contaminant transport phenomena. Analytical and numerical solution of flow and transport equations. Prerequisite: Hydraulics and Hydrology or Civil Engineering 485 for geology majors. (Same as Geological Sciences 535.)

540 Remote Sensing for Transportation and Facilities Planning (3) Principles of remote sensing: sources of data and data acquisition systems; photo interpretation, analog and digital techniques for analysis of aerial and terrestrial images, radar and thermal imagery applications to transportation and facilities planning, construction, and operations. Prerequisite: Consent of instructor.

541 Remote Sensing Data Acquisition and Analysis (3) Active and passive sensors; automated analog and digital processing and interpretation of remote sensing data; enhancement and classification techniques for color aerial photo and thermal imagery applications to environmental problems; stress assessment. Prerequisite: Consent of instructor.

542 Instrumentation and Measurement (3) Same as Agricultural Engineering 542.

545 Monitoring Hydrologic Phenomena (3) Same as Agricultural Engineering 545.

551 Physicochemical Unit Processes (3) Theory and design application in water and wastewater treatment. Prerequisite: Civil Engineering 380 and Civil Engineering 380.

552 Biological Treatment Theory (3) Theory and design application of biological wastewater treatment system. Sedimentation and treatment of wastewater and solid wastes. Prerequisites: Civil Engineering 380, 2 hrs and 1 lab. (Same as Agricultural Engineering 552.)

553 Aquatic Chemistry (3) Theoretical, applied and analytical chemistry related to water quality, treatment, and conservation of surface and groundwaters. Prerequisite: Chemistry 130, 2 hrs and 1 lab.

554 Environmental Engineering Chemistry (3) Application of chemical principles in analyzing physical, chemical, or biological interactions of chemical contaminants in various environmental compartments: atmosphere, hydrosphere, and lithosphere. Prerequisite: One year chemistry and consent of instructor.

555 Solid Waste Management (3) Magnitude and characteristics of solid waste problems; collection systems, design of disposal systems: landfill, incineration, and composting, design of reserve recovery systems; current and future regulations. Prerequisite: Senior standing.

556 Hazardous Waste Management (3) Analysis and design of operations and processes for hazardous waste disposal and processing; regulations; analysis of industrial applications. Prerequisite: Graduate standing or consent of instructor.

557 Air Quality Control/Pollution Control (3) Introductory course on concepts of air pollution, analysis of relationships among sources, meteorology, effects; stack sampling; emission control systems. Prerequisite: 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. Prerequisite: Chemical Engineering 266.

572 Air Quality Dispersion Modeling (3) Diffusion in atmosphere: application of atmospheric dispersion models and evaluation of meteorological and air quality data. Prerequisite: Chemistry 130.

573 Sampling of Air Pollutants (3) Standard sampling methods for particulate and gaseous air pollutant emissions from industrial processes: ambient air monitoring instrumentation/techniques. Prerequisite: Consent of instructor.

574 Applied Microbiology and Bioengineering (3) (Same as Chemical Engineering 574, Microbiology 575, and Agricultural Engineering 575.)

590 Special Problems in Environmental Engineering (1-6) Enrollment limited to environmental engineering students in non-thesis programs. May be repeated. Maximum 6 hrs. S/NC only.

591 Design of Water Quality Control Systems (3) Design and evaluation of systems used to control erosion of gaseous and particulate air pollutants. Comprehensive design of specific devices and systems. Prerequisite: Chemical Engineering 266.

592 Air Quality Dispersion Modeling (3) Diffusion in atmosphere: application of atmospheric dispersion models and evaluation of meteorological and air quality data. Prerequisite: Chemistry 130.

593 Sampling of Air Pollutants (3) Standard sampling methods for particulate and gaseous air pollutant emissions from industrial processes: ambient air monitoring instrumentation/techniques. Prerequisite: Consent of instructor.

594 Applied Microbiology and Bioengineering (3) (Same as Chemical Engineering 574, Microbiology 575, and Agricultural Engineering 575.)

595 Special Problems in Environmental Engineering (1-6) Enrollment limited to environmental engineering students in non-thesis programs. May be repeated. Maximum 6 hrs. S/NC only.

596 Special Topics (1-4) Problems and topics related to current developments in field. May be repeated. Maximum 12 hrs. S/NC only.

620 Advanced Surface Water Hydrodraulics (3) Advanced topics in surface water hydraulics; solutions in ST. Venant equations of unsteady flow for complex channel situations; dam breach modeling. Prerequisite: P520.
431-32 Selected Readings from Latin Literature (3,3) Advanced topics in Latin literature; poetry of ancient Rome in original Latin. Prereq: 351-352 or consent of instructor. May be repeated. Maximum 9 hrs.

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.

462 Roman Law (3) Development of Roman law through examination of cases from writings of Roman jurists, world's first legal professionals. Understanding legal institutions in relationship to Roman society. Roman property and contract law.

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

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

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

551 Special Topics in Classical Civilization (1-3) Advanced tutorial work in Greek and Roman authors in English translation; problems in cultures of Greece and Rome. May be repeated. Maximum 9 hrs. Letter grade or S/N.

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

Communications

MAJOR DEGREES

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

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

For application forms and other information about the M.S. and Ph.D. programs in Communications, write to: Associate Dean for Graduate Studies, College of Communications, 426 Communications Building, The University of Tennessee, Knoxville, TN 37996-0947.

ADMISSION REQUIREMENTS

Applicants must meet admission requirements of The Graduate School. In addition, they must complete the Graduate Record Examination, rating forms, and application forms as required by the College of Communications. Minimum requirements for admission to full potential candidate status normally include a 3.0 (4.0 system) grade-point average in undergraduate studies and scores above the eighty-fifth percentile in verbal and quantitative aptitude on the Graduate Record Examination. All application materials are screened by an admissions committee authorized by the faculty of the College of Communications.

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

A baccalaureate degree in communications or a related field is recommended. Admission is possible with other baccalaureate degrees, however, all applicants without the appropriate background are required to take up to 18 semester hours of prerequisite and corequisite courses as determined by the department in which the student is enrolled. Students may take a proficiency test on any prerequisite course, subject to review by the Master's or Doctoral Committee of the College of Communications.

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

ACADEMIC COMMON MARKET

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

ACADEMIC STANDARDS

A student in the College of Communications whose graduate grade-point average, not including incomplete grades, is below 3.0 at any time after the end of 12 hours of graduate credit will be placed on probation. A student on probation will be dropped from the program unless his or her cumulative graduate grade-point average is 3.0 or higher at the end of the probationary period. The probationary period is defined as the next 12 semester hours of graduate coursework attempted that is specified in the student's degree program. Exceptions to this policy may be made only with the approval of the Associate Dean for Graduate Studies of the College of Communications on the recommendation of the student's faculty committee.

THE MASTER'S PROGRAM

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

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

Degree Requirements

The M.S. program emphasizes communications management in the areas of advertising, broadcasting, journalism (publications), and public relations. For the thesis option, a minimum of 31 hours of approved graduate work...
is required. The non-thesis option requires 34 hours.
1. Ten hours of core courses—Communications 510, 512, 540, and 550 or 560, the first three of which must be for the thesis option and nine hours for the non-thesis option of electives from a list provided by the department in area of concentration.
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 additional hours for the thesis option and nine hours for the non-thesis option of electives from a list provided by the department in area of concentration.

The following are normally minimal requirements for admission to full potential candidate status:
1. A 3.0 (4.0 system) grade-point average in undergraduate studies, or 3.5 for graduate work.
2. Above the fiftieth percentile in verbal and quantitative aptitude on the Graduate Record Examination.
3. Endorsement by at least three former teachers or professional colleagues; and
4. A statement of the applicant’s goals and reasons for pursuing the doctorate. Personal interviews within two hours of the Ph.D. Admissions Committee are recommended and may be required. Professional experience in some field of communications is highly desirable for admission.

A minimum of 88 hours of approved graduate work is required for the Ph.D.
1. Twenty-eight hours of core courses—Communications 610, 612, 620, 640, 641; 6 hours of statistics; and three of the following courses: Communications 622, 632, 642, 652, and 692.
2. Fifteen hours in a primary concentration (Advertising, Journalism, public relations, or speech communications).
3. Twelve hours in a secondary concentration (outside the College of Communications).
5. Twenty-four hours of dissertation.

Specific courses to be taken require the approval of student’s committee.

Admission to candidacy must be attained at least two semesters prior to graduation and requires successful completion of a 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 advisor, who will convey the committee’s recommendation concerning the student’s remaining in the program (non-biasing field) 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 the full calendar year are published the preceding November. This information is available from the Dean’s Office, 302 Communications Building. See also courses listed under Advertising, Broadening, and Journalism.

GRADUATE COURSES

400 Mass Communications Law and Ethics (3) Legal issues directly affecting the mass media: libel, privacy, free press, fair trial, judicial controls, governmental regulations. Ethical standards and practices of mass media in America. Prereq: Writing for Mass Communication or consent of instructor. E

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

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

510 Orientation to Mass Media Studies (1) Degree and thesis requirements. Committee formation and program planning. Overview of research methods and information sources. Prereq: Consent of instructor or admission to program. S/NC only. F

512 Fundamentals of Mass Media Research (3) Applications of research techniques for management, mass media and research of media. Prereq: Consent of instructor or admission to program. S/NC only. F

521 Tutorial in Communications Teaching (1) Experience as teacher under guidance of faculty member. Prereq: Consent of instructor. S/NC only. E

540 Theory for Media Management (3) Selected research hypotheses and theories in literature of mass communications, managerial decision-making. Prereq: Consent of instructor or admission to program. F

550 Seminar in Media Economics and New Technology (3) Electronic and print media ownership, finance and corporate structure. Role of new technologies and marketing techniques in changing media content and function in society. Prereq: Consent of instructor or admission to program. Sp


552 Seminar in Health Communications (3) Methods, problems, and issues of communication in health field. Media’s reporting of health issues. Setting of media’s “health agenda” and public relations theories of health. Prereq: Consent of instructor.

553 Seminar in Risk Communications (3) Interaction of scientists, journalists, and public on scientific, technological, and medical risks; analysis of methods for enhancing public understanding. Prereq: Consent of instructor.

560 Seminar in Communications Management (3) Organizational structure and development of communications corporations: development of objectives, strategies, and tactics. Analysis of financial statements and case studies. Prereq: Consent of instructor.

590 Project (3) Capstone project under guidance of faculty. Application of principles from previous coursework. Prereq: Consent of instructor or admission to program. S/NC only. F

593 Seminar in Mass Communications Issues (3) Special contemporary topics in communications. Prereq: Consent of instructor or admission to program. S/NC only. F

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

610 Orientation to Doctoral Research (1) Degree and dissertation requirements. Committee formation and program planning. Overview of research methods and information sources. Prereq: Consent of instructor or admission to program. S/NC only. F

612 Fundamentals of Mass Media Research (3) Techniques for analysis, planning, and reporting to the research community. Prerequisites: Research design, statistical analysis, and writing techniques. Prereq: Consent of instructor or admission to program. S/NC only. F

620 Seminar in Mass Communications Education (3) Role and scope of mass communications teaching unit, historical perspectives of curricular trends. Teaching methods and institutional objectives: classroom testing and measurement; design of professional curricula, research: experimental, survey, content analysis, historical and qualitative. Prereq: Consent of instructor or admission to program. S/NC only. F

622 Quantitative Research (3) Techniques for evaluation of research design and measurement. Survey, content analysis, and experimental techniques. Assessment of validity and reliability. Prereq: Consent of instructor or admission to program. S/NC only. F

632 Mass Communications History and Historiography (3) Historical and biographical. Prereq: Consent of instructor or admission to program. S/NC only. F

640 Mass Communications Theory I (3) Selected research hypotheses, and theories in literature of mass communications theory. Prereq: Consent of instructor or admission to program. F

641 Mass Communications Theory II (3) Selected topics in theory. Prereq: Consent of instructor or admission to program. F
Comparative and Experimental Medicine

(Office of the Vice Chancellor for Academic Affairs)

MAJOR DEGREES

Comparative and Experimental Medicine ............. M.S., Ph.D.
L. N. D. Potgieter, Director

Joint Graduate Coordinating Committee:

Fuhr, J. E., Ph.D., Medical Biology
Lawler, J. E., Ph.D., Psychology
Lozio, C., M.D., Medical Biology
Potgieter, L. N. D., Liaison, B.V.Sc., Ph.D., Veterinary Teaching Hospital
Slauson, D. O., D.V.M., Ph.D., Veterinary Teaching Hospital

The Comparative and Experimental Medicine degree program (M.S. and Ph.D.) is a jointly-administered graduate program intended to prepare students for teaching and/or research careers in the health sciences. This program emphasizes the comparative approach to the study of pathology, immunopathology, hematology, infectious diseases, aberrant metabolism, oncology, and genetic disorders. The Ph.D. program is open to approved graduate students seeking training in this area and is especially useful for individuals with professional degrees. For the student with undergraduate biological science background, the Comparative and Experimental Medicine program provides an unusual opportunity to study disease processes common in humans and animals from a multidisciplinary perspective. The scope of this interdisciplinary program, which pools faculty resources from both veterinary and human medicine, is broadened by faculty members representing animal science and numerous areas of the life sciences. The interdisciplinary training environment includes such diverse support as facilities and personnel at the Veterinary Teaching Hospital, the Oak Ridge National Laboratory, Knoxville Zoological Park, Hemophilia Clinic, Developmental and Genetic Center, Pharmacokinetics Laboratory, Clinical Virology, Clinical Parasitology, Inflammation Research Laboratory, Hematology and Oncology services, and departments of life sciences.

For specific course listings, see Veterinary Medicine and Medical Biology under Fields of instruction.

ADMISSION REQUIREMENTS

General Requirements

Admission requirements of The Graduate School of UT Knoxville apply. In addition, all applicants must furnish three letters of recommendation from individuals who are familiar with their scholastic or professional records.

Requirements for Admission to the Master of Science Degree Program

Applicants must have a baccalaureate degree with coursework in chemistry through organic, mathematics through calculus, physics, and basic biology. More advanced study in biology such as biochemistry, mammalian anatomy, histology, cell biology, or other appropriate biomedical courses from an accredited university is recommended.

Applicants for admission to the Master of Science degree program whose background includes no formal training in the biomedical field beyond the baccalaureate degree will be required to score at least 1,000 on the quantitative and verbal portions of the Graduate Record Examination.

Requirements for Admission to the Doctor of Philosophy Program

Applicants generally will be expected to have a Master's degree in one of the biological sciences and a Graduate Record Examination score of at least 1000 for the quantitative and verbal sections, or a professional degree in one of the medical sciences, (e.g., M.D., D.D.S., D.V.M.).

An individual having a baccalaureate degree with a strong background in the physical and biological sciences may be admitted upon presenting evidence of exemplary performance on the Graduate Record Examination.

Exceptional veterinary students at UT Knoxville may be enrolled in the Comparative and Experimental Medicine graduate program but will be listed officially as veterinary students. Such students may take advantage of enrolling in graduate courses during summers and as elective courses in the veterinary program.

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

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of the state of Kentucky to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. and Ph.D. programs in Comparative and Experimental Medicine are available to residents of the state of Kentucky. Additional information may be obtained from the Department of Graduate Admissions and Records.

Computer Science

(College of Liberal Arts)

MAJOR DEGREES

Computer Science ......................... M.S., Ph.D.

For specific course listings, see Veterinary Medicine and Medical Biology under Fields of instruction.

ADMISSION REQUIREMENTS

General Requirements

Admission requirements of The Graduate School of UT Knoxville apply. In addition, all applicants must furnish three letters of recommendation from individuals who are familiar with their scholastic or professional records.

Requirements for Admission to the Master of Science Degree Program

Applicants must have a baccalaureate degree with coursework in chemistry through organic, mathematics through calculus, physics, and basic biology. More advanced study in biology such as biochemistry, mammalian anatomy, histology, cell biology, or other appropriate biomedical courses from an accredited university is recommended.

Applicants for admission to the Master of Science degree program whose background includes no formal training in the biomedical field beyond the baccalaureate degree will be required to score at least 1,000 on the quantitative and verbal portions of the Graduate Record Examination.

Requirements for Admission to the Doctor of Philosophy Program

Applicants generally will be expected to have a Master's degree in one of the biological sciences and a Graduate Record Examination score of at least 1000 for the quantitative and verbal sections, or a professional degree in one of the medical sciences, (e.g., M.D., D.D.S., D.V.M.).

An individual having a baccalaureate degree with a strong background in the physical and biological sciences may be admitted upon presenting evidence of exemplary performance on the Graduate Record Examination.

Exceptional veterinary students at UT Knoxville may be enrolled in the Comparative and Experimental Medicine graduate program but will be listed officially as veterinary students. Such students may take advantage of enrolling in graduate courses during summers and as elective courses in the veterinary program.

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ACADEMIC COMMON MARKET

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Computer Science

(College of Liberal Arts)

MAJOR DEGREES

Computer Science ......................... M.S., Ph.D.
worked after earning a Bachelor's degree). The department reserves the right to contact these individuals or other knowledgeable people if additional information is deemed necessary or desirable.

2. The student is expected to have taken the GRE verbal and quantitative general test within the past three years and to have these scores sent to The Graduate School.

3. The student should satisfy the same background requirements as for the Master's program. See the departmental brochure for details.

Original research reported in a dissertation of high quality is emphasized. The minimum hour requirements are 24 hours of course 600 Doctoral Research and Dissertation and 24 hours of graduate courses beyond the equivalent of a Master's degree (i.e., beyond 30 graduate credit hours) graded A-F. Computer Science 530, 560 and 580 are required for the degree. At least six hours of 600-level graded courses must be taken in computer science at UTK. The student's advisor and committee will establish the specific course requirements. The comprehensive examination consists of a departmental written examination and a subsequent oral examination conducted by the student's committee.

GRADUATE COURSES

420 Advanced Topics in Machine Intelligence (3) Search, learning, expert systems, neural networks, pattern recognition and natural language processing. Faculty research. Prereq: Completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hrs.

430 Advanced Topics in Hardware Systems (3) Architecture, parallel processors, microprogramming, networks and communications. Faculty research. Prereq: Completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hrs.

460 Advanced Topics in Software Systems (3) Operating systems, compilers, parallel computation, software engineering, database systems and programming languages. Faculty research. Prereq: Completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hrs.

470 Advanced Topics in Scientific Computation (3) Numerical methods, supercomputers and computer modeling and simulation of physical systems. Faculty research. Prereq: Completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hrs.

471 Numerical Analysis (3) (Same as Mathematics 471.)

472 Numerical Algebra (3) (Same as Mathematics 472.)

480 Advanced Topics in Theoretical Computer Science (3) Theory of computation, complexity theory, formal languages and graph theory and its applications. Faculty research. Prereq: Completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hrs.

494 Special Topics in Computer Science (1-3) May be repeated. Maximum 9 hrs.

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

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

521 Artificial Intelligence (3) Heuristic search, automatic theorem proving, symbolic methods, semantic information processing, representation theory. Prereq: Discrete Structures. Problem Solving.

522 Cybernetics (3) Various functions in living systems and their actual or potential realization in computers. Prereq: Discrete Structures.

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

525 Software Engineering (3) Survey of key ideas in software engineering, formal methods, tools, testing, reliability, structured design and development, metrics, management and history of the field.


538 Computer Networks (3) Design and operation of networks. Hardware and software systems; communication sub-systems. Prereq: System Programming and 532.


551 Pattern Analysis (3) Decision-theoretic and structural pattern analysis. Deterministic and statistical decision rules, feature extraction and representation; syntactic and semantic methods, relational models. Prereq: Digital design and probability or statistics.

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


563 Operating Systems (3) Operating system design, alternative strategies for memory, device, and processor allocation and management, protection, time sharing, real-time systems. Memory management, dispatchers, interrupts, Design project. Prereq: System Programming.

571-72 Numerical Mathematics (3) (Same as Mathematics 571-72.)

573 Finite Difference Methods for Partial Differential Equations (3) (Same as Mathematics 573.)

574 Finite Element Methods (3) (Same as Mathematics 574.)

575 Matrix Theory and Techniques in Numerical Analysis (3) (Same as Mathematics 575.)

576 Sparse Matrix Computations (3) Solution of large sparse linear systems: graph models, reordering techniques, symbolic factorizations, data structures, numerical algorithms, complexity analyses, parallel algorithms. Prereq: Numerical linear algebra.

580 Foundations (3) Finite automata and regular sets, push-down automata and context-free languages, Turing Machines, recursively enumerable sets, undecidability, Cock's theorem and NP-completeness. Prereq: Discrete Structures.

581 Design and Analysis of Algorithms (3) Algorithms of relevance to analysis of design of efficient computer algorithms. Sorting, searching, graph algorithms, pattern matching, dynamic programming, efficient approximation algorithms.


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

594 Special Topics in Computer Science (1-3) May be repeated.

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

620 Advanced Topics in Intelligent Systems (3-6) Prereq: Consent of instructor. May be repeated with consent of department.

630 Advanced Topics in Computer Systems (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

640 Advanced Topics in Databases/Information Retrieval (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

650 Advanced Topics in Pattern/Imagery Analysis (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

660 Advanced Topics in Software Systems (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

670 Advanced Topics in Numerical Mathematics (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

680 Advanced Topics in Theory and Foundations (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

690 Advanced Topics in Computer Science (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

Curriculum and Instruction

(College of Education)

MAJOR

DEGREES

MAJORS

Curriculum and Instruction.... M.S., Ed.S., Ed.D. Education............................. Ph.D.

J. Estill Alexander, Head

Professors:

### Graduate Programs

Graduate programs are designed to improve scholarly and educational competence in a number of areas leading to the Master of Science, the Specialist in Education, the Doctor of Education, and the Doctor of Philosophy with a major in Education.

#### THE MASTER'S PROGRAM

The department offers two tracks for the Master's degree. Track 1 focuses on art education, curriculum, elementary education, English education, foreign language education, instructional media and technology, mathematics education, reading education, science education, social foundations, and social science education. Track 2 is for students seeking initial licensure. Thesis and non-thesis options are available for both tracks.

**Track 1 - Concentrations are available in: Art Education, Curriculum and Instruction, Elementary Education, English Education, Foreign Language Education, Instructional Media and Technology, Mathematics Education, Reading Education, Science Education, Social Foundations, and Social Science Education.**

**Track 2 - Concentrations are available in: Education, Social Foundations, and Social Science Education.**

### THE DOCTORAL PROGRAM

The Ed.D. program in Curriculum and Instruction may include concentration upon the following fields: curriculum, educational foundations, educational research, elementary education, English education, foreign language education, mathematics education, reading education, science education, social science education. The Doctor of Philosophy with a major in Education includes concentrations and specializations as listed under Education.

For further information, write the Department of Curriculum and Instruction.

### ACADEMIC COMMON MARKET

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

### Art Education

#### GRADUATE COURSES

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 Thesis</td>
<td>Thesis (1-15)</td>
<td>P/NP only</td>
</tr>
<tr>
<td>502 Registration for Use of Facilities</td>
<td>Registration for Use of Facilities (3-15)</td>
<td>Pre-requisite for the student not otherwise registered during any semester when student uses University facilities and/or faculty before degree is completed. May not be used toward degree requirements. May be repeated. S/N only.</td>
</tr>
<tr>
<td>510 History and Philosophy of Art Education</td>
<td>History and Philosophy of Art Education (3)</td>
<td>United States from 1860 to present. Pre-requisite: Consent of instructor.</td>
</tr>
<tr>
<td>520 Studies in Art Education</td>
<td>Studies in Art Education (3)</td>
<td>Current practices and procedures in art education: unit planning, sequential organization, and teaching methods. Pre-requisite: Consent of instructor.</td>
</tr>
<tr>
<td>530 Production and Critical Analysis of Art</td>
<td>Production and Critical Analysis of Art (3)</td>
<td>Relationship of production and critical analysis of works of art to discipline-based art education.</td>
</tr>
<tr>
<td>540 Instructional Materials and Production Related to the Teaching of Art</td>
<td>Instructional Materials and Production Related to the Teaching of Art (3)</td>
<td>Development and use of instructional aids concerned with all aspects of teaching art: videotapes, audiotapes, slides, charts, and learning aids.</td>
</tr>
</tbody>
</table>

### CURRICULUM AND INSTRUCTION

#### GRADUATE COURSES

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>404 Problems in Improvement of Instruction</td>
<td>Problems in Improvement of Instruction (1-3)</td>
<td>Special conferences, workshops, or service programs. May be repeated. Maximum 6 hrs. S/N only. E</td>
</tr>
<tr>
<td>421 Elementary and Middle School Science and Social Studies Instruction</td>
<td>Elementary and Middle School Science and Social Studies Instruction (3)</td>
<td>Methods and materials for teaching science and social studies. Development of functional relationships and entities of two fields.</td>
</tr>
<tr>
<td>422 Elementary and Middle School Teaching Methods</td>
<td>Elementary and Middle School Teaching Methods (1-6)</td>
<td>Methods and materials (knowledge base) for teaching reading, language arts, mathematics, science and social studies, content and curriculum overview. Unit planning, daily planning, evaluation, etc., and language and concept development.</td>
</tr>
<tr>
<td>429 Language Arts/Reading Instruction in Elementary and Middle Schools</td>
<td>Language Arts/Reading Instruction in Elementary and Middle Schools (3)</td>
<td>Language and language development as applied to teaching of oracy (listening-speaking) and aspects of literacy (reading process/reading and writing). Not open to students with recent course in language arts methods. Pre-requisite: Admission to teacher education. F, Sp</td>
</tr>
<tr>
<td>430 Elementary and Middle School Developmental Reading Instruction</td>
<td>Elementary and Middle School Developmental Reading Instruction (3)</td>
<td>Word recognition (including phonics), comprehension, evaluation, and materials. Not open to students with recent course in reading methods. Pre-requisite: Admission to teacher education. F, Sp</td>
</tr>
<tr>
<td>434 Topics in Reading Education</td>
<td>Topics in Reading Education (1-15)</td>
<td>Pre-requisite: Admission to teacher education and course in reading education. May be repeated. Maximum 6 hrs. E</td>
</tr>
<tr>
<td>443 Elementary and Middle School Mathematics Instruction</td>
<td>Elementary and Middle School Mathematics Instruction (3)</td>
<td>Procedures for helping children learn mathematics. Unit planning, daily planning, grouping, general factors related to classroom management. Not open to students with recent course in teaching of elementary school mathematics. Cannot apply toward M.S. degree. Pre-requisite: Admission to teacher education. F, Sp</td>
</tr>
<tr>
<td>445 Early Childhood Education</td>
<td>Early Childhood Education (3)</td>
<td>Pre-requisite: Admission to teacher education. F, Sp</td>
</tr>
<tr>
<td>451 Education in Cultural Perspective</td>
<td>Education in Cultural Perspective (3)</td>
<td>Contribution of anthropological concepts (primarily concepts of culture) to understanding of educational processes, problems, and thought in our society and others.</td>
</tr>
<tr>
<td>454 Teaching Strategies and Issues in Social Studies</td>
<td>Teaching Strategies and Issues in Social Studies (3)</td>
<td>Goals, objectives, techniques, materials and evaluation; direct and indirect observation in social studies classes; preparation of teaching plans and materials; simulated teaching experiences. Pre-requisite: Admission to Teacher Education Program.</td>
</tr>
<tr>
<td>455 Teaching of Foreign Languages, Grades 7-12</td>
<td>Teaching of Foreign Languages, Grades 7-12 (3)</td>
<td>Instrucational methods, lesson planning, peer-teaching; materials for teaching foreign language and culture; evaluation techniques. Required for certification in modern foreign languages and Latin. Pre-requisite: Admission to Teacher Education Program.</td>
</tr>
<tr>
<td>460 Teaching Reading and Literature in the Secondary School</td>
<td>Teaching Reading and Literature in the Secondary School (3)</td>
<td>Approaches for teaching basic reading skills and ways of teaching literature. S</td>
</tr>
</tbody>
</table>

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) Content area teaching and development of students to apply methods. Prereq: 422. Coreq: 575. 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 poetry and materials. F

509 Teaching Composition in the Secondary School (3) Teaching narration, description, exposition, and argumentation; writing process and marking of student papers. Sp

509 Teaching Fiction in the Secondary School (3) Teaching of novels and short stories. F


515 Seminar (1-3) Curriculum, instructional technology, elementary education, or social foundations as related to goals of students’ programs. May be repeated. Maximum 6 hrs. S/NC only. E

516 Seminar (1-3) Curriculum, instructional technology, elementary education, secondary education, or social foundations as related to goals of students’ programs. May be repeated. Maximum 6 hrs. S/NC or letter grade. E

518 Educational Specialist Research and Thesis (2) May be repeated. Maximum 4 hrs. P/NP only. E

519 Educational Specialist Research and Thesis (2) P/NP only. E

520 Techniques of Research in Education (3) Study and application.

521 Teaching Social Studies in Elementary and Middle Schools (3) Planning and techniques. Trends in curriculum, development and generalization, integration of social sciences. Prereq: Course in teaching of social studies or consent of instructor. Sp

522 Teaching Mathematics in Elementary and Middle Schools (3) Instructional strategies for helping elementary school children learn mathematics. Examination, development and use of materials for creating active learning environment. Prereq: 443 or equivalent or consent of instructor. F, Su

523 Diagnosis and Correction of Children’s Difficulties in Learning Mathematics (3) Children’s difficulties in learning mathematics and procedures for helping classroom teacher correct difficulties. Prereq: 522 or equivalent teaching experience or consent of instructor. Su


525 Strategies, Programs and Materials for Teaching Elementary Social Studies (3) Analysis of new and innovative social studies programs and materials. Techniques of teaching social studies education. Prereq: Previous course in teaching of social studies or consent of instructor. Sp

526 Philosophy of Education (3) Truth, knowledge, and valuation in relation to work of schools. F, Su

527 Elementary School Curriculum (3) Examination, evaluation and application of curriculum designs in elementary school. Trends and issues which affect elementary education. Prereq: Consent of instructor. F, Su

528 Teaching Language Arts Elementary and Middle School (3) Recent trends and current materials and methods in teaching elementary language arts (except reading). Prereq: Course in language arts or consent of instructor. Sp, Su

529 Practicum in Diagnosis and Remediation of Difficulties in Learning Mathematics (2) Assessment and practicum experience with children having difficulties in learning elementary school mathematics. Prereq: 523 or consent of instructor. May be repeated. Maximum 4 hrs. Su

530 Teaching Reading in Elementary and Middle School (3) Trends in methods, materials, basic approaches, and development of classroom teacher’s role in reading and teaching reading of primary school students. 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. F

532 Instructional Research: Analysis and Application (3) Analysis of research on instruction. Translation and application of research findings into instructional performance. Prereq: Consent of instructor. F, Su

533 Reading in Middle and Secondary Schools: Research and Theory (3) Analysis of components of effective middle and secondary school reading programs. Attention to research and theoretical bases. Prereq: Consent of reading education or consent of instructor. F

534 Seminar in Reading Education (1-4) May be repeated. Maximum 6 hrs. E

535 Curriculum Evaluation and Program Improvement (3) Historical background and importance of educational evaluation in relation to curriculum development. Understanding of systematic curriculum evaluation approaches and application and its impact on effective education programs and content. Prereq: Consent of instructor. E

536 Psychology of Reading (3) Reading act, relationship between language and thinking, role of reading in the child’s intellectual development. Prereq: 500-level course in reading education or consent of instructor. Su

537 Diagnosis and Correction of Classroom Reading Problems (3) Procedures, methods and materials for diagnosing and correcting classroom reading problems. Prereq: Course in reading education or equivalent teaching experience or consent of instructor. Sp, Su

538 Practicum in Diagnosis of Reading Problems (2) 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. May be repeated. Maximum 4 hrs. Sp

539 Practicum in Remedial Reading Problems (2) 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. May be repeated. Maximum 4 hrs. Sp

540 Topics in Improvement of Instruction (1-3) Special conferences, workshops, and in-service programs. May be repeated. Maximum 6 hrs. S/NC only. E


542 Development of Educational Thought (3) History and philosophical approach to the nature of education. Prereq: Consent of instructor. F

543 Foundations of Educational Policy (3) Relationship between theory, policy, and practice; educational policies that arise from philosophical and practical considerations relative to human nature, to educational purpose, to content of curriculum and to methods and techniques for conducting educational enterprise. F, Su

544 Survey in Contemporary Philosophies of Education (3) Basic theoretical considerations of educational thought, a philosophy of education, and educational policy. Prereq: Consent of instructor. F

545 Educational Sociology (3) Sociological analysis of American education system. Controversial social issues that affect educational system and potential solutions offered by various programs. Open to juniors, seniors, and graduate students. F

546 Topics in History of Education (3) May be repeated. E

547 Topics in Philosophy of Education (3) May be repeated. F, Su

549 Topics in International Education (3) Historical, philosophical, sociological, and sociopolitical reflections on international relations and their cultures. May be repeated. E

550 Assessment and Correction of Language Arts Difficulties (3) Procedures and materials for diagnosing and correcting language arts difficulties; analysis of children’s work. Prereq: At least one language arts course or consent of instructor. Su

552 Developmental Reading Practicum (2) Diagnosis 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

557 The Junior High and Middle School Curriculum (3) Curriculum and instructional design for junior high and middle schools. Characteristics of students, curriculum, instructional organization and structure of junior high and middle schools. Sp, Su

558 Curriculum Planning and Development (3) Foundations and principles of curriculum planning and development. Historical analysis of curriculum theory, principles of planning and development, and classroom applications for improved learning. E

559 Introduction to Qualitative Research in Education (3) Fundamentals of qualitative research methods and development of skills needed for qualitative research proposals. Overview of qualitative research methods: ethnography, case study, historiography, biography, oral and life history. Critical reading and evaluation of qualitative research studies. F

560 Educational Statistics (3) Applications of descriptive and inferential statistics to educational and instructional problems: Use of electronic calculators in educational research. Prereq: One year of college mathematics. F

562 Direction and Supervision of Student Teaching (3) Roles and responsibilities of cooperating teachers and student teacher; objectives and policies of student teaching program; elements of clinical supervision; overview of research. F, Su

564 Curriculum for Early Childhood Education (K-3) (3) Theoretical foundations and current research in content and skill areas of curriculum for kindergarten-grade
3: application to local school setting. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. Sp, Su

555 Instructional Trends and Issues in Science Education (3) Analysis of current trends in science instruction, instructional issues facing elementary, secondary, and community college science teachers, and application of learning theories, psychological, physical, and environmental sciences. Prereq: 496, 422, or equivalent.

566 Administering Instructional Media Programs (3) Leadership roles and responsibilities of professional media administrator in variety of organizational settings. F

567 Application of Theory in Early Childhood Education (K-3) (3) Principles and practices from selected theoretical orientations. Prereq: Course in early childhood education or consent of instructor. May be repeated. Maximum 6 hrs. F, Su

568 Teacher-Parent-Community Relations (3) Techniques for effective relations between parents and teachers: examination of roles and expectations; parental involvement; volunteer programs; influence of community on educational process. Prereq: Consent of instructor. Sp, Su

569 Advanced Production of Audiovisual Software (3) Hand and mechanical lettering, flat picture mounting, laminating, overhead projection, audio production, TV studio orientation, sync-taping, multi-screen presentations, and printing techniques. (Same as Library and Information Science 569.) Tu

573 Utilization of Educational Television and Radio (3) Television and radio as instructional and training media. Selecting, making and evaluating instructional/ training video and audio tapes. F

577 Introduction To Data Processing in Curriculum and Instruction (3) Analysis of current activities in educational computing and data processing. Curricular, instructional, research, and classroom management applications from microcomputers to super computers. Prereq: Consent of instructor. F

578 Teaching English as a Second Language (3) Instructional methods. Utilization of assessment procedures to diagnose English linguistic proficiency; materials for non-native speaker in K-12 classroom. Required for Tennessee ESL (K-12) certification. Prereq: Consent of instructor.

580 Techniques for Research in Curriculum and Instruction (3) Fundamentals of research methodology applicable to curriculum, instruction, an other areas of educational inquiry. Critical reading of research and development of skills needed for proposal development. E

581 Seminar in Mathematics Education (3) Current issues influencing instruction in mathematics in schools, elementary through high school, investigating theoretical methodologies. Opportunities for work on special problems. Prereq: Undergraduate course in teaching of mathematics. Su

582 Teaching Enrichment Mathematics in Middle and Junior High Schools (3) Topics to enrich middle and junior high school mathematics. Geometrical, laboratory, and problem solving activities. Special attention to metric system. Opportunities for individual projects. Prereq: 581. Su


584 Seminar in Early Childhood Education (3) Analysis of research and theory in early childhood education; integrative. Prereq: Consent of instructor. F, Su

585 Teaching Secondary School Social Studies (3) Strategies, projects, materials, and programs in social studies. Prereq: Graduate course in teaching of social studies. F, Su

586 Teaching Probability & Statistics (3) Teaching of probability and statistics in schools, elementary through college. Probabilities and statistical experiments, demonstrations, and applications. Prereq: 581. F

587 Teaching Foreign Languages in Secondary Schools (3) Advanced instructional techniques and evaluation procedure; materials analysis for presentation; trends, issues, and research in modern foreign languages and Latin. Prereq: Consent of instructor.

588 Instructional Theory and Design (3) Relationship of curricular instruction; examination of instructional and related learning theories; instructional models and teaching styles. E

589 Field Experience (1-3) Application of curricular and instructional principles, methods, and materials in schools. Prereq: Program planning and consent of instructor. May be repeated. Maximum 9 hrs. S/N only. E

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

595 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

595 Special Topics (1-3) May be repeated. S/N or letter grade. E

596 Curricular Trends and Issues in Science Education (3) Analysis of elementary and secondary curricular projects for biological, physical, and environmental sciences. Impact of current teaching theories on future curriculum development projects. Prereq: 496, 422, or equivalent. Prereq or coreq: 585 or consent of instructor.

597 Teaching Drama Grades 7-13 (3) Strategies and materials for teaching creative dramatics, enacting and writing of plays, reading of scripts. Sp

598 Developing Speaking and Listening Skills, Grades 7-12 (3) Teaching approaches to nonverbal communication, interpersonal and group communication, public address and listening. Review of tests and materials. Sp

599 Seminar in Social Studies Research and Theory (3) Research, trends, and issues in secondary social studies. Su

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

601 Studies in English Education (3) Issues and research in teaching of English. Su

602 Seminar in Reading Education (1-6) May be repeated. Maximum 6 hrs. E

603 Advanced Studies and Theoretical Models of Reading (3) Research on reading processes. Current theoretical models related to how learners process print. Prereq: 500-level courses in reading education or consent of instructor. Sp

604 Seminar in Curriculum and Instruction (1) Required 2 consecutive semesters. S/N only. E

605 Organizing and Administering Reading Programs (3) Analyzing and synthesizing instructional, learning, and materials components into classroom, school, and system programs. Prereq: 2 500-level courses in reading education or consent of instructor. Su

606 Research in Elementary Education (3) Analysis of research in elementary education with application to classroom teaching. Prereq: research course. Su

607 Advanced Seminar in the Social Foundations of Education (4) Interdisciplinary team-taught seminar. Readings selected by faculty and participants from classic studies and current periodical literature in anthropology, sociology, and philosophy of education. Required of Ph.D. students in Education. 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

609 Advanced Seminar in Curriculum and Learning (4) Team-taught interdisciplinary seminar: trends, themes, and issues in curriculum and learning. Reading and discussions based on significant research and scholarly publications. (Same as Educational & Counseling Psychology 609.)

617 Trends and Issues in Curriculum and Instruction - An Interdisciplinary Perspective (3) Current trends and issues in the field of curriculum and instruction. Prereq: Admission to Ed.S. program.

618 Interpretation and Application Curriculum and Instruction Research (3) Analysis of research in curriculum and instruction, newer methodologies and strategies. Utilization of research to improve curriculum and instruction practice, application of research principles in context of specific professional assignments. Prereq: Consent of instructor. Sp

621 Seminar in Social Studies Research and Theory (2) Statistical research and theories related research from other fields, and application of research. Prereq: Recent course in teaching of social education or consent of instructor. May be repeated. Maximum 4 hrs. E

622 Using Research for Curriculum Improvement (3) Research methodology; application to descriptive/survey curriculum materials. Critical reading of research, technological development in descriptive and survey areas. Sp

623 Seminar in History of Education (3) Selected historical issues in education. Prereq: 2 courses in history or philosophy of education. May be repeated with consent of instructor. Sp


634 Teacher Education in America (3) For students preparing to enter teacher education. Brief historical development, program analysis and evaluation, current issues, and future directions. F

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

650 Advanced Studies in Early Childhood Education (3) Prereq: Graduate course in early childhood education or consent of instructor. May be repeated. Maximum 6 hrs. S/N only. E

651 Advanced Studies in Elementary School Language Arts (3) Selected issues in elementary school language arts. Prereq: Graduate course in elementary school language arts or consent of instructor. Sp

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


669 Instructional Media Research (3) Identification, location, and collection of developmental and experimental research on instructional media. Application of research. Sp

671 Advanced Educational Statistics (3) Applications of parametric and non-parametric statistical inference to educational and instructional problems. Use of microcomputers in educational research. Prereq: 561, Sp, Su

675 Curriculum Evaluation: Theory and Application (3) Evaluation trends and issues. Theoretical frameworks to design evaluation studies for various educational programs. Sp

676 Curriculum Theory (3) Influential curriculum theories and approaches, implications for structure and design of educational programs. Nature and function of theory, theory building activities. Prereq: Consent of instructor. E

683 Advanced Studies in Elementary School Mathematics (2) Research in elementary school mathematics. Prereq: Graduate course in mathematics education or consent of instructor. Sp

695 Educational Leadership: Theory and Practice (3) Theories of leadership applied to a variety of educational settings. Prereq: Consent of instructor. F, Su
Ecology

(College of Liberal Arts)

MAJOR DEGREES

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

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

Shared Faculty:

Adams, Marshall, Ph.D., ORNL
Amundsen, C. C., Ph.D., Botany
Blytlkock, B. G., Ph.D., ORNL
Boake, Christine R. B., Ph.D., Zoology
Buckner, E. R., Ph.D., Forestry, Wildlife & Fisheries
Bunting, Dewey L. (Liaison), Ph.D., Zoology
Burghardt, G. M., Ph.D., Psychology
Dearden, B. L., Ph.D., Forestry, Wildlife & Fisheries
DeAngelis, D. L., Ph.D., ORNL
Delcourt, Paul A., Ph.D., Geology
Dimnick, Ralph W., Ph.D., Forestry, Wildlife & Fisheries
Drake, James A., Ph.D., Zoology
Echternacht, Arthur C., Ph.D., Zoology
Emanuel, William, Ph.D., ORNL
Elner, D. A., Ph.D., Zoology
Farkas, Walter, Ph.D. Environmental Practice
Fribourg, Henry A., Ph.D., Plant & Soil Science
Gardner, R. H., Ph.D., ORNL
Gehrs, C. W., Ph.D., ORNL
Gett, C. S., Ph.D., ORAU
Glittelman, John L., Ph.D., Zoology
Goss, L. Barry, Ph.D. Science Appl.
Greenburg, Neil, Ph.D., Zoology
Gross, L. J., Ph.D., Mathematics
Hallam, Thomas G., Ph.D., Mathematics
Harden, Carol P., Ph.D., Geography
Herbes, S. E., Ph.D., ORNL
Hildebrand, S. G., Ph.D., ORNL
Hilty, J. W., Ph.D., Entomology & Plant Pathology
Horn, Sally P., Ph.D., Geography
Houston, M., Ph.D., ORNL
Kelly, J. M., Ph.D., TVA
Kimmel, B. L., Ph.D., ORNL
McCarty, J. F., Ph.D., ORNL
McCormick, J. Frank, Ph.D., Botany
McCracken, G. F., Ph.D., Zoology
McKinney, M. L., Ph.D., Geology
McLaughlin, S. B., Ph.D., ORNL
Mulholland, P. J., Ph.D., ORNL
Nodvin, Stephen C., Ph.D., CPSU
Norbry, Richard, Ph.D., ORNL
O'Neill, R. V., Ph.D., ORNL
Pagni, R. M., Ph.D., Chemistry
Parker, Charles, Ph.D., ORNL
Patton, Michael R., Ph.D., Forestry, Wildlife & Fisheries
Pimm, S. L., Ph.D., Zoology
Piess, C. D., Ph.D., Entomology & Plant Pathology
Post, W. D., Ph.D., ORNL
Reed, R. M., Ph.D., ORNL
Rehder, J. B., Ph.D., Geography
Reichle, D. E., Ph.D., ORNL
Rennie, J. C., Ph.D., Forestry, Wildlife & Fisheries
Reynolds, J. H., Ph.D., Plant & Soil Science
Riechert, Susan E., Ph.D., Zoology
Rose, K. A., Ph.D., ORNL
Sayer, Gary S., Ph.D., Microbiology
Schlarbaum, S. E., Ph.D., Forestry, Wildlife & Fisheries
Schneider, Gary, Ph.D., Forestry, Wildlife & Fisheries
Smith, W. C., Ph.D., Botany
Stacey, G., Ph.D., Microbiology
Stewart, A., Ph.D., ORNL
Strange, R. J., Ph.D., Forestry, Wildlife & Fisheries
Turner, Monica G., Ph.D., ORNL
Van Hook, R. I., Ph.D., ORNL
VanWinkle, W., Ph.D., ORNL
Vaughn, G., Ph.D., Zoology
Walton, B. T., Ph.D., ORNL
Wehry, E. L., Ph.D., Chemistry
West, D. C., Ph.D., ORNL
White, David C., Ph.D., Microbiology
Wilson, J. L., Ph.D., Forestry, Wildlife & Fisheries
Witherspoon, J. P., Ph.D., ORNL

The Graduate Program in Ecology offers Master of Sciences and Doctor of Philosophy degrees. This interdepartmental program provides advanced courses in contemporary ecology for students from undergraduate programs in basic and applied biology, social sciences, mathematics, and engineering. Research opportunities in both fundamental and applied ecology are intended to prepare students for academic careers as well as professional positions in industry or government. The Environmental Sciences Division of the Oak Ridge National Laboratory, the National Park Service, and the Tennessee Valley Authority provide advisors and research facilities. The Great Smoky Mountains, Cumberland Plateau, valley and ridge topography, TVA reservoirs and wild rivers provide locally a spectrum of natural habitats and consequent biological diversity that is truly unique. In addition, faculty research programs provide opportunities for student research elsewhere on this continent and abroad.

ADMISSION REQUIREMENTS

Requirements for admission to this program are: (1) admission to The Graduate School; (2) chemistry including organic, mathematics including calculus, and 3 semester hours of ecology at the upper division level (physics highly recommended); (3) departmental application and candidate forms; (4) the Graduate Record Examination. Application forms for admission should be obtained from The Graduate School as well as the Ecology Program. Inquiries concerning the admission requirements should be addressed to the Director, Graduate Program in Ecology, University of Tennessee, Knoxville, Tennessee 37996-1610.

THE MASTER'S PROGRAM

Within the minimum requirements of The Graduate School, the program of study must include Ecology 573, 574, and 610 as designated, or an approved equivalent and one course from an approved list of quantitative methods offerings. The list is available from the ecology office and is updated annually by the Ecology Curriculum Committee. The remainder of a student's course program is determined in consultation with the graduate committee. A listing of approved campus-wide ecology offerings is provided to each student during orientation.

A graduate minor in ecology is available on an individual basis.

THE DOCTORAL PROGRAM

The requirements for this degree are in general the same as those of The Graduate School. The doctoral program must include Ecology 573, 574, and 610 as designated, or an approved equivalent and one course from an approved list of quantitative methods offerings. A student cannot enroll for dissertation hours until the research proposal has been discussed and approved by the doctoral committee. A foreign language is required.

ADVISORS

Advisors are selected from ecologists on the shared faculty of the University who have competence in the area in which the student expects to work. Entering students should consult early with the director of the program on the choice of a faculty committee. The Master's committee need not have more than three members. Doctoral committees consist of the major professor as chairperson, one additional member who should have an appointment in the same department, and at least two additional Ecology faculty from other departments.

MINOR IN ENVIRONMENTAL POLICY

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

ACADEMIC COMMON MARKET

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

GRADUATE COURSES

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
Economics

(College of Business Administration)

MAJORS

Economics ................................. M.A., Ph.D.  
Business Administration ............... MBA

William F. Fox, Head

Professors:

Bohm, Robert A. (Liaison), Ph.D. ....... (St. Louis)  
Bollby, Roger L., Ph.D. .................... Texas  
Carroll, Sidney L., Ph.D. ................. Harvard  
Chang, Hui S., Ph.D. ...................... Vanderbilt  
Clark, Don P., Ph.D. ........................ Michigan State  
Cole, William E., Ph.D. ........................... Texas  
Davidson, Paul (J. Fred Holly Chair),  
Ph.D. ........................................ Pennsylvania  
Felker, George R. (Emeritus), Ph.D. .... Ohio State  
Garrison, Charles B., Ph.D. ............... Kentucky  
Herzog, Henry W., Ph.D. ................... Maryland  
Jensen, Hans E. (Emeritus), Ph.D. ...... Texas  
Lee, Feng-Yao, Ph.D. ........................ Michigan State  
Mayhew, Anne, Ph.D. ...................... Texas  
Moore, John R. (Distinguished Prof.)  
(Emeritus), Ph.D. .......................... Cornell  
Neale, Walter C. (Emeritus), Ph.D. .... London

Quindry, K. E. (Emeritus), Ph.D. .......... Kentucky  
Russell, Milton, Ph.D. ..................... Oklahoma  
Schiottman, Alan M., Ph.D. .............. Washington (St. Louis)  
Spiva, George A. (Emeritus), Ph.D. .... Texas

Associate Professors:

Gauger, Jean A., Ph.D. ...................... Iowa State  
Glusoff, Etrol, Ph.D. ........................ Stanford  
Kahn, James R., Ph.D. ...................... Maryland  
Mandy, David M., Ph.D. ................... Illinois  
Mayo, John W., Ph.D. ........................ Washington (St. Louis)  
Murray, M. N., Ph.D. ........................ Syracuse  
Phillips, Keith E., Ph.D. .................... Washington

Assistant Professors:

Curry, Amy F., Ph.D. .......................... Duke  
Rubin, Jonathan D., Ph.D. ................. California (Davis)

The Department of Economics offers graduate programs leading to the M.A. and Ph.D. The M.A. may be completed either by 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 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 Director of Graduate Studies. The next two semester's coursework is 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 above the 400 level or above. Of these, at least 24 hours (at least 18 hours of which are in economics) must be at the 500 level or above. Of the minimum of 18 hours in economics at the 500 level or above, 12 hours must consist of 511, 512, and 513, taken by recommendations. The program requires a minimum of 48 hours of coursework beyond the bachelor's degree or 24 hours beyond the Master's degree, at least 24 hours of 600 Doctoral Research and Dissertation, and successful completion of the following:

1. Students are required to complete the following core requirements:
   a. Economic Theory: Microeconomic theory and macroeconomic theory by a qualifying exam taken not later than the beginning of the fourth semester of study.
   b. History of Economics: Completion of 515 or 516 with a grade of B or better, or by qualifying examination.
   c. Quantitative Methods: Completion of 581, 582 and one additional course in quantitative methods approved by the department.
   d. Students failing a qualifying examination must retake the examination the next time offered. A qualifying examination may be taken a third time only with approval of the department. Failing a qualifying examination for a third time will result in dismissal from the doctoral program.

2. Students are required to demonstrate competence by comprehensive examination in at least two fields of specialization in economics. Students failing a comprehensive examination may retake the examination the next time offered. A comprehensive examination in a specific field may be taken a third time only with approval of the department.

3. Students are required to complete with a grade of B or better two elective courses in economics at the 500 level or above, outside the core subject areas and outside the fields of specialization.

4. Students are required to complete a doctoral dissertation and to defend it successfully before the faculty.

MINOR IN ENVIRONMENTAL POLICY

The program is designed to give Master's level graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. While administered through the Economics Department, the program is coordinated by a committee of representatives from the following participating departments: Agricultural Economics and Rural Sociology; Civil and Environmental Engineering; Ecology; Economics; Forestry; Wildlife and Fisheries; Geography; Management; Political Science; and Sociology.

Students may request admission to the minor following admission to the Master's program in one of the participating departments. Students in good standing in one of these programs may apply for admission to the minor in environmental policy. The coordinating
committee will consider the admission of interested students. Applicants should have a background in both natural and social sciences evidenced by prior coursework or experience. One course in environmental studies from the student's Master's discipline and one course in quantitative methods are required. These requirements must be fulfilled before or after admission to the minor. All students admitted to the minor will be required to register for at least three hours of Environment courses, Environmental Policy Research Workshop, and to complete the following:

1. Ecology 520 or Plant and Soil Sciences 414 or Geography 443. An equivalent course approved by the coordinating committee.

2. Six hours of coursework outside the Master's discipline approved by the coordinating committee.

BUSINESS ADMINISTRATION

CONCENTRATION

For complete listing of MBA program requirements, see Business Administration. MBA Concentration:

Minimum course requirements are as approved by the area MBA faculty advisor.

GRADUATE COURSES

400 Special Topics (3) Topics vary. Prereq: Determined by department. May be repeated.

413 Macroeconomic Fluctuations (3) Analysis of historical data, methods of analyzing macro-economic fluctuations, theoretical explanations of cycles, and role of monetary and fiscal policies in aggregate economy. Major writing requirement. Prereq: Intermediate Macroeconomics or consent of instructor.

415 History of Economics (3) Methods of study of historical history. Origins and evolution of major doctrines: classical and neoclassical economics, economics of Keynes and his followers, development of second half of 20th century. Major writing requirement. Prereq: 201 or equivalent and consent of instructor.

424 Political Economy of World Development (3) Topics vary: Latin America, Asia, Soviet Union and Eastern Europe. Analysis of major economic strategies, policies, and problems. May be repeated. This course includes a major writing requirement. May be repeated when topic varies. Maximum 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 on growth of environment. 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 Macroeconomics with B or better and Calculus.

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

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

510 Fundamentals of Microeconomics (3) Theory of consumer behavior and demand, theory of production and cost, behavior of the firm in perfectly competitive and monopolistic environments. For non-economics majors. Not available for students with credit for 511. Prereq: 311 or equivalent.

511-12 Microeconomic Theory (3,3) Theory of consumer choice and demand, theory of production, behavior of the firm in perfectly competitive and monopolistic environments. For non-economics majors. Not available for students with credit for 511. Prereq: 311 or equivalent.

511-12 Microeconomic Theory (3,3) Theory of consumer choice and demand, theory of production and cost, behavior of the firm in perfectly competitive and monopolistic environments. For non-economics majors. Not available for students with credit for 511. Prereq: 311 or equivalent.

513-14 Macroeconomic Theory (3,3) Determination of national income, prices, and employment. Results using Keynesian, non-market-clearing, monetarist, and rational expectations paradigms.


525 Economic History of Europe (3) Nature and functioning of economic systems and policies in history of Western civilization; major issues of method and interpretation. Prereq: Graduate standing in economics or consent of instructor.

526 Economic History of the U.S. (3) Development of economic systems and policies from colonial times; 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 utility, intergovernmental, and environmental regulation on business. Development of decision-making skills in area of governmental-business relations.

562 Labor Relations and Collective Bargaining (3) Same as Management 592.

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.


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

612 Advanced Microeconomic Theory (3) Prereq: 512 or equivalent.

613 Advanced Macroeconomic Theory (3) Prereq: 514 or equivalent.


623 Economic Development: Theories and Policies (3) Principal theories: explaining economic behavior in developing countries and policies and strategies used to promote development. Prereq: Undergraduate degree in economics or consent of instructor.

624 Economic Development: Western Impact on Africa (3) Economic development decisions of governments and policies and strategies used to promote development. Prereq: 21 hrs of upper division undergraduate social science or consent of instructor.


642 Labor History and Legislation (3) Organization of industry in modern, mixed enterprise economy. Problems of monopoly and competition. Prereq: Consent of instructor.

651 Monetary Theory (3) Study of money, credit, and approaches to systematic models, equilibrium, money, and resource allocation. Major writing requirement. Prereq: 513.

652 Topics in Monetary Theory (3) Advanced monetary models, issues in monetary policy, open economy monetary theory and policy. Student participation. Prereq: 513.

661 Regional and Urban Location and Development Theory (3) Theory of industrial and agricultural location and human migration. Economic basis for land-use patterns, central places, and urban form. Spatial inequalities and urban problems. National policies for regional and urban assistance.

662 Methods of Regional and Urban Analysis (3) Theory of regional and urban economic structure and growth, Regional income and product accounts, shift and share analysis, economic base studies, and regional urban input-output models. Theory and problem solution.


672 Public Finance: Taxation and Intergovernmental Relations (3) Theory of taxation, tax incidence and tax efficiency, policy analysis of U.S. tax structure at federal, state, and local levels. Theory of fiscal federalism and intergovernmental relations.

677 Environmental and Natural Resource Economics (3) Alternative paradigms for allocating and valuing environmental resources. Exploration of issues related to market failure and differences between renewable and nonrenewable resources.

678 Economics of Environmental Policy (3) Topics in environmental policy analysis. Consideration of alternative policy instruments, definition policy objectives and role of risk in decision-making process.

681-82 Econometric Methods (3,3) Theory and techniques of statistical testing of economic hypotheses and construction and estimation of econometric models. Review of classical least squares regression model, and applications to simultaneous equation models with application to current econometric research. Prereq: 582 or equivalent.

690 Workshop (3) Advanced topics in economics. Student participation. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

Education

(College of Education)

MAJOR

DEGREE

Education............................. M.S.
Human Performance and Sport Studies....... M.S.
Technology and Adult Education............... M.S.
The College of Education offers an extended teacher preparation program which features a professional year internship with accompanying coursework and an interdepartmental doctoral program.

**TEACHER LICENSURE AND THE MASTER'S PROGRAM**

For teacher licensure and a Master's degree in one of the available majors offered in the College, a student must complete the 24 hours associated with the professional year and 12 more credits for the total of 36 semester hours. Course requirements for an M.S. program include:

**Fall Semester**
- Internship: 4 hrs
- Specialties Studies: 6 hrs
- Analysis of Teaching for Professional Development: 2 hrs

**Spring Semester**
- Internship: 8 hrs
- Clinical Studies: 4 hrs

**Post Internship**
- Major Area: 12 hrs
- TOTAL: 36 hrs

Prior to the first semester of internship, a student must be admitted to The Graduate School and register as a graduate student to receive graduate credit. Prior to the completion of the first semester of internship, a student must be admitted to a Master's program within the College of Education in which the degree is to be pursued. See the individual program descriptions for complete details.

**THE DOCTORAL PROGRAM**

The Ph.D. program with a major in Education provides six concentrations. The departments participating in the Ph.D. program are Curriculum and Instruction; Educational Leadership; Educational and Counseling Psychology; Health, Leisure, and Safety; Human Performance and Sport Studies; Special Services Education; and Technological and Adult Education.

The program requirements, concentrations and specializations are:

**Requirements Minimum Hours**

- **Research Area**
  - Foreign or Computer Language (demonstrate proficiency): 6

- **General Core Requirements**
  - History and philosophy of education, (both areas must be represented): 4
  - Learning theory and curriculum (both areas must be represented): 4
  - Administrative theory: 2
  - Trans-college seminar: three consecutive semesters (including summer): 3

- **Alternative Core Requirements**
  - Courses in philosophy of science: 3
  - Trans-college Seminar: three consecutive semesters (including summer): 3
  - Seminar in area of specialization: 3
  - Courses in learning theory (group or independent study): 3

- **Concentrations**
  - Primary Concentration: A minimum of 16 hours normally selected from one or two specializations within the primary concentration: 16
  - Supporting Specialization: A minimum of 9 hours selected from a specialization in a concentration other than the primary concentration: 9

- **Cognate**
  - A minimum of 6 hours selected from outside the college in addition to the designated research courses: 6

- **Dissertation**
  - 24

- **CONCENTRATIONS**

  **Administrative Theory and Practice**
  - Specializations:
    - 1. School administration
    - 2. Higher education administration
    - 3. Organizational leadership and policy studies

  **Theories of Curriculum Development and Foundations of Education**
  - Specializations:
    - 1. Anthropological, historical, philosophical, and sociological bases for educational planning and curriculum
    - 2. Principles and models for planning, developing, and evaluating educational programs
    - 3. Research design for educational programs

  **Instructional Theory and Practice**
  - Specializations:
    - 1. Principles and models for instructional improvement
    - 2. Elementary and early childhood instruction and practices
    - 3. Secondary/community colleges: (English, foreign language, mathematics, science, social studies education)
    - 4. Elementary: mathematics, science, social studies education
    - 5. Reading education
    - 6. Instructional media and technology
    - 7. Technological and adult education
    - 8. Special education and rehabilitation

  **Theories and Practice of Educational and Personal Adjustment**
  - Specializations:
    - 1. Counselor education
    - 2. Counseling psychology
    - 3. Educational psychology
    - 4. School psychology

  **Foundations of Human Movement**
  - Specializations:
    - 1. Exercise Science: Adapted Physical Education
    - 2. Motor Behavior: Motor Control
    - 3. Socio-Cultural Foundations of Sport: History, Philosophy, Sociology

  **Educational and Counseling Psychology**
  (College of Education)

  **MAJORS DEGREES**

  - Guidance: M.S.
  - Educational Psychology: M.S.; Ed.D.
  - Educational Psychology and Guidance: Ed.S.
  - Education: Ph.D.

  **R. Steve McCallum, Head**

  **Professors:**
  - Davis, K. L., Ed.D: Georgia
  - DeRidder, Lawrence M. (Emeritus), Ph.D: Michigan
  - Dinkinson, Donald J., Ed.D: Oklahoma State
  - Dietz, Siegfried C. (Emeritus), Ed.D: Arizona State
  - Hector, M. A., Ph.D: Michigan State
  - Huck, Schuyler W., Ph.D: Northwestern
  - McCallum, R. S. (Liaison), Ph.D: Georgia
  - McClain, Ed W. (Emeritus), Ph.D: Texas

**ACADEMIC COMMON MARKET**

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The Ph.D. program in Education is available to residents of the states of Arkansas (concentration in administrative theory and practice only), South Carolina (concentration in theories and practice of educational and personal adjustment only) and Virginia (concentration in health education only). Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

See College of Education for additional departmental listings.

**GRADUATE COURSES**

- **574 Analysis of Teaching for Professional Development** (2) Strategies to document and analyze effectiveness of teaching and of professional development; study and application of various approaches. Coreq: 575. (Same as Child and Family Studies 574.) F

- **575 Professional Internship in Teaching (1-8)** Intensive teaching and teaching-related experiences in professional settings in public schools. Enrollment limited to postbaccalaureate students in professional year program. prereq: Admission to Teacher Education program. May be repeated. Maximum 12 hrs. (Same as Child and Family Studies 575.) S/NC only. F, Sp

- **591 Clinical Studies (4)** Group and individual seminar activities during full-time internship. Application and evaluation of professional core competencies. Completion and presentation of portfolio and analysis of teaching project. Coreq: 575. (Same as Child and Family Studies 582.)

- **601 Trans-College Seminar (1)** Introduction to Ph.D. program in Education; research requirements, meaning of scholarship in academe and issues/problems in education. Minimum of two consecutive semesters preceded or followed by summer term required of all Ph.D. students. Prereq: Admission to Ph.D. program or consent of Ph.D. program coordinator. May be repeated. Maximum 3 hrs. May not be used to meet 600 requirement. S/NC only.

**Educational and Counseling Psychology**

*MAJORS DEGREES*

- Guidance: M.S.
- Educational Psychology: M.S.; Ed.D.
- Educational Psychology and Guidance: Ed.S.
- Education: Ph.D.

**R. Steve McCallum, Head**

**Professors:**

- Davis, K. L., Ed.D: Georgia
- DeRidder, Lawrence M. (Emeritus), Ph.D: Michigan
- Dinkinson, Donald J., Ed.D: Oklahoma State
- Dietz, Siegfried C. (Emeritus), Ed.D: Arizona State
- Hector, M. A., Ph.D: Michigan State
- Huck, Schuyler W., Ph.D: Northwestern
- McCallum, R. S. (Liaison), Ph.D: Georgia
- McClain, Ed W. (Emeritus), Ph.D: Texas
The Department of Educational and Counseling Psychology offers graduate programs leading to the following: Master of Science with a major in Educational Psychology, concentrations in educational psychology and community counseling; Master of Science with a major in Guidance, concentrations in elementary guidance, secondary guidance, and school counseling; Educational Specialist with a major in Educational Psychology and Guidance, concentrations in educational psychology, school psychology, and school counseling; and Doctor of Education with a major in Educational Psychology, concentrations in counselor education and educational psychology. The department also participates in the college-wide Ph.D. program with a major in Education. The concentration area is theories and practice of educational and personal adjustment with specializations in counselor education, counseling psychology, educational psychology, and school psychology. Several programs in the department are accredited. The Ed.D. counselor education concentration and the Ph.D. specialization in counselor education are accredited by the Council for Accreditation of Counseling and Related Educational Programs; counseling and school psychology by the American Psychological Association; and school psychology by the National Association for School Psychology. Also, the school counseling and school psychology programs have the approval of the National Council for Accreditation of Teacher Education. The program in community counseling and school counseling programs are accredited by the Council for Accreditation of Counseling and Related Educational Programs. The program in Educational Psychology has been recognized as a "Designated Program" by the American Association of State Psychology Boards and the Council for the National Register of Health Service Providers in Psychology.

The application deadline for admission varies by program area. February 1 is the deadline for all programs. Some programs also review applications November 1. For information about the various programs of study, write to the departmental admissions secretary.

THE MASTER'S PROGRAMS

Admission requirements include up-to-date scores from the GRE, the departmental admissions application form and letters of recommendation. All programs include thesis and non-thesis options. Hour requirements for a major in Educational Psychology, concentration in educational psychology, 36; concentration in community counseling, 60; and for a major in Guidance, 48. The programs in community counseling and in guidance each require supervised practicum and internship experience. A final examination is required of all Master's degree students.

THE EDUCATIONAL SPECIALIST PROGRAM

Admission requirements include up-to-date scores from the GRE, the departmental admissions application form and letters of recommendation. All programs include thesis and non-thesis options. The program in school psychology requires a minimum of 66 hours. When students are admitted to the Ed.S. programs in educational psychology or school counseling, it is assumed that they have completed a Master's degree equivalent to the one offered at UT Knoxville. In this case, the minimum hours beyond the Master's required to complete the Ed.S. are: educational psychology, 24; school counseling, 22. The specialization programs require supervised practicum and internship experiences with students or clients, either in the public schools or in community human services agencies. A final examination is required of all specialist students.

THE DOCTORAL PROGRAMS

The Ph.D. with a major in Education includes concentrations and specializations as listed under Education. For students applying to the Ph.D. program concentration located in this department, two applications are required: one for the Ph.D. in Education program and one for the department that specifies which specialization is desired (e.g., counseling psychology, counselor education, educational psychology, or school psychology). Applicants for the Ed.D. with a concentration in either counselor education or educational psychology fill out only the departmental application form. Departmental admissions requirements include up-to-date scores from the GRE, the departmental admissions application form, letters of recommendation, and a writing sample. The following minimum number of hours is required in each program concentration/specialization: counseling psychology - 96; counselor education, Ph.D. - 96, Ed.D. - 79; educational psychology, Ph.D. - 92, Ed.D. - 89; school psychology, Ph.D. - 97. Residents for the Ph.D. programs is three consecutive semesters of full-time coursework and two consecutive semesters for the Ed.D. The Ph.D. program requires coursework in both a supporting specialization and a cognate area, as well as either foreign language or computer proficiency. Coursework in statistics and research design is a requirement in all doctoral programs. Dissertation research participation is a requirement in the Ph.D. program. The concentrations/specializations in counseling psychology, counselor education, and school psychology each require a year-long practicum sequence and the equivalent of a year's full-time work as an intern in an appropriate counseling setting. The concentrations/specializations in educational psychology and counselor education also require supervised practicum experience in classroom teaching. All doctoral students take written comprehensive examinations in the program concentration, supporting specialization and cognate areas. The guidelines for each program concentration may be consulted for further requirements.

MINOR IN GERONTOLOGY

Graduate students in the Department of Educational and Counseling Psychology may pursue a specialized minor in gerontology. This interdepartmental/interdisciplinary minor gives the student an opportunity for combining the knowledge about aging in American society with his/her major concentration. Please refer to Human Ecology for specific requirements.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. and Ed.D. programs in Educational Psychology are available to residents of the state of South Carolina. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

404 Special Topics (1-3) Instructor-initiated course offered at convenience of department on topics of current interest. May be repeated. Maximum 15 hrs. S/NC or letter grade. E

410 Sex Role Development: Implications for Education and Counseling (3) Theories and research concerning development of person's sexual role and its relevance in educational and counseling settings. F, Su

431 Personality and Mental Health (3) Various perspectives of mental health with application to education and other social institutions. E

432 The Disadvantaged Student: Psychoeducational Perspectives (3) Theory and research regarding etiology, psychosocial behavior and appropriate interventions. Sp

460 Self-Management in the Helping Professions (3) Applications of self-management strategies to career, social, emotional and learning domains for both helping professionals and their clientele. Prereq: Introductory course in psychology or consent of instructor. S/NC or letter grade. Sp, Su

493 Independent Study (1-15) Independent investigation of problems in educational and counseling psychology. May be repeated. Maximum 15 hrs. S/NC or letter grade. E

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

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

503 Problems in Lieu of Thesis (1-3) May be repeated. Maximum 12 hrs. S/NC only. E

504 Special Topics (1-3) Instructor-initiated course offered at convenience of department on topics of current interest. May be repeated. Maximum 15 hrs. S/NC or letter grade. E

510 Psychological Theories of Human Development Applied to Education (3) Theory and research on emotional, social, and intellectual development over life span with applications to educational and therapeutic settings. F, Su

511 Cognitive Development: Implications for Education (3) Applications of theory and research related to higher mental problem-solving. Prereq: 510 or consent of instructor. F

515 Educational Applications of Behavioral Theories of Learning (3) Behavioral theories and research used in classroom teaching. Prereq: 510 or consent of instructor. F, Su

516 Educational Applications of Cognitive Learning Theories (3) Cognitive theory and research, social learn-
ing, attribution and information processing as systems apply to education. Prereq: 515 or consent of instructor. F.

519 Educational Specialist Research and Thesis (1-9) May be repeated. Maximum 9 hrs. P/NP only. E.

520 Statistics and Research Design: Conceptual (3) Consumer-oriented, conceptual treatment of statistics, research design, and quantitative basis of testing. E.

521 Statistics and Research Design: Application (3) Data collection. Descriptive techniques, estimation, logic of hypothesis testing and selected parametric and nonparametric tests. For Master's students conducting theses and beginning doctoral students. Use of computer statistical packages. F, Su.

525 Formal Measurement in Education and Counseling (3) Principles of test construction and item analysis. Survey of standardized tests of intelligence, achievement, aptitude, personality, and educational tests. Prereq: 520 or equivalent. F, Su.


541 Psychoeducational Assessment (3) Direct, psychometric and naturalistic assessment methods in learning environments. Prereq: Admission to school psychology program or consent of instructor, and 525 or equivalent. May be repeated. Maximum 6 hrs. F, Sp.


545 Psychoeducational Consultation (3) Use of two and three-person models of consultation in educational and therapeutic settings based on behavioral, ecological, social learning and cognitive-behavioral theories. F.


549 Internship in School Psychology (1-6) Supervised employment in departmentally approved school psychology internship sites. Prereq: Enrollment in school psychology program or consent of instructor. May be repeated. Maximum 12 hrs. S/NC only. E.

550 Introduction to Personnel Programs (3) History, philosophy, professional standards, counselor role in relation to school staff and mental health professionals, and ethics of practice. F.

551 Theory and Practice of Counseling (3) Philosophical bases of helping relationship; development of counselor and client self-awareness; counseling theory, techniques. F, Su.

552 Career Development: Vocational Theory, Research and Practice (3) Relationship of vocational theory, career development research and societal factors to life career roles. F, Su.

553 Career Development: Vocational and Educational Resources (3) Application and use of career and educational resources in personnel planning and program development. Sp.

554 Group Dynamics and Methods (3) Theory and types of groups, descriptions of group methods, methods, dynamics, and facilitative skills, supervision of leadership skills. E.

555 Practicum in Counseling (3) Supervised practice and application of counseling skills with individual clients. Prereq: Admission to program, 431, 525, 551 and consent of instructor. May be repeated. Minimum 9 hrs. E.

556 Seminar in Community Agency Counseling (1) Orientation to professional organizations, code of ethics, certification requirements, and role identification of community agency counselors. May be repeated. Maximum 2 hrs. S/NC only. F, Sp.

558 Internship in School Counseling (1-6) Supervised postpracticum employment at departmentally approved sites. Prereq: 550 and consent of instructor. May be repeated. Maximum 12 hrs. S/NC only. E.

559 Internship in Community Agency Counseling (1-6) Supervised postpracticum employment at departmentally approved human service agencies. Prereq: Admission to community agency program. 555 and consent of instructor. May be repeated. Maximum 12 hrs. S/NC only. E.

560 Models of Classroom Discipline (3) Applications of major models of discipline in development of constructive atmospheres for classroom learning. Sp.

561 Development and Operation of School Counseling Programs (3) Management of comprehensive school counseling programs to include needs assessment, program goals, resource identification, evaluations, and use of computer-based program management software. Prereq: 550. Sp, Su.

566 Approaches to Family Intervention and Counseling (3) Same as Child and Family Studies 566. Sp.

570 Cross-Cultural Counseling: Theory and Research (3) Theory and research on issues and problems in counseling of clients from different cultural backgrounds in U.S. and abroad. Sp.


593 Independent Study (1-15) Independent investigation of problems in educational and counseling psychology. May be repeated. Maximum 15 hrs. S/NC or letter grade. F.

600 Doctoral Dissertation (1-15) F/P/NP only. E.

602 Directed Research (1-3) Instructor- or student-initiated group investigation of empirical and theoretical problems in educational and counseling psychology. May be repeated. Maximum 12 hrs. S/NC or letter grade. F, Sp.

604 Special Topics (1-3) Instructor-initiated courses offered for convenience of department on topics of interest. May be repeated. Maximum 15 hrs. S/NC or letter grade. F, Sp.

606 Advanced Seminar in Curriculum and Learning (4) Same as Curriculum & Instruction 609. Sp.

625 Advanced Study in Personality (3) Theory, research and conceptual analysis of studies with application to education and counseling. Prereq: 431 or equivalent. F.

535 Ethical, Legal, and Professional Issues in Psychology (3) Research, human services, teaching and public policy. Prereq: Admission to doctoral program in psychology or consent of instructor. Same as Psychology 635. F.

549 Advanced Internship in School Psychology (1-9) Supervised experience as school psychologist in departmentally approved site for doctoral level students. Prereq: Enrollment in doctoral level school psychology program and consent of instructor. May be repeated. Maximum 9 hrs. S/NC only. E.

650 Seminar in Counselor Education (1) Professional issues related to role and function of counselor education. Prereq: Admission to doctoral program in counselor education. May be repeated. Maximum 2 hrs. S/NC only. F.

595 Practicum in Counselor Education (3) Supervised practice and application of counseling skills within school settings. Prereq: Admission to counselor education program and consent of instructor. May be repeated. Maximum 6 hrs. F.

659 Internship in Counselor Education (1-6) Supervised employment in departmentally approved counselor education internship sites. Prereq: Admission to counselor psychology program and consent of instructor. May be repeated. Maximum 12 hrs. S/NC only. E.

663 Scale Construction (3) Development, pilot testing, and revision of attitude inventories, rating scales, and other paper-and-pencil techniques for assessing beliefs, personality characteristics, and opinion. Prereq: 525, and two-course sequence in statistical analysis. A.

665 Analysis of Research in Instructional Technology (3) Research on human learning, design of learning environments. Analysis of teacher behavior, text development, computer software design and video presentations. A.

669 Practicum in Instructional Planning (3) Development and management of course or program of instruction in educational psychology. Prereq: 665, or consent of instructor. E.

669 Internship in Educational Psychology (1-6) Supervised employment in departmentally approved educational psychology internship sites. May be repeated. Maximum 12 hrs. S/NC only. E.


671 Personality and Vocational Assessment (3) Use and interpretation of personality and vocational measures in assessment of clients. Prereq: 525, 552 or consent of instructor. A.

672 Psychological Dysfunction (3) Classification methods, dynamics and treatment of dysfunctional individuals in counseling. Prereq: 625 and course in abnormal psychology, or consent of instructor. A.

673 Advanced Theory and Practice in Group Counseling (3) Theories and supervised practice. Prereq: 554, 555, and consent of instructor. F.

674 Practicum in Counseling Psychology (3) Supervised practice of individual counseling. Minimum 135 clock hrs. required each semester. Prereq: Admission to counseling psychology doctoral program, 655, and consent of instructor. May be repeated. Maximum 6 hrs. E.


679 Internship in Counseling Psychology (1-6) Supervised employment in departmentally approved counseling psychology internship sites. Prereq: Admission to counseling psychology doctoral program and consent of instructor. May be repeated. Maximum 12 hrs. S/NC only. E.

693 Independent Study (1-15) Independent investigation of problems in educational and counseling psychology. May be repeated. Maximum 15 hrs. S/NC or letter grade. E.

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Educational Leadership

(College of Education)

MAJORS

DEGREES

College Student Personnel..........................M.S.

Educational Administration and Supervision............M.S., Ed.S., Ed.D.

Education...............................................Ph.D.

Mary Jane Connelly, Head

Professors:

Coffield, William H. (Emeritus), Ph.D..............Iowa

Harris, G. W., Jr., Ph.D.............................Michigan

Lovel, J. T. (Emeritus), Ed.D........................Florida

McInnis, Malcolm C., Jr., Ph.D......................Florida State

Peccolo, C. M. (Emeritus), Ph.D.....................Iowa

Roney, Robert K. (Emeritus), Ed.D..................Tennessee

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Environments from evidence gathered. Prereq: Two-course sequence in statistics. F.

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Educational Leadership 95
Stollar, Dewey H. (Emeritus), Ph.D. .......................... Ohio State
Trusky, Francis M. (Emeritus), Ed.D. ............. Stanford
Ubben, Gerald C., Ph.D. .............................. Minnesota
Venditti, Fred P. (Emeritus), Ed.D. .................. Northern Colorado

Associate Professors:
Askew, Jerry W. (Adjunct), Ph.D. ...... Ohio State
Connelly, Mary Jane ( Liaison), Ed.D. . .......... VPI
Gross, Francis M. (Adjunct), Ed.D. ......... Tennessee
Husen, Peter M., Ed.D. ...................... Stanford
Mertz, Norma T., Ed.D. .................... Columbia

Assistant Professors:
Aper, Jeffrey P., Ph.D. .......................... VPI
Grubb, James J., M.S. .......................... Indiana State
High, Katherine N. (Adjunct), Ed.D. .............. Tennessee

Visiting Professors:
Bogue, Grady, Ed.D. .......................... Memphis State

The Department of Educational Leadership offers graduate programs leading to the Master of Science with majors in Educational Administration and Supervision and in College Student Personnel. A higher education program is also available for practicing school administrators. The master's degree requires a minimum of 36 credit hours including 6 hours of required courses in the department. Six hours must be in a cognate area within the college and 6 hours outside the college. An internship is highly recommended but not required. A written comprehensive examination is given as an oral exam over the thesis.

Non-Thesis Option
A minimum of 60 hours beyond the baccalaureate degree including 6 hours of Educational Administration and Supervision 518 is required. Six hours must be in a cognate area within the college and 6 hours outside the college. An internship is highly recommended but not required. A written comprehensive examination is given as an oral exam over the thesis.

Non-Thesis Option
A minimum of 60 hours beyond the baccalaureate degree including 6 hours of Educational Administration and Supervision 503 is required. Six hours must be in a cognate area within the college and 6 hours outside the college. An internship is highly recommended but not required. A foreign language requirement is at the discretion of the committee. A written comprehensive examination is given as an oral exam over the dissertation.

The Doctoral Program
For the Ed.D. program, the minimum hours are determined by the student's doctoral committee. Six to nine hours must be in a cognate area within the college and 6-9 hours outside the college unless the student has a Master's degree in a field outside the College of Education. Two consecutive semesters of 604 must be taken during residence. An internship is highly recommended but not required. A foreign language requirement is at the discretion of the committee. A written comprehensive examination is given as an oral exam over the dissertation.

The Department of Educational Leadership also has an Ed.D. program for practicing school administrators. Please contact the department for further information.

The Ph.D. with a major in Education includes concentrations and specializations as listed under Education.

Educational Administration and Supervision

Graduate Courses

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

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

503 Problems in Lieu of Thesis (3-5) May be repeated. S/NC only. E

513 Administrative and Organizational Theory in Education (3) Introduction to theoretical administrative and organizational foundations of management and leadership theories and practices. Prereq: M.S. introductory core or consent of instructor. F

515 Human Relations and Communication in Administration (3) Development and use of effective interpersonal, communication skills and channels, intergroup and interpersonal relations, group process, communication. Prereq: M.S. introductory core or consent of instructor. F

516 Research for School Administrators (3) Descriptive, experimental, and quasi-experimental research design and methods for helping students develop skills in using research. Prereq: M.S. introductory core or consent of instructor. F

517 School Environments in Educational Administration (3) Environment and experiences in which school programs are conducted. Prereq: M.S. introductory core or consent of instructor. F

518 Educational Specialist Research and Thesis (3) May be repeated. Maximum 6 hrs. P/NP only. E

529 Politics of Education and Educational Environments (3) Study of political, social, and economic factors and processes, political economy, and political culture. Prereq: M.S. introductory core or consent of instructor. F

535 Administrative Applications of Micro Computers (3) DSS, word processing, data analysis, evaluation, program evaluation, financial management, and decision making. Prereq: M.S. introductory core or consent of instructor. F

541 Educational Policy in Organizations (3) School organizational structure, theory, and policy in educational organizations. Prereq: M.S. introductory core or consent of instructor. F

544 School Finance and Business Management (3) Financial management, personnel management, and technology in educational organizations. Prereq: M.S. introductory core or consent of instructor. F

547 Educational Facility Planning (3) Concepts and methods of planning, design, and construction of educational facilities. Prereq: M.S. introductory core or consent of instructor. F

548 Introductory Supervision and Personnel (3) Basic principles of supervision and personnel management, including: planning, recruiting, selection, supervision of instructional and non-instructional personnel, record keeping, staff evaluation, and staff development. Prereq: M.S. introductory core or consent of instructor. F

553 Strategies of Educational Planning (3) Processes for improving decision-making function through use of both quantitative and qualitative planning techniques. Prereq: M.S. introductory core or consent of instructor. F

554 School Law (3) Logical arrangement of case and statutory materials for public school administrators. Prereq: M.S. introductory core or consent of instructor. F

586 Internship in Educational Administration (3) Field experience in approved educational organizations working directly with administrators. Prereq: M.S. introductory core or consent of instructor. F

850 Internship in Educational Administration (3) Field experience in approved educational organizations working directly with administrators. Prereq: M.S. introductory core or consent of instructor. F
Electrical and Computer Engineering (College of Engineering)

MAJOR

DEGREES

Electrical Engineering ................. M.S., Ph.D.

R. C. Gonzalez, Head

Professors:

Alexeff, Igor, Ph.D. ................. Wisconsin
Bailey, J. Milton, Ph.D. ............... Georgia Tech
Birdwell, J. Douglas, Ph.D. ...... MIT
Bishop, A. J., Ph.D. ................. Clemson
Blalock, T. Vaughn, Ph.D. ......... Tennessee
Bodenheimer, Robert E., Ph.D. ...... Northwestern
Bowes, Bimal K. (Condra Chair of Excellence), Ph.D. ...... Calcutta
Boudinon, Donald W., Ph.D. ...... Vanderbilt
Gonzalez, R. C. (Distinguished Prof.), Ph.D. ...... Florida
Googe, Joseph M., Ph.D. ...... Georgia Tech
Green, Walter L., Ph.D. ......... Texas A&M
Hoffman, Graham W., Ph.D. ...... Harvard
Hunh, James C. (Distinguished Prof.), Ph.D. ...... New York
Kennedy, Eldredge J., Ph.D. ...... Tennessee
Lawler, Jack S., Ph.D. .................. Michigan State
Leffell, Will O. (Emeritus), M.S. ...... Tennessee
Neff, Eberle P., Ph.D. ................. Auburn
Pace, Marshall O. (Liaison), Ph.D. ... Auburn
Ph.D. .................................................. Georgia Tech
Pierce, J. Frank (Distinguished Prof.) (Emeritus), Ph.D. .... Pittsburgh
Pujol, Alfonso Jr. (UTSI), Ph.D. ..... Vanderbilt
Roberts, M. J., Ph.D. ..................... Tennessee
Rochelle, Robert W. (Emeritus), Ph.D. .... Tennessee
Roth, J. Reece, Ph.D. ..................... Cornell
Symonds, Frederick W., Ph.D. ....... Nottingham
Tillman, James D. (Emeritus), Ph.D. .... Auburn
Trivedi, Mohan M., Ph.D. ............. Utah State
Weaver, Charles H. (Emeritus), Ph.D. ..... Tennessee

Associate Professors:
Abidi, M. A., Ph.D. ...................... Tennessee
Bomar, Bruce W. (UTSI), Ph.D. ..... Tennessee
Brzakovic, Dragana, Ph.D. .......... Florida
Cryly, Paul B., Ph.D. ..................... New Mexico State
Joseph, Roy D. (UTSI), Ph.D. .... Case Western
Koch, Daniel, Ph.D. ..................... Missouri (Rolla)
Rosenberg, David, Ph.D. ............. New York
Rochelle, James M., Ph.D. .......... Tennessee
Wallar, J. Wayne, Ph.D. ............. Tennessee

Assistant Professor:
Smith, L. Montgomery (UTSI), Ph.D. .... Tennessee

Lecturers:
Adams, Raymond K., M.S., P.E. ...... Tennessee
Martin, Clyde D., Jr., M.S. ......... Tennessee

The Electrical and Computer Engineering Department has a graduate committee to administer, promote, and advance the general well-being of the graduate program. The Department of Electrical and Computer Engineering and the Department of Nuclear Engineering jointly offer a Master's degree program in the field of fusion energy. Students may have the opportunity to do their Master's thesis at the Fusion Energy Division of the Oak Ridge National Laboratory or at the Plasma Science laboratory, affiliated with the Electrical and Computer Engineering Department. A limited number of Graduate Research Assistantships are available at each location. Further information about this program is available from the department.

THE MASTER'S PROGRAM
Graduate work leading to the Master of Science with a major in Electrical Engineering may be completed during one academic year of full-time study, or the degree may be obtained in two or three years of study in the evening.

Admission Requirements
Students applying for admission to the Master of Science program and who hold a B.S. in Electrical Engineering are considered for admission on an individual basis. The minimum expectation is an undergraduate cumulative grade-point average of 3.0 out of 4.0 and a GPA of 3.0 for the senior year. A TOEFL score of 580 is required for international students.

Students who hold the B.S. or B.A. in a field other than electrical engineering are also expected to have a minimum cumulative grade-point average of 3.0 and a minimum senior year average of 3.0 in that field. These students should also have a background equivalent to that obtained by earning credit with a minimum 3.0 grade-point average in the Electrical Engineering courses normally offered at the 200 and 300 levels in the Bachelor's program in this department, and senior electrical and computer engineering courses and (any labs associated with them) in the student's area of interest. Students from fields other than electrical engineering who have met the admission standards except for this background may be admitted only as non-degree students until they have completed coursework to provide this background.

Master's Degree Requirements
Specific degree requirements which must be met include:
1. Electrical and Computer Engineering 503 and 504.
2. Six semester hours of graduate credit in mathematics consisting of mathematics courses of 400 level or higher which have been approved by the E.C.E. Graduate Committee.
3. An additional 12 semester hours of 500-level work in electrical and computer engineering courses or 6 semester hours of 500-level work in one area of electrical and computer engineering courses and 6 semester hours of 500-level work in another area approved by the student's Master's committee. The 500-level work in electrical and computer engineering courses must include at least 5 hours in the student's major area.
5. A final oral examination covering the thesis and related coursework.

THE DOCTORAL PROGRAM
The Ph.D. with a major in Electrical Engineering may be pursued in the concentration areas of circuit theory, computer, electronics, communication theory, electromagnetic theory, plasma engineering, power systems, solid-state electronics, and control systems. Applicants must submit scores on the General Graduate Record Exam. A TOEFL score of 580 is required for non-native speakers of English. Additional requirements for the Ph.D. include the following:
1. A Master of Science or Master of Engineering degree.
3. A minimum of 24 semester hours of work in electrical and computer engineering courses at the 500 and 600 levels.
4. A minimum of 9 semester hours of 600-level coursework. At least 3 semester hours of this work must be in an area other than the student's major area.
5. A minimum of 12 hours of mathematics courses approved by the Electrical and Computer Engineering Graduate Committee. All 12 hours must be 400-level or above, and at least 6 hours must be at 500-level or above.
6. 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.
7. Satisfactory performance on both the qualifying and comprehensive examination. The qualifying examination is prepared by the electrical and computer engineering faculty and consists of a 3-hour written examination in each of four areas. Areas (1) mathematics and transform methods, and (2) basic electrical network analysis are required of all Ph.D. students. Areas (3) and (4) are usually chosen from two of the graduate course divisions in the department and cover material from undergraduate and first year graduate courses. A student who fails the qualifying examination must take and pass the examination the next time it is offered to remain in the Ph.D. program. The qualifying examination is normally taken after the completion of 24 hours of graduate coursework or immediately after completion of a Master's degree. A minimum of 18 hours of graduate coursework must be completed after the student has taken the qualifying examination the first time.

A comprehensive examination is required by The Graduate School. In this department the comprehensive exam is administered by the student's committee; the exam results are reported to the graduate committee for approval; and the exam is filed in the department. The comprehensive exam is given when the student is ready to apply for admission to candidacy.

The exam consists of 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 student 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.

Many of the electrical and computer engineering courses are offered in the evening. Students working in industry are encouraged to participate in the department's graduate program. Departmental graduate programs are also available at the Space Institute, Tullahoma.

Departmental actions regarding a graduate student may be appealed in writing, first to the Department Graduate Committee and then to the Department Faculty.

GRADUATE COURSES
Note: Courses required in the Electrical and Computer Engineering undergraduate curriculum cannot be used in either the M.S. or Ph.D. programs. No 400-level course may be used toward a graduate degree in Electrical and Computer Engineering except when required by the program.

405 Digital Signal Processing and Filter Design (3) Discrete-time signals and systems, sampling, discrete Fourier transforms, analog filter characteristics, non-recursive and recursive filter designs, and computer-aided design tools for filter design. Includes laboratory experiments and projects.


421 Linear Control System Design (3) Classical and modern techniques for design and compensation of

421 Electric Energy Systems (3) Structure and operation of electrical energy grid; load flow; economic loading; planning; control; reliability. Balanced and unbalanced faults; system protection; system stability. Prereq: Electrical Energy System Components.

422 Machines (4) Dynamic behavior of rotating machines; transfer functions for common modes of operation of d.c., machines; response to different waveforms in supply; dynamic behavior, operation, and control of representative machines. Includes laboratory experiments and projects. Prereq: Electric Energy System Components.

423 Power Electronics (4) Principles and characteristics of power semiconductor devices, single-phase and polyphase phase-controlled converters, converter control, ac phase controller, voltage-fed inverter and dc-dc converter principles, industry applications. Includes laboratory experiments and projects. Prereq: Electric Energy System Components.


431 Digital and Analog Integrated Electronics (4) Basic fabrication and functioning of active and passive components, design of integrated electronic circuits including the operational principles of bipolar, MOS and JFET transistors in typical analog and digital integrated circuit designs; standard digital logic circuits including TTL, ECL, Schottky, NMOS, CMOS, and GaAs gates and arrays; design concepts for op-amps, comparators, references, regulators, and other linear functions. Includes laboratory experiments and projects. Prereq: Electric Energy System Components.

432 Analog Signal Processing Electronics (4) Transducer signal and interfacing characteristics; analog integrated circuits: operational, instrumentation, and isolation amplifiers, ratiometric and logarithmic converters, multipliers, and voltage comparators. Includes laboratory experiments and project. Prereq: Electric Electronics.

433 Electronic Amplifiers (4) Feedback amplifier principles; wideband linear amplifier design; radio frequency and audio power amplifier design; linear regulated power supply design; oscillator principles. Includes laboratory experiments and projects. Prereq: Electric Circuits.


442 Antennas and Propagation (3) Linear antennas, arrays, other simple antennas. Antenna gain, impedances, communication link parameters. Wave propagation in earth bound regions, earth's atmosphere and ionosphere. Reflections from earth; effects on link reliability. Prereq: Fields.

443 Microwave Circuits and Electronics (3) Scattered wave devices, transformers, isolators, smoothers, couplers and power dividers, circulators, phase shifters. Loading and interconnection of systems. Power generation and amplification by switching, filtering and multipliers. Topics for further study: microwave devices and components. Includes laboratory experiments and projects. Prereq: Fields.


453 Data Acquisition Systems (4) Digital-to-analog conversion techniques; Quot and R-2R ladder networks; error analysis of D/A converters; sample hold circuitry; analog-to-digital conversion techniques; operation of counters, digitized microwaves; direct and matrix converters; closed loop systems; dual slope and successive approximation; error analysis of converters. Accuracy, linearity, accuracy, drift, dynamic range, frequency response, gain, grounds and shielding; automated testing of A/D and D/A converters. Digital signal processing systems; service device routines; signature analysis. Includes laboratory experiments and projects. Prereq: Introduction to Logic Design of Digital Systems or consent of instructor.


461 Plasma Magnetohydrodynamic Engineering (3) MHD approximation; MHD waves and instabilities; MHD in static and dynamic systems. MHD in pulsed and steady-state power generation. Applications to fusion energy, industry, and astrophysics. Prereq: 361.

462 Plasma Kinetic Theory Engineering (3) Kinetic theory of plasma as a fluid, waves and instabilities; transition from multiple beams to continuum; Vlasov and Landau theory; microwave generation in plasmas and traveling wave tubes; free electron masers in circular geometry; gyrotron and oscillator. Design of plasma devices. Prereq: 361; 461 or consent of instructor.

463 Introduction to Fusion Energy I (3) High temperature plasma physics relevant to fusion plasmas, principles of fusion reactions, and engineering and physics constraints on fusion reactors. Prereq: Introduction to Plasma Engineering for ECE majors, or consent of instructor. (Same as Nuclear Engineering 463.)

464 Introduction to Fusion Energy II (3) Continuation of 463. Principles and phenomenology of tokamak reactors, tokamak magnetic confinement concepts, advanced fusion fuels, fusion technology, plasma engineering, and fusion reactor design studies. Project which integrates material in 463 and 464. Prereq: 463 or consent of instructor. (Same as Nuclear Engineering 494.)

465 Plasma Laboratory (1) Experiments and design project illustrating material covered in 461 and 462.

471 Introduction to Pattern Recognition (3) Theory of learning and pattern recognition; prediction theory, perception algorithm, Bayes classification rule, learning algorithms, elements of syntactic pattern recognition, Prereq: Electrical and Computer Engineering Computer Engineering; 312; Elements and Statistics for Scientists and Engineers and FORTRAN.


481 Electro-Optical (4) Fourier optics, Diffraction lenses, coherence and interference, holography, Laid optical waveguides. Modulation by electro-optic devices. Includes laboratory experiments and projects. Prereq: Consent of instructor.

482 Electro-Optics II (4) Sensitivity, resolution, frequency response and noise limits for light detection devices. Optical communication channel design. Interferometry. Stimulated emission of radiation. Traveling-wave amplification and detection (e.g., lasers). Includes laboratory experiments and projects. Prereq: 481.

493 Special Topics in Electrical and Computer Engineering (1-3) Topics related to recent developments and current practice. Prereq: Consent of instructor. May be repeated.

494 Special Problems in Electrical Engineering (1-3) Problems involving library and experimental research. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

495 Senior Seminar (1) Topics of interest discussed in weekly seminar. Prereq: Consent of instructor. May be repeated. Maximum 2 hrs. S/U or letter grade.

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

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester. Registration for faculty and/or faculty arising from minimal time before degree is completed. May not be used toward degree requirements. May be repeated. S/N or letter grade.


504 Random Process Theory for Engineers (3) Probability and random variables as approached by set theory. Statistical averages and transformations of random variables. Random processes, stationarity, correlation functions and temporal analysis, power spectrum and spectral analysis as applied to response of systems to random signals.

505 Digital Signal Processing I (3) Discrete-time signals and systems, sampling, fast Fourier transform (FFT) and fast convolution, design of FIR filters and IIR filters.

506 Digital Signal Processing II (3) Filter properties in the Z and Fourier transform domains, structures for digital filter design and implementation, hardware implementation of digital filters.

507 Application of Numerical Linear Algebra in Systems and Control Engineering (3) (Same as Chemical Engineering 507 and Mechanical Engineering 507.)

511 Linear Systems Theory (3) State space models of linear dynamical systems, linear algebra, state transition matrix, controllability, observability, realization theory, and stability theory. Coreq: 503.

512 Multivariable Linear Control System Design (3) Design of controllers, for multivariable systems, which satisfy constraints on robustness to plant uncertainties, disturbances and rejection, command following. Prereq: 511.

515 Adaptive Control and System Identification (3) Adaptive control of linear deterministic and stochastic systems, adaptive filtering and prediction, parametric estimation for deterministic and stochastic systems.

516 Passive and Active Network Analysis and Synthesis I (3) Frequency and time domain techniques for network analysis, network realizability, synthesis algorithms.


519 Control Systems Design II (3) Control digital, variable structure control, state-space design of SISO
511 Plasma Diagnostics I (3) Principles of active, passive, perturbing and nonperturbing diagnostic methods used in low temperature plasmas, and high temperature plasmas of interest in fusion research. Laboratory safety, data reduction and presentation, and discussion of plasma based data handling and analysis, and reduction of time series data. Prereq: 461, 463, or consent of instructor. (Same as Nuclear Engineering 561)

562 Plasma Diagnostics II (3) Laboratory instruction in operation of plasma diagnostic instruments in plasma science laboratory, experience with high voltage, vacuum, RF, and digital data handling techniques. Prereq: 562 (Same as Nuclear Engineering 562)

556 Industrial Plasma Engineering I (3) Low temperature plasma physics relevant to industrial applications: kinetic theory, particle dynamics in electric and magnetic fields, gaseous discharges, and electronic, ion, and plasma sources. Prereq: Graduate standing or consent of instructor.

556 Industrial Plasma Engineering II (3) Continuation of 556 in industrial applications: ion implantation in solids, plasma deposition and etching, space propulsion systems, plasma etching systems, circuitry and plasma processing. Prereq: 565 or consent of instructor.

571 Pattern Recognition (3) Decision-theoretic and structural approaches to pattern recognition. Deterministic and statistical decision rules, feature extraction and representation, syntactic and semantic methods. Prereq: 471 or consent of instructor.


573 Vision and Sensing for Robotics and Automation I (3) Acquisition, processing, and interpretation of neural and vision sensing modalities as applied to automated and teleoperated systems. Prereq: Consent of instructor.

574 Vision and Sensing for Robotics and Automation II (3) Aspects of color processing, segmentation, and recognition, using various sensing modalities. Selected topics from current literature. Prereq: Consent of instructor.


598 Graduate Seminar (1) Topics of interest discussed in weekly seminar. May be repeated. Maximum 6 hrs. Sr KC or letter grade.

599 Special Topics (1-3) May be repeated. Maximum 9 hrs.

617 Special Topics in Systems Theory I (3) Topics of current interest to students and faculty: large scale systems, model order reduction, algebraic and geometric system theories, and advanced design methods. Prereq: 617.

623 Advanced Power Electronics and Drives (3) Phase-controlled cycloconverters, cycloconverter-fed ac drives, resonant converters, vector and scalar control of synchronous machines, static Kramer drives, static Scherbius drives, VSCF generation, modern control theory in ac drives.

624 Electrical Insulation (3) Principles, testing, and case studies. Basic principles of aging, losses, charging, conduction, and breakdown in vacuum, gas, liquid, solid, and composite insulation systems. Testing with low-noise instrumentation, pulse height analysis, optics, acoustics, and bridges; associated theories and distribution parameter effects. Case studies drawn from active research, power systems, electronic circuits and devices, shielding, and stress grading. Prereq: 503, 504, and consent of instructor.

651 Advanced Topics in Electronic Instrumentation I (3) Based on particular interests of students: Fundamental physical processes in instrumentation transducers: thermoelectric, magnetoelectric, electromechanical and quantum-mechanical devices. Prereq: 591-3 and consent of instructor.


643 Advanced Topics in Information Science I (3) Detection, signal processing, theory; system identification, signal processing with unknown parameters; optimal filter synthesis; adaptive systems; sequential detection; suboptimal detection. Prereq: 504 or consent of instructor.

644 Advanced Topics in Information Science II (3) Structure of algebraic and probabilistic codes; linear codes, convolutional codes, code combining of decoding 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: 591-2 or consent of instructor.

652 Computer-Aided Design of VLSI Systems II (3) Computer-aided design tools: design and implementation of fully custom very large scale integrated (VLSI) circuits: design for testability; testing of fabricated chips. Prereq: 651.

653 Advanced Plasma Physics (3) Basic concepts of high temperature plasma physics: Magnetohydrodynamics and kinetic descriptions of plasma, plasma transport, plasma waves, equilibrium, and stability. Prereq: Physics 541-2, 461-2 or 563-4, or consent of instructor. (Same as Physics 563)

664 Advanced Plasma Physics II (3) Plasma heating and radiation phenomena. Advanced topics of current interest. Must be taken in sequence. Prereq: 663.

671 Image Processing and Robotics I (3) Three-dimensional scene modeling and recognition, multi-sensor systems. Prereq: 572 or 573 or consent of instructor.

672 Image Processing and Robotics II (3) Stereo vision, feature extraction, and navigation. Prereq: 671.

673 Image Processing and Robotics III (3) Time varying imagery, path planning and navigation. Prereq: 672.

681-692 Special Projects (1-3) Prereq: Consent of instructor.

691 Graduate Advanced Seminar (1) Research in department. May be repeated. Sr KC or letter grade.

692 Special Topics (1-3) Advanced topics of current interest to students in Electrical Engineering. May be repeated. Maximum 9 hrs.
Engineering Science and Mechanics

(College of Engineering)

MAJOR DEGREES

Engineering Science .......... M.S., Ph.D.

T. G. Carley, Acting Head

Professors:

Antar, B., (UTSI), Ph.D............... Texas
Baker, A. J., PE, Ph.D................ New York
Carley, T. G. (Liaison), PE, Ph.D..... Illinois
Forrester, J. H., PE, Ph.D.......... Iowa State
Jendrucko, R. J., PE, Ph.D.......... Virginia
Keefe, D. R., (UTSI), Ph.D........ Florida
Kim, K. H., Ph.D....................... NC State
Krieg, R. D., Ph.D.................... New Mexico
Landes, J. D., PE, Ph.D............. Lehigh
Lee, C. W. (Emeritus), Ph.D........ Illinois IT
McCay, M. H., (UTSI), PE, Ph.D..... Florida
McCay, T. D., (UTSI), PE, Ph.D..... Auburn
Pih, H. (Emeritus), PE, Ph.D........ Illinois IT
Romanyak, C. J. (Emeritus), Ph.D.... Johns Hopkins
Scott, W. E., Ph.D.................... Johns Hopkins
Shahroki, F. (UTSI), Ph.D........... Oklahoma
Shobe, L. R. (Emeritus), PE, M.S...... Kansas State
Snyder, W. T., Ph.D.................. Northwestern
Sollman, G., PE, Ph.D.............. Tennessee
Stoneking, J. E., PE, Ph.D.......... Illinois
Wasserman, J., Ph.D.................. Cincinnati
Weitsman, V. J., Ph.D............... Rensselaer

Research Professors:

Fan, J., Ph.D......................... Cincinnati
Morarity, T. F., PE, Ph.D........... Illinois

Associate Professors:

Boulet, J. A. M., Ph.D.............. Stanford
Caruthers, J. E., (UTSI), Ph.D...... Georgia Tech
Engels, R. C., (UTSI), Ph.D........ VPI
Madhukar, M. S., Ph.D.............. Drexel
Mathews, A., PE, Ph.D............. Illinois
Steinhauser, J. S., (UTSI), Ph.D..... Chicago

Assistant Professors:

Cazenave, J. L., Ph.D.............. Rensselaer
Iannelli, G. S., Ph.D.............. Tennessee
Pionke, C. D., PE, Ph.D.......... Georgia Tech
Yu, N., Ph.D......................... California (San Diego)

Graduate programs leading to the degrees of Master of Science and Doctor of Philosophy with a major in Engineering Science are available to graduates of recognized curricula in engineering, mathematics, or one of the physical or biological sciences. Program concentrations include solid mechanics, fluid mechanics, computational mechanics, biomedical engineering, and optical engineering (UTSI only). In each of these concentrations, interdisciplinary programs are arranged to meet individual needs or interests. Each applicant is advised as to any prerequisite courses before entering a program; the student's program of study must be approved by his/her advisory committee, and must comply with the requirements of The Graduate School. The student's major professor may be selected from a department other than the Department of Engineering Science and Mechanics; however, at least one member of the student's graduate advisory committee must be on the faculty of the Department of Engineering Science and Mechanics.

A departmental application is required in addition to The Graduate School application. The names and addresses of four references must be included with the departmental application.

The flexibility and interdisciplinary aspect of the program concentrations are intended to be of particular interest to prospective students currently employed in research, development, or design activities and whose interests in continuing education (either full-time or part-time) lie at one of the interfaces between science and engineering or can be met by interdisciplinary study in engineering. The department's course offerings and research activities are also intended to meet the needs of students who seek preparation for employment in engineering areas requiring specialization in mechanics or in related interdisciplinary studies such as biomachines.

THE MASTER'S PROGRAM

Two M.S. options are offered: option I requires a thesis, while option II does not. The second plan is restricted to those students who have had significant engineering professional work experience.

In option I, a minimum of 30 semester hours including the thesis is required. In option II, a minimum of 33 hours is required. The requirements include the following:

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Mathematics

Engineering courses* (Major concentration may include but is not restricted to courses offered by the Engineering Science and Mechanics Department)

12 18

Related courses (May include additional courses in mathematics, computer science, or the physical and life sciences as well as engineering courses.)

9 9

Thesis

6 6

*Engineering courses under option II may include advanced laboratory work or special problem work; for example, Engineering Science and Mechanics 581 or analogous courses in other departments.

A final examination is required under both options covering graduate coursework and the thesis.

THE DOCTORAL PROGRAM

Specific departmental requirements for the Ph.D. include:

1. A minimum of 72 semester hours beyond the Bachelor's degree, exclusive of credit for the Master's thesis. These shall include a minimum of 24 semester hours in Doctoral Research and Dissertation and a minimum of 48 semester hours in other courses.

2. A minimum of 24 semester hours in engineering graduate courses, exclusive of thesis and dissertation credit. These courses will normally be numbered 500 and above, with at least 9 semester hours of 600-level courses, which constitute one or two areas of concentration selected by the student. The number of courses in this group to be taken will depend on the program selected by the student and the approval of his/her advisory committee.

3. A minimum of 12 semester hours in mathematics or computer science in courses numbered 400 and above, exclusive of a first course in ordinary differential equations.

4. Attendance and participation in graduate seminars and colloquia.

5. Two doctoral examinations must be passed to be admitted to candidacy for the Ph.D. in Engineering Science.

After being admitted as a potential candidate for the Ph.D., a qualifying examination must be taken at the first offering after the student has either completed a Master's degree or completed 24 semester hours of graduate credit.

The purposes of qualifying examinations are:

a. To determine the qualifications of the student to continue the Ph.D. program, and
b. To identify the areas of strengths and weaknesses to guide the student's graduate coursework and research.

The qualifying examination will be administered by the department's Graduate Studies Committee. The examination will be written and will cover at least four graduate level subject areas. One subject area will be mathematics, and the others will be designated by the student subject to the approval of the department's Graduate Studies Committee.

The comprehensive examination is to be taken by students within 6 credit hours of completion of graduate coursework required for the Ph.D. degree. This examination is to be administered by the student's advisory committee and shall consist of both a written and an oral portion.

6. After successfully passing the qualifying and comprehensive examinations, the student must present the Ph.D. dissertation research proposal to the student's advisory committee and receive committee approval of the proposal before being admitted to candidacy for the Ph.D.

7. A final examination on the student's dissertation and related fields will be taken by the student after completion of the Ph.D. dissertation and course requirements.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The Ph.D. program in Engineering Science is available to residents of the state of Florida (concentration in biomedical engineering only). Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE CREDIT FOR 400-LEVEL COURSES

Four hundred-level courses in engineering may be used for graduate credit at the discretion of the advising committee. However, at least two-thirds of minimum required credit hours in a Master's degree program must be at or above the 500 level.

GRADUATE COURSES

421 Materials of Engineering (3) Mechanical properties of engineering materials: data collection and proc-
423 Fracture-Safe Design (3) Critical review of variables controlling stress intensity factors; non-propagation and re-propagation of linear cracks.

431 Fundamentals of Vibrations (3) Free and forced vibrations of damped and undamped lumped parameter systems; energy methods; free vibration of continuous bodies. Prereq: 231, Mathematics 231.

433 Dynamic Systems (3) Three dimensional dynamics of particles and rigid bodies; gyroscopes; variable mass systems; central, forced motion; Lagrange's equations; stability; transfer functions. Prereq: Dynamics.

435 Engineering Acoustics (3) Concepts of acoustics, measures of sound and their units; noise generation and transmission, noise control principles and application, materials and procedures for noise abatement. Prereq: Introductory course in vibrations or acoustics.

42 Fluid Mechanics (I) (3) Dimensional forms of basic laws; compressibility; centrifugal flow, shocks, duct flows with heat transfer; characteristic methods, critical flow, energy methods; internal and external flows, boundary layers, elementary turbulent flow models. Prereq: 341, Mathematics 231.

461 Experimental Stress Analysis (3) Theory, techniques, and instrumentation of strain analysis; theory and techniques of brittle coating methods; introduction to other strain measuring devices. Prereq: 321, Electrical and Computer Engineering 301. 2 hrs and 1 lab.

463 Photoacoustics (3) Introduction to photoacoustic, photoelastic, photoacoustic coating methods; Moore's method, interferometry, and holography. Prereq: 321, Physics 232. 2 hrs and 1 lab.

506 Dynamic Data Acquisition (3) Use and calibration of instrumentation, signal conditioning, data collection and recording dynamic events; Fourier analysis, transfer function analysis, digital signal processing, transduction, experimental parameter estimation with applications to modal vibration analysis. Prereq: 431, Electrical and Computer Engineering 301. 2 hrs and 1 lab.

521 Engineering Mechanics (I) (3) Statics. Free body diagrams; equations of equilibrium; general equilibrium equations; Lagrange's equations; work and energy methods; friction, moments of forces, equilibrium of particles and rigid bodies; dynamics of rigid bodies. Gyroscopic systems. Prereq: 341, Mathematics 431.


532 Fluid Mechanics (II) (3) Viscous flow, stress and strain; shear, pressure, and external forces acting on a fluid; continuity; Navier-Stokes equations. Prereq: 341, Mathematics 431.


536 Advanced Engineering Acoustics (3) Introduction to theory and application of acoustic analysis: vibration of continuous systems, plane and spherical waves, transmission, reflection, absorption, standing waves, resonators, filters, absorption mechanisms, microphones, ultrasonic, sonar transducers. Prereq: 431 or 435.

541 Fluid Dynamics (3) Kinematic, kinematic and thermodynamic properties of fluids. Introduction to the development of differential equations that govern fluid flow, and the boundary conditions for these equations. Prereq: 341, Mathematics 231.

542 Fluid Dynamics II (3) Development of basic concepts and governing equations for turbulence and turbulent flow field. Formulation for correlation function, energy transfer, and cascade, molecular and gross transport processes, free turbulence, wall turbulence; use of engineering turbulence closure models; examination of modern numerical and experimental methods. Prereq: 541.

551 Computational Mechanics (3) Discrete approach for analyzing linear and non-linear elastic systems. Continuum mechanics; finite elements; computer programming; equations of motion. Prereq: 341, Mathematics 231.

575 Applied Artificial Intelligence (3) (Same as Nuclear Engineering 575 and Mechanical Engineering 575.)

576 Expert Systems in Engineering (3) (Same as Nuclear Engineering 576 and Mechanical Engineering 576.)

577 Neural Networks in Engineering (3) (Same as Nuclear Engineering 577 and Mechanical Engineering 577.)


586 Measurement Science I (3) (Same as Nuclear Engineering 586, Aviation Systems 586, Chemical Engineering 588, Civil Engineering 588, Mechanical Engineering 588 and Aerospace Engineering 588.)

599 Measurement Science II (3) (Same as Nuclear Engineering 599 and Aviation Systems 599.)

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

621 Analysis and Design of Thin Shell Structures (3) Geometry of surfaces, derivation of thin shell theory for arbitrary shell geometry; selected applications of theory in structural engineering. Prereq. 525 or Civil Engineering 562.


624 Viscoelasticity (3) Viscoelastic constitutive relations; isothermal boundary value problems; wave propagation in viscoelastic materials; stability problems; determination of viscoelastic properties. Prereq. 523 and 539 or Polymer Engineering 541.

625 Computational Plasticity and Creep (3) Theory and numerical algorithms used to describe plastic and creep behavior in finite element structural models. Perfect plasticity, kinematic and isotropic hardening; Mroz, mechanical sublayer, and two-surface models; volumetric plasticity models; traditional creep models and unified creep-plasticity models. Numerical algorithms, including error maps, and plane stress plasticity algorithms in parallel. Prereq. 539 or 523, and 553.


641 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, closure procedures; time- and ensemble-averaging, large scale structures; high speed flow; reacting, nonreacting, excitation, ionization. Applications in propulsion, lasers, aerodynamics. Prereq. 542.

645 Theory of Turbulence (3) Mathematical descriptions of turbulence: isotropic turbulence, energy spectra, Kolmogoroff's hypothesis, large and small eddy structures for turbulent flows; turbulent diffusion by continuous movement; applications to turbulent jets, wakes, pipe flow, boundary layers. Prereq. 542. (Same as Aerospace Engineering 545.)

563-54 Advanced Topics in Computational Solid Mechanics (3,3) Fracture mechanics; singularity solutions, non-linear constitutive problems, variable stiffness, initial strain methods, plasticity, creep, unified creep-plasticity theory; geometrically non-linear problems, large deflection, stability; shell structures: theories of adaptive, convergence; adaptive grids. Prereq. 553. (Same as Mechanical Engineering 653-54.)

657 Computational Mechanics Seminar (1) Current developments in computational fluid/thermal/structural mechanics. For departmental thesis students only. May be repeated.

671 Advanced Topics in Applied Artificial Intelligence (3) (Same as Nuclear Engineering 671 and Mechanical Engineering 671.)

681 Advanced Topics in Engineering Mechanics (3) Advanced problems in mechanics, group or individually. Prereq. Consent of instructor. May be repeated with consent of department.

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English

(College of Liberal Arts)

MAJOR

DEGREES

English .................................. M.A., Ph.D.

D. Allen Carroll, Head

Professors:

Bratton, Edward W., Ph.D. ............. Illinois
Carol, D. Allen, Ph.D. ................. North Carolina
Cox, Don R., Ph.D. ................. Mississippi
Drake, Robert W., Ph.D. ............. Yale
Dykeman, Wilma (Adjunct), B.A. .... Northwestern
Ensor, Allison R. (Liaison), Ph.D. .... Indiana
Finneran, Richard J. (Hodges Chair of Excellence), Ph.D. .... North Carolina
Goslee, Nancy M., Ph.D. ............. Yale
Heffernan, Thomas J., Ph.D. .... Cambridge
Kelly, Richard M. (Lindsay Young Prof.), Ph.D. .... Duke
Leggett, B. J. (Distinguished Prof.), Ph.D. .... Florida
Lofaro, Michael A., Ph.D. .... Maryland
Maland, Charles J., Ph.D. ........... Michigan
Penner, A. Richard, Ph.D. .......... Colorado
Resee, Jack E., Ph.D. .............. Kentucky
Sanders, Norman J. (Lindsay Young Prof.), Ph.D. .... Pennsylvania
Shurr, William, Ph.D. .............. North Carolina
Spencer, John A., Ph.D. .............. Utah
Stern, Alan, Ph.D. .............. University of Wisconsin
Stoiber, Margaret, Ph.D. .......... University of Wisconsin
Tate, Edith, Ph.D. .............. University of Wisconsin
Thomas, Joyce Carol, M.A. .... Stanford
Thomas, Patricia, Ph.D. .............. University of Wisconsin
Wheeler, Thomas V., Ph.D. ....... North Carolina
White, James M. (Lindsay Young Prof.), Ph.D. .... North Carolina
Wickliffe, Susan, Ph.D. ......... University of Wisconsin
Wolff, Edward, Ph.D. .............. University of Wisconsin
Woolsey, Robert, Ph.D. .......... University of Wisconsin
Wright, Joseph, Ph.D. .............. University of Wisconsin
Yao, Shaolin, Ph.D. .............. University of Wisconsin
Young, William, Ph.D. .......... University of Wisconsin
Zehnder, Mary J., Ph.D. .... University of Wisconsin
Zornick, John, Ph.D. ......... University of Wisconsin

Assistant Professors:

Atwill, Janet, Ph.D. ................. Purdue
Barton, Ken, Ph.D. ................. Texas Christian
Bhatt, Rakesh, Ph.D. ............... Illinois
Hammon, Steve, Ph.D. .............. Illinois
Hurst, Russel, Ph.D. ................. Illinois
Howes, Laura L., Ph.D. .......... Columbia
Hubbard, Dolan, Ph.D. ............. Illinois
Jennings, LaVina, Ph.D. .... North Carolina
Papke, Mary E., Ph.D. .............. McGill

The Department of English offers the Master of Arts and the Doctor of Philosophy degrees with a major in English. Thesis and non-thesis options are available for the M.A. as well as a special concentration in writing.

Detailed information about the Master’s and doctoral programs, admission requirements, and about individual graduate courses, may be obtained by writing to the Director of Graduate Studies in English, 306 McClung Tower. A prospective student must contact the department to receive the proper information and forms with which to apply. The Department of English does not accept students in non-degree or provisional status. A student who wishes to enter the department must apply in degree-seeking status for his/her application to receive consideration for admission to any graduate program in English.

THE MASTER’S PROGRAM

Requirements

Coursework: A minimum of 24 semester hours in English beyond the B.A. to include 6 hours at the 600 level; 12 additional hours at the 500-600 level (Only 3 hours of 593 Independent Study may be applied toward the M.A.); and 6 hours for graduate credit at any level, including the 400 level. In this coursework, students must maintain at least a 3.0 GPA.

Thesis Option: Written under the direction of a faculty member of the department and approved by a committee of two other faculty members. Six semester hours of credit will be given.

Thesis-Option: Six hours of additional courses at the 500-600 level, making a total of 30 hours of required coursework.

Language Requirement: Evidence of proficiency in one foreign language, to be fulfilled in one of the following ways:

1. Completion of the second year of a language at college level with a grade of C or better.

2. Completion of French 302 or German 332 at UT Knoxville with a grade of B or better.

3. Passing of the regular Ph.D. foreign language examination as currently administered at UT Knoxville.

4. Passing the Graduate Student Foreign Language Test (GSFLT) as currently administered through the English Department.

Final Examination: A candidate presenting a thesis must pass a one-hour oral examination.
a candidate presenting a creative project must pass a ninety-minute oral examination. The examination consists of a short thesis defense, but chiefly of questions covering the general history of English and American literature, not merely the coursework taken. A reading list of primary works designed to help the student prepare for these questions is available in the office of the Director of Graduate Studies in English.

A non-thesis student must pass a written examination, followed by a one-hour oral examination, both consisting of the same sort of questions as the examination taken by the thesis student.

Residence Requirement: There is no residence requirement for the M.A., but students should attempt to pursue a full-time program whenever possible.

WRITING CONCENTRATION

The Master's program with writing concentration is intended for those students who plan to do free-lance writing, specialize in teaching writing courses at the college level, or work as professional writers in business or industry.

Requirements

The requirements for the writing concentration are the same as those for the thesis option above with the following exceptions:

Coursework: Writing students may substitute two 400-level writing courses for two 500-level courses. Students must take at least 9 hours in writing and 9 in literature, the remaining 6 to be selected from any English courses at the proper level. Of the courses in writing, at least 3 hours must be taken at the 500 level; additional 500-level courses are strongly recommended.

Writing Projects: One of the following writing projects for six hours of credit:

1. A thesis, using research to analyze some aspect of writing or rhetorical theory.
2. A creative project, such as a collection of poems or short stories, a short novel, a play, or a creative work of non-fiction prose.

The nature and length of each project will be determined by the Director of Graduate Studies after consulting with the student and the project director. In addition to the director, two other English Department faculty members will supervise and approve the project; at least one should be from the literature faculty.

Final Examination: The reading list may be modified by the M.A. examining committee, meeting as a body with the student, to reflect the candidate's particular writing emphasis. However, most of the oral examination should focus upon the literature outlined in the original reading list.

THE DOCTORAL PROGRAM

Requirements

A student must successfully complete a program of study, normally 6 full semesters as outlined below, approved by the candidate's committee or the Director of Graduate Studies in English.

Coursework: At least 51 semester hours beyond the B.A. to include at least 21 semester hours at the 600 level; at least 15 semester hours at the 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. These represent the research for and writing of the dissertation. The research and dissertation will be directed by a faculty member of the department and approved by a doctoral committee of three or four other faculty members.

Language Requirement: A language requirement met in one of the following ways:

1. Two languages approved by the Director of Graduate Studies in English. The requirement for each language may be fulfilled by (a) 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; or (d) passing the Graduate Student Foreign Language Test (GSFLT) as currently administered through the English Department.

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 given in the foreign language at the 400 level or above, at least one course to be at the 500 or 600 level. A minimum grade of B must be received in each course.

3. One modern language approved by the Director of Graduate Studies in English and intensive study of the English language. This requirement must be fulfilled by completion of (a), (b), or (c) in option 1, for one foreign language, and completion of 6 semester hours in English language courses with grades of B or better, at least three of which must be from English 508 or 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 500 or 600 level and approved by the Director of Graduate Studies in English. These courses will not count toward the minimum number of courses for the Ph.D., and anyone electing this language option may not take the comprehensive examination in linguistics.

Examinations: (1) A one-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 assistants, 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 tragedies, including Hamlet.

405 Shakespeare II: Later Plays (3) Shakespeare's dramatic achievement between 1601 and 1613. Reading and discussion of selected plays from great tragedies, including Othello; problem plays, including Measure for Measure; and dramatic romances, including The Tempest.

406 Renaissance Drama (3) English theatre between 1550 and 1560 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) Major genres or literary modes: drama, novel, poetry, non-fiction prose, satire, romance, or epic, written between 1660 and 1800. May be repeated.

414 Romantic Poetry and Prose I (3) Wordsworth, Coleridge, and Blake; readings from Lamb, De Quincey, and other prose writers.

415 Romantic Poetry and Prose II (3) Keats, Shelley and Byron; readings from Hazlitt, Peacock, and other prose writers.

416 Victorian Poetry and Prose I (3) Tennyson, Pre-Raphaelites, Carlyle, Newman, and Mill.

419 Victorian Poetry and Prose II (3) Browning, Arnold, Hopkins, Hardy, Ruskin, Darwin, and Wilde.

420 The Nineteenth-Century British Novel (3) Scott to Hardy.

421 Modern British Novel (3) Lawrence, Joyce, and Woolf.

422 Women Writers in Britain (3) Literary consciousness and works of women writers in Britain. (Same as Women's Studies 422.)

431 Colonial, Federal, and Early National American Literature (3) From Columbus to Washington Irving.

432 American Romanticism and Transcendentalism (3)

433 American Realism and Naturalism (3)

434 Modern American Literature (3) World War I to present.
435 American Novel before 1900 (3) From earliest sentimental novels through Brown and Cooper, and major figures to 1900: Hawthorne, Melville, Stowe, Clemens, and James.


441 Southern Literature (3) Southern writing from colonial period into twentieth century; frontier humorists, local color writers, and Southern literary renaissance.

442 American Humor (3) Early nineteenth century into twentieth century: Mark Twain.

443 Topics in Black Literature (3) Contents vary: particular genres, authors, or theories from 1845 to present: Langston Hughes and Harlem Renaissance, Richard Wright and Gwendolyn Brooks, writing by black women, international black literature in English, and black American autobiography.

451 Modern British and American Poetry (3) From Yeats and Frost to Auden, Stevens, and more recent poets.

452 Modern British and American Drama (3) O'Neill's works as precursors to modern dramatists: Williams, Miller, Albee, and representatives of Black theater, Buffins, and Baraka.

453 Continental Drama (3) Selection of plays (in English translation) by major European writers from late Renaissance to present; twentieth century achievement.

454 Twentieth-Century International Novel (3) Joyce, Camus, Kafka, Nabokov.

455 Persuasive Writing (3) Persuasive strategies in both student and professional writing. Practice in mastering effective logical and emotional appeals.

460 Technical Editing (3) Editing technical material for publication. Principles of style, format, graphics, layout, and production management. Prereq: 456 and 459, or consent of instructor.

461 Advanced Technical and Professional Writing (3) (For students planning careers in industry, education, and government who need technical writing skills. Writing of definitions, process descriptions, sets of instruction, descriptions of mechanisms, recommendation reports, abstracts, proposals, and major reports. Prereq: Junior standing in student's major or consent of instructor.


463 Advanced Poetry Writing (3) Further development of skills acquired in basic writing poetry course. Prereq: 460 or consent of instructor.

464 Advanced Fiction Writing (3) Further development of skills acquired in basic writing fiction course. Prereq: 465 or consent of instructor.

471 Sociolinguistics (3) Study of language in relation to society. Empirical and theoretical focus. Large-scale units: tribes, nations, social groups. Prereq: 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 of sociolinguistic and cultural variation. Prereq: 371 or 372 or Linguistics 200 or consent of instructor. (Same as Linguistics 472.)

474 Teaching English as a Second or Foreign Language (3) Grammatical structures of English: particular grammatical difficulties of non-native learners of English. Basic phonological structures of English. Teaching grammar and phonology to non-native speakers: contrastive analysis of English with other languages. Prereq: 2nd year of a foreign language. (Same as Linguistics 474.)

475 Teaching English as a Second or Foreign Language (3) Second language acquisition theory. Issues in teaching English as a second language. Materials and methods of language teaching and testing: preparation of materials. Observation of and team teaching with experienced staff member. Prereq: English 474. (Same as Linguistics 475.)

479 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 most influential writers in British or American literary history: e.g., Donne, Tennyson, Jane Austen, Whitman, Faulkner, Baldwin or Lawrence.

483 Special Topics in Literature (3) Topics vary. May be repeated. Maximum 6 hrs.

484 Special Topics in Writing (3) Original writing integrated with reading, usually taught by professional author. Topics vary. May be repeated. Maximum 6 hrs.

485 Special Topics in Language (3) May be repeated. Maximum 5 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. Topic to be repeated with consent of department. Maximum 6 hrs.

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

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

505 Teaching Freshman Composition (3) Introduction to teaching freshman English through study of various techniques and philosophies of composition. Required of all first-year teaching associates.

506 Introduction to Literary Research (3) Critical examination of aims of English studies, professions of English, English literature, English composition, research, and methods of research: collecting of information, evaluation of material, and transmission of results of scholarship.

507 Applied Criticism: The Rhetoric of Literary Forms (3) Study and application of ways in which major critics have analyzed form and prose fiction.

508 History of the English Language I (3) Phonological, morphological, and syntactic development of English language: Old and Middle English. F,A

509 History of the English Language II (3) Phonological, morphological, and syntactic development of the English language with concentration on developments after 1500, especially in American English. Sp,A

513-14 Readings in Medieval Literature (3,3) Reading and analysis of selected masterpieces of Old and Middle English literature and their Continental sources in Modern English.

520-21 Readings and Analysis in Selected Areas of Sixteenth- and Seventeenth-Century Prose, Poetry, and Drama (3,3) Content varies: genre, theme, literary movement, or other coherent emphasis.

530-31 Readings in English Literature of the Restoration and Eighteenth Century (3,3) Topics vary. Genre: prose, poetry, fiction, drama; or period: Restoration, earlier eighteenth century, later eighteenth century.

540-41 Readings in English Literature of the Nineteenth Century (3,3) Content varies: genre, theme, literary movement, or other coherent emphasis.

550-51 Readings in American Literature from the Colonial Period to the Present (3,3) Content varies: genre, theme, literary movement, or other coherent emphasis.

552 Readings in Black American Literature (3) Content varies: genre, theme, literary movement, or other coherent emphasis.

560-61 Readings in Twentieth-Century Literature (3,3) Content varies: genre, theme, literary movement, or other coherent emphasis.

576 Introduction to Contemporary Criticism (3) Introductory survey of twentieth-century literary criticism from New Criticism to present.

580 Fiction Writing (3) Advanced fiction projects under supervision of instructor and time for independent study. Prereq: Extensive background in reading and writing fiction.

581 Colloquium in Poetry Writing (3) Major poetic project or continuation of project begun in 450. Individual consultation with instructor supplements class analysis, readings in contemporary poetry and theory. Prereq: 483 or consent of instructor.

582 Special Topics in Writing (1-3) Topics vary. May be repeated. Maximum 6 hrs. Enrollment by consent of instructor; supervised study.

585 Issues in Invention, Style, and Audience (2) Theoretical perspectives on contemporary research in rhetoric and composition.

586 History of Rhetoric I (3) Survey of rhetoric from Sophocles to Ramus.

587 History of Rhetoric II (3) Survey of rhetoric from Bacon to present.

588 Readings in Applied Rhetoric (3) Content varies: Writing across curriculum, teaching centers, technical communication, text linguistics.

590 Topics in Critical Theory (3) Topics vary.

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

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

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

594 Film History, Rhetoric, and Analysis (3) Film as narrative art form: historical development of film; the "rhetoric of film"; critical approaches to film study: genre, auteur, formalist, and historical; critical analysis of individual films.

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

610 Studies in Old English Language and Literature (3) Old English grammar with readings in prose and poetry, F,A

611 Studies in Beowulf (3) Translation and critical study of Beowulf. Prereq: English 510 or consent of instructor. Sp,A

620 Studies in Medieval English Literature (3) Seminar in literature and literary genres of Medieval English literature, read in Old and Middle English. Subject matter varies from year to year.

621 Studies in Chaucer (3) Seminar in text, interpretation, and criticism of Chaucer's writings. Prereq: Previous course in Chaucer.


650 Studies in English Romanticism (3) Seminar content varies: particular literary figure or figures, genres, theme, or other coherent focus.

651-52 Studies in Victorian Literature (3,3) Seminar content varies: particular literary figure or figures, genres, theme, or other coherent focus.

660-661-662 Studies in American Literature (3,3,3) Southern literature before 1860, frontier, regionalism, women's literature, Irving, Cooper, Poe, Emerson, Thoreau, Hawthorne, Melville, Whitman, Dickinson, James, and Twain.

670-71-72 Studies in Twentieth-Century Literature (3,3,3) Seminar content varies: particular literary figure or figures, genres, theme, or other coherent focus.
Entomology and Plant Pathology

(Major of Agricultural Sciences and Natural Resources)

MAJOR DEGREE
Entomology and Plant Pathology M.S.

Carroll J. Southards, Head

Professors:
Bernard, Ernest C., Ph.D. Georgia
Gerhardt, Reid R. (Liaison), Ph.D. NC State
Hilly, James W., Ph.D. Ohio State
Johnson, Leander F. (Emeritus), Ph.D. Louisiana State
Lambdin, Paris L., Ph.D. VPI
Piess, Charles D., Ph.D. Clemson
Southard, Carroll J., Ph.D. NC State

Associate Professors:
Grant, Jerome F., Ph.D. Clemson
Gwinn, Kimberly D., Ph.D. NC State
Reddick, Bradford B., Ph.D. Clemson
Windham, Mark T., Ph.D. NC State

Assistant Professor:
Owens, Bonnie H., Ph.D. NC State

The Department of Entomology and Plant Pathology offers a graduate program leading to the Master of Science with a concentration in entomology or plant pathology. Students in entomology may specialize in crop entomology, medical and veterinary entomology, insect biology, insect pest management, or biological control. Students in plant pathology may specialize in fungal 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 have completed (1) a general botany or biology course, 8 hours; (2) advanced biological sciences, 8 hours; (3) general inorganic chemistry, 6-8 hours; (4) organic chemistry, 3 hours. In addition, three completed courses in a field of 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 as approved by the advisor. The thesis is a comprehensive study of current problems. The student must pass a comprehensive oral defense of the thesis to a committee of three members of the department other than the advisor. A minor is not required but may be selected at the option of the student. The minor will require 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 of the minor department to assist in designating courses required for the minor.

GRADUATE COURSES

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

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

510 Plant Disease Fungi (4) Morphology, taxonomy, biology, and genetics of plant pathogenic fungi. Isolation and identification of plant pathogenic fungi. Prereq: 313 or consent of instructor. 2 hrs and 2 labs. (Same as Ornamental Horticulture and Landscape Design 511.) F,A

512 Soilborne Plant Pathogens (3) Causal agents; host-parasite-soil environment interactions; epidemiology; and biological, cultural, and chemical control. Prereq: Plant Pathology. 3 hrs and 1 lab. F,A

514 Plant Disease Phytoplasmas (4) Morphology, taxonomy, ecology, physiology, and genetics of bacterial plant pathogens; infection and disease development, pathogenesis and resistance, diagnosis, detection, effect of environment, and management of bacterial plant diseases; beneficial plant-bacterial interactions. Prereq: Plant Pathology or consent of instructor. 3 hrs and 1 lab. F,A

515 Physiology of Plant Disease (3) Biochemical and physiological processes involved in host-pathogen interactions. Mechanisms of disease resistance. Prereq: Introductory plant physiology and pathology, or consent of instructor. F,A

520 Plant Parasitic Nematodes (4) Morphology, physiology, taxonomy, and ecology of plant parasitic nematodes; host-parasite relationships. Prereq: 6 hrs biological science or consent of instructor. 2 hrs and 2 labs. Sp,A

521 Plant Virology (3) Symptomatology, epidemiology, and management of virus infection; structure, morphology, replication, transmission, purification, characterization, and classification of plant viruses; virology; plant pathogenic viroids, mycoplasmas, and viroid. Prereq: 313 or consent of instructor. 2 hrs and 1 lab. Sp,A

522 Field Crop and Vegetable Insects (2) Identification, biology, and management of insects affecting commercial vegetable and home garden crops. Prereq: Plant Pathology or basic entomology course. 1 hr and 1 lab. F,A

525 Medical and Veterinary Entomology (3) Morphology, taxonomy, and biology of arthropod parasites and vectors of pathogens of humans and animals. Ecology and control of arthropod vectors in relation to disease transmission. Prereq: 321 or 325, or Zoology 380, or consent of instructor. 2 hrs and 1 lab. Sp,A

530 Integrated Pest Management (3) Principles and application of biological, cultural, genetic, behavioral, and chemical methods of control to maintain pest populations below economic threshold levels. Prereq: 321, or consent of instructor. (Same as Plant and Soil Science 530.) F,A

531 Special Problems in Entomology (1-3) Comprehensive individual study of current problems. May be repeated. Maximum 6 hrs. E

532 Special Problems in Plant Pathology (1-4) Comprehensive individual study of current problems. May be repeated. Maximum 6 hrs. E

533 Concentrated Study in Entomology (1-3) Selected subjects in entomology for advanced students, concentrated in time and subject matter. Prereq: 321 or basic entomology course. May be repeated. Maximum 6 hrs. F,Sp

541 Seminar (1) Review of current research in entomology and plant pathology. May be repeated. Maximum 2 hrs. E

Environmental Engineering

See Civil Engineering

Environmental Practice

(Major of Veterinary Medicine)

MAJOR DEGREE
Veterinary Medicine D.V.M.

L. N. D. Potgieter, Head

Professors:
Farkas, W. R., Ph.D. ................. Duke
Oliver, J. W., D.V.M., Ph.D. ............ Purdue
Patton-McCord, S., Ph.D. ............... Kentucky
Potgieter, L. N. D., B.V. Sc., Ph.D. ... Iowa State
Raal, C. F. (Emeritus), D.V.M. ....... Ohio State
Schaltz, T. W., Ph.D. ................. Tennessee

Associate Professors:
Frazier, D., D.V.M., Ph.D. .......... NC State
New, J. C., D.V.M., Ph.D. .......... Texas A&M
Orosz, S. E., D.V.M., Ph.D. ............ Ohio State
Reinemeyer, C., D.V.M., Ph.D. ........ Ohio State
Rohrback, B. W., V.M.D. .......... Johns Hopkins
Schroeder, E. C., D.V.M. ............ Michigan State

Assistant Professors:
Hahn, K. A., D.V.M. ................. Purdue
Kanitz, S., Ph.D. ...................... Florida
Ramsey, E. C., D.V.M. .............. California (Davis)

Instructor:
Kennedy, M. A., D.V.M., Ph.D. ........ Tennessee

Clinical Associate:
Clyde, V. L., D.V.M. ................. NC State

Post-Doctoral Research Associate:
Alansari, H. M., Ph.D. ............... Kansas State
Kelch, W. J., D.V.M. ................. Michigan State
Lui, X., M.D. ....................... China

Residents:
Jones, M. P., D.V.M. ................. Missouri
GRADUATE COURSES

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

501 Special Topics in Environmental Medicine (1-3)
Aceramicmetastasis, pharmacokinetic studies, toxicological
studies, epidemiology and techniques in molecular
biology; atomic absorption, gas chromatography, ul-
tracentrifugation, extractive techniques and radioimmu-
nosays. Prereq: Consent of instructor. May be re-
peated. Maximum 6 hrs. E

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

503 Predictive Toxicology (3) Principles and tech-
niques of predictive toxicity; structure-activity rela-
tionships, expert systems, neural nets and molecular
similarity.

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

506 Experimental Animal Surgery (3) Competence in
performing human surgical modifications of experimen-
tal animals. Techniques of anesthesia, Drug administra-
tion and postoperative care. Prereq: Embryology, para-
sitology, physiology and/or consent of instructor. 1 hr
and 2 labs. F

530 Wildlife Diseases (2) (Same as Wildlife and Fish-
eries Science 530.)

561 Pharmacology (4) Principles of pharmacokinetics
and pharmacodynamic properties of drugs; mode of
action, pharmacologic effects, chemical and physical
properties, metabolism, toxicities, important idiosyn-
crasies and clinical applications. Prereq: Consent of In-
structor. F

500 Doctoral Research and Dissertation (3-15) P/N
only. E

607 Diagnosis and Pathogenesis of Virus Diseases of
Domestic Animals (3) Advanced study of virus
diseases important to domestic animals; virus biology,
pathogenesis, pathology and diagnosis technical train-
ing in virus diseases diagnosis. Prereq: Cellular and
Comparative Biochemistry, and Advanced Topics in
Biochemistry. Virology and Virology Lab, or Microbi-
ology-Veterinary Medicine 811-812. 2 hrs and 1 lab. Sp.A

610 Advanced Topics in Environmental Medicine (1-
3) Current and future research methodology, laboratory
situation, recent advances in instrumentation in analyti-
cal techniques for environmental medicine. Prereq: Consent
of instructor. May be repeated. Maximum 6 hrs. E

Finance

(College of Business Administration)

MAJOR

Business Administration MBA, Ph.D.

Harold A. Black, Head

Professors:
Black, Harold A. (James F. Smith, Jr., Prof.),
Ph.D. ........................................ Ohio State
Dorweiler, William W. (Emeritus),
Ph.D. ....................................... Pennsylvania

Associate Professors:
Philippatos, G. C. (Distinguished Prof.),
Ph.D. ..................................... New York
Shives, Ronald E. (Wm. Voigt Scholar),
Ph.D. ..................................... UCLA
Wansley, James W. (Clayton Chair of Excellence),
Ph.D. ................................ South Carolina

531 Financial Markets (3) Interest rate determination.
Role of short- and long-term financial markets in process
of allocating capital. Theory of determination of interest
rates. Analysis of term structure. Money and bond mar-
kets. 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 environ-
ment and implications for management. Financial institu-
tion structure and competition and changing trends in
U.S. financial system. Prereq: Business Administration
504 and 505 or consent of instructor.

551 Financial Management of a New Enterprise (3)
Financial issues associated with formation, control, and
long-term planning of new enterprise. Acquisition of
venture capital. Prereq: Business Administration 504
and 505 or consent of instructor.

581 Real Estate Investment and Finance (3) Financial
and market analysis used to make real estate investment
decisions. Analysis of varying options on rate of return
and income-producing properties. Effect of various
financing options on consumer's decisions to pur-
chase. Relationship between primary and secondary
mortgage markets and impact of those markets on cost
and availability of funds for real estate lending. Effects of
government intervention (taxation, subsidization, and
regulation) in both real estate and mortgage markets.
Prereq: Business Administration 504 and 505 or consent
of instructor.

599 Special Topics in Finance (1-3) Topics vary.
Prereq: 501 or consent of instructor. May be repeated.
Maximum 6 hrs.

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

641 Seminar in Finance I: Capital Markets (3) Capital
markets, capital market imperfections, and market dy-
namics. Interest rate theory and term structure of interest
rates. Utility theory, state preference theory, mean-
variance, capital asset pricing, efficient set theorems,
interest rate theory, financial market micro structure.

642 Seminar in Finance II: Theory of the Firm (3)
Financial theory of firm and financial decision making
under conditions of uncertainty, equilibrium models of
firm. Option pricing, agency theory, capital structure,
expected returns and risk, dividend policy.

651 Advanced Seminar in Finance I (3) Recent theo-
retical and empirical developments in micro-finance lit-
erature. Topics vary. May be repeated. Maximum 6 hrs.

652 Advanced Seminar in Finance II (3) Recent theo-
retical and empirical developments in macro-finance lit-
erature. Topics vary. May be repeated. Maximum 6 hrs.

Food Science and Technology

(College of Agricultural Sciences and Natural Resources)

MAJOR

DEGREES
Food Science and Technology M.S., Ph.D.

Marjorie P. Penfield, Acting Head

Professors:
Collins, J. L., Ph.D. ......................... Maryland
Draughon, F. A., Ph.D. ..................... Georgia
Jaynes, H. O. (Emeritus), Ph.D. .......... Illinois
Melson, S. L., Ph.D. ....................... Tennessee
Miles, J. T. (Emeritus), Ph.D. .......... Wisconsin
Overcast, W. W. (Emeritus), Ph.D. .. Iowa State
Penfield, M. P., Ph.D. ..................... Tennessee

Associate Professors:
Christen, G. E., Ph.D. .................... Missouri
Loveday, H. D., Ph.D. .................... Kansas State
Mount, J. R., Ph.D. ....................... Ohio State
THE DOCTORAL PROGRAM

1. Completion of a Master's degree in the field, or a closely related field, or passing a special qualifying examination is required for admission. Scores on the GRE aptitude test are also required.
3. A minimum of 72 hours beyond the Bachelor's degree, excluding credit for the Master's thesis, is required. Of this, 24 semester hours must be 600 Doctoral Research and Dissertation.
4. At least 24 hours of coursework numbered above 500 are required exclusive of doctoral research and dissertation. At least 6 of the 24 hours must be courses numbered above 600.
5. A minimum of 6 hours of courses for graduate credit must be taken outside the Department of Food Science and Technology.
6. All candidates must complete 601 (2 hrs.) and are expected to attend 601 during their Ph.D. program.
7. Each candidate must pass both written and oral comprehensive examinations prior to admission to candidacy. Major professors will advise candidates on competencies expected.
8. A final oral examination is required that includes a defense of the dissertation and subject matter that the student's committee considers appropriate.

GRADUATE COURSES

410 Food Chemistry I (3) Reactions of proteins, enzymes, and additives in foods. Pre-req: Chemistry 110 or equivalent. 2 hrs and 1 lab. F
411 Food Chemistry II (3) Reactions of inorganic compounds, carbohydrates, lipids and vitamins in foods. Pre-req: Chemistry 110 or equivalent. 2 hrs and 1 lab. F
420 Food Microbiology (2) Physical, chemical, and environmental factors moderating growth and survival of foodborne microorganisms; pathological and spoilage microorganisms affecting quality of foods and their control. Pre-req: Microbiology 210. Coreq: 429. F
430 Sensory Evaluation of Food (3) Principles and methods of sensory evaluation of foods. Pre-req: Basic statistics. 2 hrs and 1 lab. F
430 Preservation of Food (3) Prevention of deterioration and spoilage of foods. Methods of preservation. Pre-req: Agricultural Engineering 422. 2 hrs and 1 lab. F
451 Dairy Products I (3) Science and technology of processing dairy products. Chemical, physical, and microbiological changes that occur during manufacture. Pre-req: Principles of Chemistry. Introduction to Organic and Biochemistry, General Microbiology. 2 hrs and 1 lab. F,A
460 Meat Products Technology (4) Processing methods for making cured, smoked, fresh, frozen and fermented products. Effects of processing methods on product characteristics. Pre-req: 360 or consent of instructor. 3 hrs and 1 lab. F,A
470 Food Crop Products (3) Food products from plants; types, manufacturing systems, quality attributes and utility. Pre-req: 3 hrs biological science. 2 hrs and 1 lab. F,A
480 Cereal Science and Bakery Products (3) Chemistry and technology of processing cereal grains, interactions of ingredients during doughing and storage of baked products. Pre-req: 410 or 411 or equivalent. 2 hrs and 1 lab. F,A
500 Thesis (1-15) P/NP only. F

501 Seminar (1) Individual reports and discussion on topics from current literature. May be repeated. Maximum 3 hrs. E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/N only. E
503 Problems in Lieu of Thesis (2-3) May be repeated. S/N only. E
510 Instrumental Analysis of Food (3) Modern instrumental methods for control of food manufacturing processes. Pre-req: 410-11. 2 hrs and 1 lab. F
511 Color and Flavor of Foods (3) Chemical basis, measurement, and reactions involved in color and flavor changes in foods. Manufacture and application of materials used to modify color and flavor. Pre-req: 410-11. 2 hrs and 1 lab. F
520 Food and Industrial Fermentations (3) Microbiology, biochemistry and technology of food-related fermentations involving dairy products, meat, cereals, fruits and vegetables. Production of food ingredients and by-product utilization. Pre-req: 420-29, 440. Biochemistry 410 or equivalent. 2 hrs and 1 lab. F,A
521 Advanced Food Microbiology (3) Microorganisms in foods, their identification, characterization and relationship to food processing. Isolation of microorganisms from foods and plant equipment. Pre-req: 420-29, 1 hr and 2 labs. F,A
540 Food Product Development (3) Art, science and technology of developing and marketing new food products. Pre-req: 440. 2 hrs and 1 lab. F,A
560 Advanced Meat Science (3) Physical and chemical changes that occur in conversion of muscle to meat; effect of postmortem treatments on meat quality, composition and palatability; packaging, preservation and quality control. Pre-req: 460. 2 hrs and 1 lab. F,A
580 Oilseed Products (3) Chemistry and technology of foods and food ingredients produced from oilseeds. Pre-req: 410-11 or equivalent. 2 hrs and 1 lab. F,A
590 Special Topics in Food Technology and Science (1-3) Critical reviews of current research and production concerns of food industry. May be repeated. Maximum 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,S
620 Food Toxicology (2) Basic and applied concepts in food toxicology, toxicological aspects of processed foods. Model of action, prevention and control of food toxicants in food supply. Pre-req: 410-11, 521, or consent of instructor. F,A
640 Advanced Food Processing (3) Role of processing treatments in modification of food properties; texture, color and flavor characteristics. Pre-req: 440, 510, 511 or consent of instructor. F,A

Forestry, Wildlife and Fisheries

(College of Agricultural Sciences and Natural Resources)

MAJORS

Forestry ..................................................... M.S.
Wildlife and Fisheries Science ..................... M.S.

John C. Rennie, Acting Head
Professors:

Barrett, J. W. (Emeritus), Ph.D. .................................. Syracuse University
Buckner, E. R. (Distinguished Prof.), Ph.D. .................................. NC State University
Core, H. A. (Emeritus), Ph.D. .................................. Syracuse University
Deardorff, L. A., Ph.D. .................................. Colorado State University
Dimmick, R. W., Ph.D. .................................. Wyoming University
Hill, T. K., Ph.D. .................................. Auburn University
Hopper, G. M., Ph.D. .................................. Virginia Polytechnic Institute and State University
Little, R. L., Ph.D. .................................. NC State University
Mcgee, C. E. (Adjunct), D.F. .................................. Duke University
Ostermeier, D. M., Ph.D. .................................. Syracuse University
Pelton, M. R., Ph.D. .................................. Georgia Institute of Technology
Schneider, G. Ph.D. .................................. Michigan State University
Sharp, J. B. (Emeritus), D.P.A. .................................. Harvard University
Smalley, G. (Adjunct), Ph.D. .................................. Tennessee State University
Strange, R. J., Ph.D. .................................. Oregon State University
Stumbo, D. A., Ph.D. .................................. Minnesota State University
Thor, E. (Emeritus), Ph.D. .................................. NC State University
Wilson, J. L., Ph.D. .................................. Tennessee State University

Associate Professors:

Hay, R. L., Ph.D. .................................. Duke University
King, M. M., Ph.D. .................................. University of Utah
Nodvin, C. (Adjunct), Ph.D. .................................. Cornell University
Rennie, J. C., Ph.D. .................................. NC State University
Schlawbaum, S. E., Ph.D. .................................. Colorado State University
Smith, K. G. (Adjunct), Ph.D. .................................. United States Department of Agriculture
Wells, G. R., D.F. .................................. Duke University
Winstrofer, P. M. (Liaison), Ph.D. .................................. Iowa State University

Graduate study leading to the Master of Science with majors in Forestry and 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 with a specialization in forest biology, wildlife science, or fisheries science can be achieved through the University’s intercollegiate graduate program in Ecology.

A joint program between the department and Knoxville College leading to a specialized B.S. in Biology prepares Knoxville College graduates for graduate programs in natural resources.

THE MASTER’S PROGRAMS

Both thesis and non-thesis options are available for the major in Forestry; a thesis is required in Wildlife and Fisheries Science. For admission, the student must have a Bachelor's degree from an accredited institution in forestry, wildlife, fisheries, or other natural resource area. Applicants must also have taken the general Graduate Record Examination (GRE). Graduate School rating forms or letters of recommendation from three individuals familiar with the applicant's academic ability are required. The department also has an application that must be submitted at the time of application to The Graduate School.

Thesis Option

1. Prior to research for the thesis, the student is required to develop a detailed written research proposal. Registration for 6 hours of Thesis (Forestry 500 or Wildlife and Fisheries Science 500) is required.

2. A graduate committee of no fewer than 3 faculty members must be selected by the second semester of residence. At least one member shall be from outside the department. In addition to the thesis requirement, a minimum of 24 hours of graduate coursework is required. This work must be approved by the student's committee and must have a grade of the minimum of 3.00. The committee may require additional coursework if the student's progress or background indicates such need.

3. All students are required to include Forestry 512 or Wildlife and Fisheries Science 512, Seminar, in their programs. This is required of each graduate student in residence all semester.

4. An oral examination covering the thesis and coursework is required.

Non-Thesis Option (Forestry only)

1. Thirty-five hours of graduate coursework of which 25 must be at the 500 level or above is required.

2. A graduate committee of no fewer than 3 faculty members will be selected. At least one member shall be from outside the department. The committee will meet and schedule the student's program during the first semester in residence.

3. Three hours of Forestry 511 are required.

4. Nine hours of coursework in the department must be at the 500 level or above, exclusive of Forestry 511.

5. Final comprehensive written and oral examinations shall be taken upon completion of no fewer than 28 hours of approved study.

A concentration in managing natural resource organizations is available under the non-thesis option with a major in Forestry. The minimum core requirements include: Forestry 511, 570, and six additional hours of Forestry and Wildlife and Fisheries courses to be selected in consultation with the student's committee. All students are required to include Forestry 511.

MINOR IN ENVIRONMENTAL POLICY

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

Forestry

GRADUATE COURSES

422 Forest and Wildland Resource Policy (3) Policy formulation; conflict resolution; forest and wildland law and regulation; theory of conflict resolution; formal and informal process. Prereq: Senior standing. S

423 Wildland Recreation Planning and Management (3) Planning processes, master and site planning, site design projects; management strategies, methods of visitor and recreation site management; case studies. Weekend field trips, Prereq: 321, 323, Ornamental Horticulture and Landscape Design 280, or consent of instructor. 2 hrs and 1 lab. Sp

432 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 products. Prereq: Graduate standing and Wood Identification, or consent of instructor. 1 hr and 2 labs. F

434 Wood Processing and Machining (2) Primary log breakdown and secondary processing into major products, Fundamentals of machining technology for major types of cutting operations: sawing, planing, veneer cutting, and laser machining; day field trips. Prereq: Wood Properties and Use and Wood Identification, or consent of instructor. F

435 Wood Drying and Preserving (2) Discussion of wood moisture relationships. Introduction to commercial wood drying equipment and practices. Prereq: Wood Properties and Use and Wood Identification, or consent of instructor. F

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

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. Maximum 2 hrs. S/NC only. E

511 Problem Analysis in Forest Resources (3) Problem identification, analysis and solution in forest resources management. Identify, analyze and prepare written report. Topic and report title must be approved by the 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 enrolled in residence. 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. F/A

530 Advanced Forest Resource Management (3) Analysis of forest management problems as exemplified in public agencies and private firms. Forest organization and computerized regulation systems; financial and operational planning tools, as applied to forest resource management. Prereq: Senior-level forest management or consent of instructor. S/A

540 Genetics in Forestry (3) Genetic improvement of forest resources. Breeding principles and their testing for genetic variability; tree breeding; development of seed orchards; hybridization; tree cytology and tissue culture for genetic variability; and computerized comparison of new and old genotypes. Prereq: Silvicultural methods and Biology 220 or consent of instructor. S/A

550 Recreation Planning for Forests and Associated Lands (3) Planning process for recreation development on forests and associated lands; analysis and critique of specific contemporary alternatives. Overnight field trips. Prereq: Senior level in forest recreation or consent of instructor. F/A

570 Management & Policy of Forest Resource Organization (3) Theory and application of management as applied to natural resource organizations: institutional direction and culture, and strategic management. Development of policy as planning tool and as results from conflict resolution. Linkage between policy development and execution, and structure and management of organizations. Prereq: Forest administration and policy or consent of instructor. F/A

580 Advanced Silviculture (3) Silvicultural characteristics, silvicultural practices and systems applied to commercially important hardwoods and softwoods. In-depth analysis of silvicultural principles involved and tools used, prescribed fire, silvicultural systems, regeneration and management; computer modeling of stand dynamics, structure, growth/yield. Prereq: Undergraduate silviculture course or consent of instructor. F/A or S

581 Hydrotechnics (5) Theoretical and practical aspects of hydropower. Hydrology, water, and power supply; water and power systems; structure and engineering; design and construction of hydraulic structures. Prereq: 311, 313 or consent of instructor. F/A or S

582 Forest Adhesives (3) Adhesive bonding of wood; wood substrate-adhesive interface for bonding; principles of adhesion; wood adhesives; gluing of solid wood and composite wood products. Prereq: Graduate standing and Wood Identification, or consent of instructor. F/A or S
and animals. Prereq: Biology 220 and at least 6 additional hrs in biological sciences. (Same as Botany 581.) S, A.

585 Advanced Forest Biometry (3) Application of sampling techniques to forest inventory, fixed and variable plot sampling, lidar sampling, regression estimators, multiscale and multivariate sampling. Growth and yield predictions for even-aged and uneven-aged forests. Prereq: Land Measurement Techniques and Forest Resources Inventory or consent of instructor. F, A.

590 Advanced Topics in Forestry (1-3) Recent advances and concepts; research techniques and analysis of current problems. Consent of instructor may be repeated. Maximum 6 hrs. E.

593 Independent Study in Forestry (1-4) May be repeated. Maximum 6 hrs. E.

Forestry, Wildlife & Fisheries

GRADUATE COURSES

410 Wildlife Habitat Evaluation and Management (3) Ecological relationships between wildlife and habitat. Evaluation, modeling, and management of wildlife habitat. Effects of land-use practices on wildlife habitat. Weekend field trips. Prereq: Principles of Wildlife and Fisheries Management or General Ecology. Applicable to majors in Forestry and in Wildlife and Fisheries Science. 2 hrs and 1 lab. F.

416 Planning and Management of Forest, Wildlife and Fisheries Resources (3) Integrated forest and wildlife resource management through developing land management plans and analyzing case studies including conflict resolution. Applicable to majors in Forestry and in Wildlife and Fisheries Science. Prereq: Senior standing 1 hr and 2 labs. Sp.

525 Management of Forestry, Wildlife and Fisheries Resources (2) 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. Not available to students in forestry or wildlife and fisheries science, 4 hrs and 1 lab for six weeks. Sp.

535 Environmental Impacts to Natural Ecosystems (3) Current environmental problems impacting natural ecosystems: climate change, acid deposition, air and water pollution, species declines, and introductions of exotic species. Management options and 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. Sp.


Wildlife and Fisheries Science

GRADUATE COURSES

440 Wildlife Techniques (2) Methods of wildlife damage control and ethical wildlife management, identification of wildlife field sign, wildlife capturing techniques and management plan preparation, weekend field trips. Prereq: Principles of Wildlife and Fisheries Management or consent of instructor. 1 hr and 1 lab or field. F.

442 Fisheries Techniques (2) Active and passive sampling techniques for fish and aquatic organisms; population estimation methods; fish handling and transport; food habits analysis; marking and tagging techniques; age determination and incremental growth analysis; stream assessment; equipment and instrumentation usage and maintenance; safety in sampling methods. Weekend field trip. Prereq: Principles of Wildlife and Fisheries Management or consent of instructor. 1 hr and 1 lab or field. F.


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

512 Seminar in Wildlife and Fisheries Science (1) Current developments in wildlife and fisheries science. Required of all graduate students in residence in fall. May be repeated. Maximum 2 hrs. S/NC only. F.

520 Planning and Administration of Fisheries and Wildlife Programs (2) Factors influencing policy and program planning activities of fisheries and wildlife agencies. Decision-making policies, case histories. Sp.

525 Endangered Species Management and Conservation of Biodiversity (2) Status, ecology and management of endangered vertebrates and plant species. Historic aspects, policy implications and philosophical issues surrounding recovery efforts. Approaches to monitor and manage for biodiversity. Prereq: Graduate standing or consent of instructor. Sp.

530 Wildlife Diseases (2) Necropy of birds and mammals. Recognition of various diseases and methods of preparing pathological materials in field and lab. Theoretical and field aspects of recombinant disease; use of computers. Prereq: 1 yr biology, 444 or 445, or consent of instructor. (Same as Environmental Practice 530.) F, A.

540 Predator Ecology (2) Dynamics of terrestrial vertebrate predator populations in human-altered and relatively unrestored environments. Prereq: 444 or 445 or consent of instructor. F, A.

545 Population and Habitat Analysis (2) Detailed characteristics, assumptions, and current technologies for fish and wildlife population analysis. Theoretical and practical aspects of computerized fisheries programs. Prereq: Animal Science 571 or Statistics 538 or consent of instructor. A.

550 Fish Physiology (3) Mechanisms of circulation, excretion, osmoregulation, and acid-base and carbonic acid-base balance of fish and aquatic organisms. Use of computers. Prereq: Animal Science 571 or Statistics 538 or consent of instructor. A.

555 Fish Culture (3) Principles, concepts and techniques of culturing economically important fish and shellfish species. Prereq: 443 or consent of instructor. 2 hrs and 1 lab. Sp.

560 Advanced Topics in Wildlife and Fisheries Science (1-3) Recent advances and concepts, research techniques and analysis of current problems. Prereq:

French

See Romance Languages

Geography

(College of Liberal Arts)

MAJOR

DEGREES

S.M., Ph.D.

Sidney R. Jumper, Head

Professors:
Aiken, Charles S., Ph.D.................Georgia
Bell, Thomas L., Ph.D......................Iowa
Forest, Ronald, Ph.D......................Rutgers
Hammond, E. H. (Emeritus), Ph.D.......California
Jumper, Sidney R. (Liaison), Ph.D......Tennessee
Long, Robert G. (Emeritus), Ph.D.......Wisconsin
Minkel, C. W., Ph.D......................Southeast Missouri
Paludan, C. T. (UTSI), Ph.D............Denver
Pulsipher, Lydia, Ph.D.................Southern Illinois
Ratson, Bruce, Ph.D.....................Northwestern
Schmude, Theodore H., Ph.D...........Minnesota
Willbanks, T. J. (Adjunct), Ph.D...........Arizona

Associate Professors:
Blaing, T. J. (Adjunct), Ph.D.............Wisconsin
Brinkman, Leonard W., Jr., Ph.D.......Brown
Brown, Marilyn (Adjunct), Ph.D........Ohio State
Harden, Carol P., Ph.D..................Colorado
Horn, Sally P., Ph.D.....................California
Rehder, John B., Ph.D...................Louisiana State

Assistant Professors:
Liu, Cheng (Adjunct), Ph.D.............Tennessee
McKeown-ICE, Rosalyn (Adjunct), Ph.D.......Oregon

The department offers the Master of Science and Doctor of Philosophy degrees. The Master's degree emphasizes development of professional competence as a geographer and offers opportunities to gain substantial depth in a concentration or a major technique. An emphasis in geographic information systems is available for students who have appropriate backgrounds in mathematics and computer science. The doctoral program is for those who have demonstrated proficiency in conducting independent research. The department is particularly well-qualified to direct graduate work in location analysis, transportation geography, urban and rural geography, and the geography of the natural environment (especially biogeography, geomorphology, and biological conservation). The faculty is qualified to direct students from a variety of approaches ranging from traditional and humanistic to rigorously analytical and GIS-based.

THE MASTER'S PROGRAM

The department offers the thesis and non-thesis options for the Master of Science. Both options require a minimum of 30 semester hours beyond the completion of a sound undergradu-
ate major program. At least two-thirds of the total hours in the degree program must be at or above the 500 level and must include 501 (at each offering during residency), 504 and 3 semester hours at the 600 level. In the thesis option, 6 hours must be Thesis 500. A final examination is required in both programs.

THE DOCTORAL PROGRAM

The doctorate is a research degree and is granted only to those who demonstrate proficiency in conducting independent research. Students must have a broad foundation and understanding of the discipline; these should have been achieved in a comprehensive Master's program. Course requirements for the degree shall be determined by the student's faculty committee in accordance with specific interests and needs. The program must include 504, 515, 599, 9 hours of 600-level seminars, and (at each offering during residency) 501. A minimum of 12 hours must be earned in related fields outside the department. Competence in cartographic and quantitative techniques is required. Additional tools, including languages, will be required as appropriate to the student's areas of research specialization. Examinations required for admission to candidacy include a written comprehensive; written examinations on two special fields; and a final oral examination on the dissertation proposal. Also required is a final oral examination on the dissertation and on other aspects of the program as determined by the student's doctoral committee.

MINOR IN ENVIRONMENTAL POLICY

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

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The Ph.D. program in Geography is available to residents of the states of Alabama, Arkansas, Mississippi, South Carolina, Virginia, or West Virginia. The Master's program is also available to residents of Texas and Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

411 Computer Mapping and Geographic Information Systems (3) Concepts, management, and presentation of digital data for spatial analysis; cartographic data structures. Prereq: 310 and knowledge of computer languages or consent of instructor. S/NC only.

412 Cartography (3) Cartographic techniques applied to design, compilation, and reproduction of maps and other graphics. Prereq: 310 or consent of instructor, 2 hrs and 1-2 hr lab.

413 Remote Sensing: Types and Applications (3) Principles and uses of remote sensing imagery, digital data, and spectral data; geographic interpretation and mapping techniques. Prereq: 310 or consent of instructor.

415 Quantitative Methods in Geography (3) Geographic application of statistical techniques, point pattern analysis, and analysis of areal units. Prereq: Mathemat-
633 Seminar in Physical Geography (3) Prereq: 533 or consent of instructor. May be repeated. Maximum 6 hrs.
635 Seminar in Biogeography (3) Prereq: 535 or consent of instructor. May be repeated. Maximum 6 hrs.
641 Seminar in Urban Geography (3) Prereq: 541 or consent of instructor. May be repeated. Maximum 6 hrs.
643 Seminar in Rural Geography (3) Prereq: 443 or consent of instructor. May be repeated. Maximum 6 hrs.
649 Seminar in Geography of Transportation (3) Prereq: 549 or consent of instructor. May be repeated. Maximum 6 hrs.
663 Seminar in Geography of the American South (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.
673 Seminar in Geography of Latin America (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.
677 Seminar in Biological Conservation (3) Conduct of original research. Prereq: 577 or consent of instructor. May be repeated. Maximum 6 hrs.

Geological Sciences
(College of Liberal Arts)

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

Harry Y. McSween, Head

Professors:
Broadhead, Thomas W., Ph.D., Iowa
Hatcher, Robert D., Jr. (Distinguished Scientist), Ph.D., Tennessee
Kopp, Otto C., Ph.D., Columbia
Labotka, Theodore C., Ph.D., Caltech
McLaughlin, Robert E. (Emeritus), Ph.D., Tennessee

McSween, Henry Y., Ph.D., Harvard
Misra, Kula C., Ph.D., Western Ontario
Taylor, Lawrence A., Ph.D., Láhíg
Walker, Kenneth R. (Carson Professor), Ph.D., Yale
Walls, James G. (Emeritus), Ph.D.

North Carolina

Associate Professors:
Bolder, Don W., Ph.D., Tennessee
Clark, G. Michael, Ph.D., Penn State
Delcourt, Paul A., Ph.D., Minnesota
Driese, Steven G., Ph.D., Wisconsin
Dunne, William M. (Liaison), Ph.D., Bristol
McKinney, Michael L., Ph.D., Yale
Williams, Richard T. II, Ph.D., VPI&SU

Assistant Professors:
McKay, Larry D., Ph.D., Waterloo
Mora, Claudia I., Ph.D., Wisconsin

The Department of Geological Sciences offers both the M.S. and Ph.D. degrees in Geology. Persons interested in these programs should contact the Director of Graduate Admissions in the department.

For admission, an applicant must provide transcripts of previous university work, two rating forms or letters of recommendation, and GRE scores, including the subject exam in geology (or in another area if geology was not the area of previous university-level concentration). Students are not normally admitted under provisional or non-degree status.

The prerequisite for both degrees is a Bachelor's degree, including coursework in mineralogy, petrology, stratigraphy, paleontology, structural geology, and field geology. One year of coursework in calculus and chemistry and one year of coursework in biology, physics, or statistics are also required. Applicants lacking any of these may be admitted, but the deficiencies must be removed within the first year without graduate credit. Substitutions may also be allowed.

THE MASTER'S PROGRAM

The department offers the thesis option in the Master's program. Graduation requirements successful oral defense of a written thesis and a minimum 3.0 GPA in all graduate coursework. Course requirements are a minimum of 30 semester hours, including:
1. Six hours of Thesis 500.
2. Registration in S55 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 graduate courses, with at least 14 hours at the 500 or 600 level, including at least one course from each of the following groups:
   - Group I: 510, 530, 560, 580
   - Group II: 521, 525, 545, 546, 550, 557, 561
   - Group III: 570, 571, 576, 577
4. Eight hours of additional graduate coursework.

THE DOCTORAL PROGRAM

The prerequisite for the Ph.D. program, in addition to that for the M.S. program, is either a Master's degree in Geology, or a Bachelor's degree plus completion of 9 hours of coursework from the list in #3 above, including one course from each group. These courses may be taken while completing other course requirements.
Graduation requires passing a comprehensive examination, taken no later than the end of the second year, completion of all course requirements with a minimum 3.0 GPA, completion of the language requirement, and successful oral defense of the dissertation.

The comprehensive examination includes both written and oral parts in which the candidate will be tested on his/her knowledge of the area concerning the proposed dissertation and of related fields. The candidate is expected to be conversant in a wide field of geological sciences.

A minimum of 24 hours of graded coursework beyond the Master's degree is required in addition to the 24 hours of Dissertation 600. The coursework includes the sum of 9 hours of 600-level geology courses, 9 hours of 500-level or higher geology courses, and 6 hours of additional graduate courses. Extra-departmental coursework is encouraged.

The student must demonstrate a reading knowledge of a foreign language in which there is a body of geologic literature, as approved by the student's dissertation committee.

GRADUATE COURSES

401 Quantitative Methods in Geology (3) Applications of calculus and differential equations to problems in earth sciences. Examples of diffusion equation in hydrogeology; wave equation in geophysics; mechanical modeling and boundary conditions in structural geology and tectonics.


420 Paleocology (4) Principles of ecological analysis as applied to fossils and fossil assemblages; data collection and interpretation. Laboratory designed to appraise interpretation 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, ecological, and stratigraphic distribution. Prereq: Paleontology or consent of instructor. 2 hrs and 2 1/2 labs.

440 Field Geology (6) Summer field course for advanced undergraduate geology majors and first-year graduate students in geology. Taught off-campus and requires full time of student. Synthesis of major aspects of geological sciences in societal context. Field techniques demonstrated, practiced, and applied to solution of geologic problems. Prereq: Completion of major core courses and consent of instructor.

445 Regional Geology of the United States (3) Evolution of geologic provinces within the U.S. Integration of several types of geologic data. Prereq: 330, 340, 370.

450 Geology Geophysical Exploration (3) A program to develop the skills necessary for the student not otherwise registered during any summer term. Geophysical exploration, including gravity, magnetics, and aeromagnetics. Prereq: 330, 340, 370.


470 Applied Geophysics (3) Basic principles of geophysical exploration and applications to environmental problems. Seismic and electromagnetic methods. Prereq: 6 hours of geology courses numbered above 300. Elements of Physics.

471 Fieldwork in Geophysics (2) Geophysical investigations applied to problems in tectonics, hydrogeology, or environment. Summer field course off-campus. Requires full-time for 2 or more weeks. Prereq: 470 or consent of instructor.

475 Physical and Chemical Systems of the Earth (3) Development of physical earth from solar nebula to present. Formation, composition and evolution of the earth, its crust, mantle, and core. Tides of the earth, its crust, mantle, and core. Interaction of the earth and its crust, mantle, and core. The earth's temperature, historical perspective on major controversies, and problems unresolved today. Prereq: 16 hrs of geology courses numbered 300 and above. 2 hrs and 1 discussion.

490 Principles of Economic Geology (4) Ore-forming processes, classification of mineral deposits, survey of different types of mineral deposits with examples, and their economic significance. Prereq: 310 and 330 or equivalents. Recommended prerequisite: 460. 2 hrs and 2 1/2 labs.

495 Principles of Geohydrology (3) Ground water flow, aquifer analysis, ground water contamination, and ground water management. Prereq: General Geology or equivalent or consent of instructor. General Chemistry or equivalent, and Calculus or equivalent. (Same as Civil Engineering 485).

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

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any summer term who uses University facilities and/or faculty time before degrees is completed. May not be used toward degree requirements. May be repeated. S/N only. E
565 Structure of the Southern and Central Appalachian District (5) Structural development of Southern and Central Appalachians from the Mississippian to the Paleozoic era. Prerequisites: 300 or equivalent. 3 hrs and 1 lab.

566 Geothermal Analysis (3) Collection and treatment of geothermal data using computer and spectrophotometric techniques. Prerequisites: 310 or consent of instructor. 2 hrs and 1 lab.

570 Advanced Structural Geology (4) Current topics in structural geology and tectonics of mountain belts: recent literature. Prerequisites: 370 or equivalent, or consent of instructor. 3 hrs and 1 lab or seminar.

571 Regional Tectonics and Structural Geology (3) Major subdivisions of earth's crust and processes that form them. Comparison of internal structure of mountain chains and how they function in increasing continental crust. Examples from different parts of the world. Prerequisite: Structural geology or consent of instructor.

575 Plate Tectonics and Orogeny (4) Tectonic development of orogenic belts in context of newest aspects of plate tectonic theory: current literature and ongoing research for both modern and ancient examples. Prerequisite: consent of instructor. 3 hrs and 1 seminar.

576 Reflection Seismology (3) Imaging subsurface features using reflected seismic waves. Energy sources, modes of wave propagation, field procedures, computer data processing, and pitfalls. Applications to tectonic and environmental problems. Prerequisite: consent of instructor.

585 Contaminant Hydrogeology (3) Physical transport processes, isotope and groundwater age dating, processes influencing inorganic, organic, and microbial contaminants, sampling and monitoring methods, remediation contaminated ground water, aquifer protection. Prerequisites: 485 or 535, 460 or 561; or Environmental Engineering 553 or equivalent, and consent of instructor.

586 Field and Laboratory Methods in Hydrogeology (5) Research methods. Measurement of hydraulic properties, tracers, sampling and instrumentation, tracer experiments. Formulating hypotheses and research plans. Prerequisite or corequisite: 485 or 535; 585; and consent of instructor.

590 Special Problems in Geology (1-3) Directed study or special topics. Prerequisite: Consent of instructor. May be repeated. Maximum 10 hrs.

591 Foreign Study (1-15) To study abroad for a semester or year. Prerequisites: Approval of department. Maximum 9 hrs.

592 Off-Campus Study (1-15) Study away from campus. Prerequisites: Approval of department. Maximum 9 hrs.

593 Independent Study (1-3) Directed study under consent of instructor. Maximum 3 hrs.

594 Field Problems in Geology (1-2) Literature study and seminars on specific regions of geologic interest, supplemented by field trips. Prerequisites: Consent of instructor. May be repeated. Maximum 8 hrs.

595 Selected Topics in Geology (1) Presentation of graduate, faculty, and visiting scientists research. Registration required each semester except summer for resident full-time graduate students. S/N only.

596 Doctoral Research and Dissertation (3-15) Work numbered 500 and above and 6 hours of Thesis 500.

600 Doctoral Research and Dissertation (3-15) Selected and directed research. May be repeated. Maximum 15 hrs.

620 Seminar in Paleontology (3) May be repeated with consent of department. Maximum 9 hrs.

630 Seminar in Petrology (3) May be repeated with consent of department. Maximum 9 hrs.

640 Seminar in Sedimentary Geology (3) May be repeated with consent of department. Maximum 9 hrs.

650 Seminar in Geomorphology and Quaternary Geology (3) May be repeated with consent of department. Maximum 9 hrs.

660 Seminar in Geochimistry (3) May be repeated with consent of department. Maximum 9 hrs.

670 Seminar in Structural Geology (3) May be repeated with consent of department. Maximum 9 hrs.

675 Seminar in Geophysics (3) Advanced treatment of selected topics in geophysics. Prerequisite: 470 or consent of instructor.

680 Seminar in Economic Geology (3) May be repeated with consent of department. Maximum 9 hrs.

Germanic and Slavic Languages

(College of Liberal Arts)

MAJORS

DEGREES

Germanian and Slavic Languages

German.............................. M.A.

Modern Foreign Languages............. Ph.D.

David E. Lee, Head

Professors:

Falen, James E., Ph.D. .................. Pennsylvania State University

Frisen, Ove, Ph.D. ..................... Indiana University

Kraus, Henry (Emeritus) ............... Ohio State University

Lee, J. C., Ph.D. ...................... Northwestern University

Moser, Beverly, Ph.D. .................. University of Wisconsin

Hochberg, Peter, Ph.D. .................. University of Chicago

The Department of Germanic and Slavic Languages offers two advanced degrees: the Master of Arts in German and the Doctor of Philosophy in Modern Foreign Languages. Inquiries should be addressed to the head of the department.

THE MASTER'S PROGRAM

The department requires a minimum of 30 semester hours including 15 hours of coursework numbered 500 and above and 6 hours of Thesis 500.

THE DOCTORAL PROGRAM

The Ph.D. in Modern Foreign Languages is offered jointly by the Department of Germanic and Slavic Languages and the Department of Romance Languages and requires advanced training in at least two foreign languages.

Admission Requirements

Applicants must have completed a B.A. in any language but do have the equivalent of 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

Candidiates must complete a minimum of 63 semester hours of coursework beyond the Bachelor's degree in addition to 24 hours of doctoral research and dissertation. Two tracks are available.

The coursework for Track I must be distributed as follows: (1) at least 39 hours in the
first concentration; (2) at least 18 hours in the second concentration; and (3) at least 6 hours in a cognate field.

1. First Concentration: French, German, or Spanish. It consists of a minimum of 39 semester hours beyond the Bachelor's degree, distributed as follows:

- A maximum of 6 hours of 400-level classes taken for the M.A. may be applied.
- A minimum of 21 hours at the 500 level (exclusive of 331-32) including French 584(3), German 560 (3), or Spanish 550 (3); German 512 (3), French 512 (3), or Spanish 512 (3); French 515-16 (2,2) or German 520 (3).
- At least 12 hours at the 600 level (exclusive of dissertation hours).

2. Second Concentration: French, German, Italian, Russian, or Spanish (different from the first concentration). It consists of at least 18 hours of courses beyond the Bachelor's degree, at least 12 of which must be at the 500 or 600 level.

3. Cognate Field: Six hours must be in graduate courses numbered 400 and above in a field outside the department of the first concentration but related to the student's principal area of research. If the cognate field is yet a third foreign language, a reading proficiency exam will be administered after completion of the 6 cognate hours by the language section concerned.

- The coursework for Track II must be distributed as follows: (1) at least 45 hours in the first concentration; (2) at least 12 hours in the second concentration; and (3) at least 6 hours in a cognate field.

1. First Concentration: French or Spanish. It consists of 45 semester hours beyond the bachelor's degree, distributed as follows:

- A maximum of 6 hours of 400-level classes taken for the M.A. may be applied.
- A minimum of 27 hours at the 500 level (exclusive of thesis hours) including French 584 (3) or Spanish 550 (3); French 512 (3) or Spanish 512 (3); and French 516 (2) or the appropriate Spanish course.
- At least 12 hours at the 600 level (exclusive of dissertation hours).

2. Second Concentration: French, German, Italian, Russian, or Spanish (different from the first concentration). It consists of at least 12 hours, with a minimum of 3 hours at the 500 level. Students are encouraged to take classes that complement the primary area of expertise in the first concentration, so that this second concentration will be a useful research tool for the dissertation and future professional activities. (Because Track II students will have taken 12 graduate hours instead of 18 hours in the second concentration, they will normally not be eligible to teach that language at Institutions which follow SACS guidelines for college foreign language teaching.)

3. Cognate Field: Six hours must be in courses numbered 400 and above and in a field outside the candidate's first concentration but related to the student's principal area of research. If the cognate field is yet a third foreign language, a reading proficiency exam will be administered after completion of the 6 cognate hours by the language section concerned.

- Additional requirements for both tracks: A student must demonstrate competence in the languages of both the first and second concentrations by taking a test in each language. The test will include reading, writing, listening, and speaking, and should be completed by the time the student reaches 40 hours of study beyond the bachelor's degree. Standardized examinations that may be used for this purpose include applicable portions of the National Teachers Examination, the MLA Examination for Teachers and Advanced Students, or the proficiency standards of the United States Foreign Service Institute (FSI).
- If the student has not chosen a third language as his or her cognate area, basic competence (determined by a reading examination with translation into English administered by the department concerned) in a third language is required. If the student's first and second languages are Romance languages, the third language should be chosen from another language family.

- A comprehensive examination on the language and literature of the first and second concentrations must be passed before the student may be admitted to candidacy. The candidate is required to defend his/her dissertation in an oral examination. Central emphasis is put on the doctoral dissertation as a final test of the candidate's scholarly qualifications.

- Graduate Teaching Assistant in the program should have the opportunity and will be strongly encouraged to instruct at least two foreign languages, subject to staffing needs.

- Doctoral students are strongly encouraged to reside and study abroad and will be assisted in identifying potential sources of financial support (e.g., Fulbright, McClure, Rotary fellowships).

- For additional courses, see Romance Languages.

ACADEMIC COMMON MARKET

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

German

GRADUATE COURSES

331-32 Elements of German for Upper-Division and Graduate Students (3,3) Elements of language, elementary and advanced readings, and a final 10,000 word translation project. Open to graduate students preparing for language examinations, and upper-division students desiring reading knowledge of the language. No credit for students having completed 311-12. May be repeated. Maximum 6 hrs. S/U only.

411-12 Advanced Conversation and Composition (3,3) Prereq: 311-12 or equivalent or consent of department.

420 Selected Topics in German Literature from 1750 to the Present (3) Prereq: 6 hrs of 300-level courses (excluding 311-32 and courses in English translation) or equivalent.

421 German Lyric Poetry (3) Prereq: 6 hrs of 300-level courses (excluding 311-32 and courses in English translation) or equivalent.

422 German Drama (3) Prereq: 6 hrs of 300-level courses (excluding 311-32 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 German literature since 1750: problems and pitfalls of periodization.

425 Introduction to Descriptive Linguistics (3) (Same as French 425, Spanish 425, Linguistics 425, and Russian 425.)

426 Methods of Historical Linguistics (3) Phonetics, distinctive feature analysis, sound change types, nature of sound change, principles of reconstruction, and fundamental assumptions about language change through time. Survey of non-phonological linguistic change, language families, Proto-Indo-European, and other proto languages. Prereq: 6 hrs of upper division foreign language courses (excluding courses in translation or graduate reading courses). (Same as Linguistics 426.)

435 Structure of the German Language (3) Contrastive English-Germanianal and suprasegmental phonemes, contrastive English-German linguistic structures, selected topics in advanced German grammar and syntactic analysis. Prereq: 6 hrs of upper division German language courses (excluding courses in translation or graduate reading courses). (Same as Linguistics 435.)

436 History of the German Language (3) Development of German language from Indo-European through Proto-Germanic, Old High German, Middle High German to New High German. Internal and external linguistic history of German speech. Prereq: 6 hrs of upper division German language courses (excluding courses in translation or graduate reading courses). (Same as Linguistics 436.)

485 Business German (3) Survey of German used in fields of business, government, administration, and economics. Prereq: 6 hrs of upper-division German excluding courses in translation and graduate courses.

500 Thesis (1-15) S/U only. E 502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/U only. 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 excuses by department.

519 Bibliographical Methods (1) Bibliographical methods, major reference works and bibliographical problems in language and literature.

520 Proseminar (2) Advanced training in use of bibliographical and reference tools; illustrative problems; paper preparation.

541-42 Medieval German Language and Literature (3,3) 541—Introduction to Middle High German; 542—Readings in Medieval German Literature.

550 Studies in German Literature (3) Content varies. May be repeated. Maximum 6 hrs.

551 German Humanism, Reformation and Baroque (3) Content varies. May be repeated. Maximum 6 hrs.

552 German Enlightenment, Rococo, and Sturm und Drang (3) Content varies. May be repeated. Maximum 6 hrs.

553 German Classicism and Romanticism (3) Content varies. May be repeated. Maximum 6 hrs.

554 German Realism and Naturalism (3) Content varies. May be repeated. Maximum 6 hrs.

555 Modern German Literature 1890-1945 (3) Content varies. May be repeated. Maximum 6 hrs.
Health, Leisure, and Safety

(English Department)

556 Modern German Literature 1945-Present (3) Content varies. May be repeated. Maximum 6 hrs.
560 German Literary Theory and Criticism (3)
551-62 Directed Readings in German and English Literature (3,3)
571-72 Old Norse Language and Literature (3,3)
591 Foreign Study (See College of Liberal Arts)
592 Off-Campus Study (See College of Liberal Arts)
593 Independent Study (1-15) See College of Liberal Arts
600 Doctoral Research and Dissertation (3-15) P/NP only.

610 Gothic (3) Phonology, morphology, and syntax of Gothic language. Relationship to Indo-European languages and other Germanic languages. Readings from Gothic Bible.
611 Old High German (3) Phonology, morphology, and syntax of Old High German. Representative readings.
621-22 Seminar in German Literature (3,3) May be repeated. Maximum 18 hrs.
631-32 Seminar in German and Germanic Philology (3,3)

Russian

GRADUATE COURSES

425 Introduction to Descriptive Linguistics (3) Same as French 425, German 425, Spanish 425, and Linguistics 425.
426 Methods of Historical Linguistics (3) Same as French 426, German 426, Spanish 426, and Linguistics 426.
510 Russian Phonetics and Advanced Grammar (3) Phonetics, pronunciation, stylistics, and selected topics in Russian grammar. For teachers and prospective teachers. Prereq: Consent of instructor.
520 Proseminar (3) Bibliography: methods, illustrative problems, preparation of papers.
521 Works of Dostoevsky in English Translation (3) Crime and Punishment, Brothers Karamazov, and other works. No foreign language credit.
522 Works of Tolstoy in English Translation (3) War and Peace, Anna Karenina, and other works. No foreign language credit.
550 Studies in Russian Literature (3) Content varies. May be repeated. Maximum 9 hrs.
591 Foreign Study (1-15) See College of Liberal Arts.

Health, Leisure, and Safety

(College of Education)

MAJORS DEGREES

Public Health ........................................... M.P.H.
Recreation and Leisure Studies ....................... M.S.
Safety Education and Service ......... M.S., Ed.S.
Health Promotion and Health Education .......... M.S.
Health Education ..................................... Ed.D.
Education ........................................... Ph.D.

Charles B. Hamilton, Head

Professors:

Gorski, June, Dr.P.H. .................... UCLA
Hamilton, Charles B. (Liaison), Dr.P.H. ........ Oklahoma

Hayes, Gene E. (Liaison), Ph.D. ............ North Texas State
Kirk, Robert H., H.S.D. ...................... Indiana
Neuens, James (Adjunct), Ph.D. ............. Illinois
Rickett, Ian R., Ph.D. ......................... Brown
Wallace, Bill C. (Liaison), Ed.D. .............. Northern Colorado

Associate Professors:

Haughton, Betsy (Adjunct), Ed.D. .......... Columbia
Krick, Ken H., Re.D. ......................... Indiana
New, John C., Jr. (Adjunct), D.V.M. Texas A&M
Purser, R., Jack, Ph.D. ....................... Iowa

Assistant Professors:

Aldrich, Tim E. (Adjunct), Ph.D. .......... Texas
Blackmon, James T., Ed.D. ................. Tennessee
Blanton, Mary Dale, Re.D. ................. Tennessee
Ellison, Jack S. (Liaison), Ed.D. .......... Tennessee
Levin, Barbara (Adjunct), M.D. .......... California(San Francisco)
Presley, Velma W., Ed.D. ............... Tennessee
Zemel, Paula C. (Adjunct), Ph.D. .... Wayne State

The Department of Health, Leisure, and Safety offers graduate programs leading to the Master of Science, the Master of Public Health, the Specialist in Education, the Doctor of Education, and the Doctor of Philosophy with a major in Education. Inquiries should be directed to the department head.

Health

Graduate programs are available leading to the Master of Science with a major in Health Promotion and Health Education (thesis and non-thesis options) and to the Doctor of Education with a major in Health Education. The Master of Science, with thesis and non-thesis options, requires completion of 30 semester hours. The Doctor of Philosophy with a major in Education offers a concentration in health education and choice of supporting specializations from public health or safety as listed under Education.

ACADEMIC COMMON MARKET

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

GRADUATE COURSES

400 Consumer Health (3) Survey of major consumer health care providers and health care services; selecting, purchasing, evaluating and financing medical and health care services/products. (Same as Public Health 400) Sp
405 Alcoholism and Alcohol Education (3) Problems of alcoholism. Factors which make alcoholism serious

406 Death, Dying and Bereavement (3) Aspects of dying, death and handling of trauma of loss. Medical, financial, physical, legal and social implications of death. F,Sp
423 Sex Education As It Relates to Human Sexuality (3) Exploration of science of human sexuality. Trends, issues, and content of sex education. E

425 Women's Health (3) Factors influencing women's health and consumer concerns in nation's health service delivery systems. Health problems/concerns of women and techniques for prevention, maintenance and/or correction. (Same as Women's Studies 425) F

430 Suicide and Crisis Intervention (3) Factors which make suicide serious health problem. Assessment, intervention, and prevention techniques. Sp

435 Substance Use and Abuse (3) Drug and alcohol abuse problems and suspected causes. Pharmacology of drugs and effects on society; strategies for intervention and education. Sp

456 Aging and Health (3) Aging process in health perspective as related to health promotion and wellness of aged. F,Sp

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

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

530 Sex Education and Human Sexuality (3) Advanced in-depth discussion of educational and health counseling techniques, techniques, materials used in school, community, or health care facility. Sp

550 Graduate Workshop (1-3) Specific health/wellness or health promotion issues. Special health problems in concentrated period of time. May be repeated. Maximum 12 hrs.

570 Special Topics (1-3) For graduate students, inservice teachers, and other health professionals. Health/wellness or health promotion issues. May be repeated. Maximum 12 hrs.

590 Research Methods in Health (3) Basic research techniques in variety of health settings. Development of research skills and problem identification for research topic. (Same as Public Health 590.) F

593 Directed Independent Studies (1-3) Individual identification and study of health/wellness or health promotion problem/issue. Specific proposal to instructor before registration. May be repeated. Maximum 12 hrs. E

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

601 Internship/Research in Safety and Health (3-5) (Same as Safety 601)

610 Critical Analysis of Writing and Research (3) Analysis of writing and research in health related areas. F

620 Advanced Research Techniques in Health (3) Advanced theory and techniques of research design and methodologies in health discipline. Prereq: 590, 610. Sp

650 Health Aspects of Gerontology (3) Knowledge and understanding of biological, psychological and sociological aspects of aging as related to health and wellness of individual. (Same as Public Health 650) Sp

655 Seminar in Nation's Health (3) Comprehensive study of definition, determinants, resources and health status of nation. (Same as Public Health 655) F
Programs at UT Knoxville on an in-state tuition basis. The M.P.H. program in Public Health is available to residents of the states of Arkansas, Florida, Kentucky, Louisiana, or Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

**Graduate Courses**

400 Consumer Health (3) Same as Health 400.

410 Health in the Work Environment (3) Fundamental activities in field of industrial hygiene aimed at reducing health problems for employees. Worksite health hazards and problems of concern to nurses, medical staff, management, employees and others in industrial health and safety fields. Approval of instructor. May not be taken for credit by occupational health concentration majors.

480 Special Topics (3) Prereq: Consent of instructor. May be repeated. Maximum 3 hrs.

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

523 Management in Extended Care Settings (3) Managerial concepts and theoretical foundations essential to supervision and administration of domiciliary health services programs. Management and operation of health services programs for patients and clients in settings which provide activities of daily living and special psychosocial environmental needs. Programs for home health services, comprehensive medical rehabilitation, nursing homes, congregate living centers and similar type health programs. Prereq: 521 or consent of instructor. F.

525 Financial Management of Health Programs (3) Financial management concepts and practices applied to health services programs. Fundamentals of budgeting, costing, financing, rate setting, financial reporting and control. Opportunities to apply techniques. Prereq: 520 or consent of instructor. Sp

530 Biostatistics (3) Application of descriptive and inferential statistical methods to health-related problems and programs. Microcomputers, applications, use and interpretation of vital statistics and introductory research methodology, preparation for first course in epidemiology. Prereq: Introductory statistics or consent of instructor. F

540 Principles of Epidemiology (3) Distribution and determinants of health-related outcomes in specified populations, with application to control of health problems. Historical origins of discipline, hypothesis formulation, research design, data analysis, measures of frequency and association, etiologic reasoning, disease screening, and injury control. Prereq or coreq: 530. F, Sp


550 Principles and Practices of Community Health Education (3) Theoretical foundations for community health education; opportunities for skill development in variety of educational processes, and introduction to community health analysis. F

552 Community Health Problem Solving (4) Dynamics of community organization, community needs assessment, educational interventions, and application of program planning and evaluation techniques. Opportunity to practice skills in realistic setting. Prereq: 550 or consent of instructor. Sp


560 Theories and Techniques in Health Planning (4) Overview of health planning concepts and methodologies, systems planning, planning elements of planning: formulation and conceptualization of problem, planning, evaluation and implementation. Health planning concepts, comprehensive local populations, appropriate design, and programs for addressing needs. Sp

562 Group Processes in Health Planning (3) Application of group process techniques used in health planning. Techniques of group processes, role playing, and techniques to encourage innovation and creativity in health planning groups. Su
Recreation and Leisure Studies

Graduate study with a major in Recreation and Leisure Studies leads to the Master of Science. Professional preparation concentrations are available in therapeutic recreation, general recreation, and sport administration/management. The third concentration is an interdisciplinary program with the department of Human Performance and Sport Studies.

The M.S., with thesis and non-thesis options, requires completion of 32 semester hours.

The following retention policy applies to graduate students seeking the M.S. with a concentration in sport administration/management:

1. Graduate students are required to maintain an overall 3.0 GPA.
2. Any student who falls below this standard will be advised in writing by the department head of the need to discuss the matter with his/her advisor.
3. If a student's overall GPA remains below 3.0 for a second semester, the student will have his/her degree status revoked.

GRADUATE COURSES

410 Maintenance and Management of Recreation and Sports Related Facilities (3) Principles for operationalizing modern facility maintenance systems and management strategies. Cost tracking, inventory systems, specialized maintenance techniques, safety guidelines, emergency management systems and security. Prereq: 110, 310 or consent of instructor. F

430 Organization and Administration of Leisure Services (3) Principles of administration applied to provision of leisure services offered by public, private and/or commercial entities. Organizational structures, personnel management, evaluation, legal authority, introduction to budgeting and fiscal procedures. Prereq: 310 or consent of instructor. F

440 Dimensions of Private and Commercial Recreation Businesses (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. Prereq: 110, 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

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

590 Special Topics (1-3) Advanced study in selected areas. May be repeated. Maximum 12 hrs. E

592 Special Topics in Recreation & Leisure Studies (1-6) May be repeated. Maximum 6 hrs. E

593 Directed Independent Study (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

594 Research Methods in Health (3) (Same as Health 560.)

595 Seminar in Gerontology (1) (Same as Human Ecology 558, Educational and Counseling Psychology 555, Nursing 525, Human Performance and Sport Studies 555, Psychology 585, Social Work 585, and Sociology 585.)

587-88-89 Internship (3,3,3) Internship (community health education, health planning/administration, or occupational/environmental health and safety) in either approved organizational or research setting under supervision of designated preceptor. Prereq: MPH major, one semester of training in the field, and approval of advisor. 595; available only for approved extended placements. S/NC only. E

600 International Health (3) (Same as Health 660.)

650 Health Aspects of Gerontology (3) (Same as Human Ecology 560.)

655 Seminar in Nation's Health (3) (Same as Health 655.)

660 International Health (3) (Same as Health 660.)

Safety

Graduate programs are available leading to the Master of Science with a major in Safety Education and Service (thesis and non-thesis options) and to the Specialist in Education with a major in Safety Education and Service.

The M.S., with thesis and non-thesis options, requires completion of 30 semester hours.

The Specialist in Education (Ed.S.) requires 30 semester hours beyond the M.S. An internship and research of a significant safety problem are included as professional development activities.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. and Ed.S. programs in Safety Education and Service are available to residents of the states of Alabama, Arkansas, Florida, or South Carolina. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

441 Driver and Traffic Safety Education (4) Preparation of traffic safety instructors for school, colleges, industry and commercial agencies. Students required to teach at least two non-drivers to drive. Valid driver's license required. 3 hrs and 2 labs.

442 Advanced Driver & Traffic Safety Education (3) Development of competence in teaching of driver education through use of simulation, multimedia, and multiple car driving range. Teaching skills and supervision, 2 hrs and 2 labs.

443 Sports & Recreational Safety (3) Accident prevention and injury control in sports activities; philosophy of sports safety; human environmental factors and interactions in sports injury control; risk-taking and decision solving strategies; and contributions of sports medicine to safety. 3 hrs and 2 labs. Sp

452 General Safety (3) Principles, practices, and procedures in general safety. Safety problems in schools, traffic, recreation, industry, home and other public areas. F

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

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

535 Problems and Research in Accident Prevention (3) Safety practices found in wide variety of accidents that occur in community; findings of current research in behavioral sciences as related to variation of accidents. F

534 Organization, Administration and Supervision of Safety Programs (3) National, state and local level programs; administrative, instructional, and supervisory aspects. Implementation of relevant programs. Sp

535 Emergency Management (3) Civil and defense problems: tornadoes, floods, fires, mass civil disorders, and nuclear and personnel attack by alien countries. Sp

572 Graduate Workshop in Safety (3) Special safety education problems. For advanced graduate students, teachers, supervisors, and administrators. May be repeated. Maximum 12 hrs.

590 Special Topics (1-3) Advanced study in selected disciplinary or professional area of safety education/management. May be repeated. Maximum 12 hrs.

593 Directed Independent Study (1-3) Individual identification and study of problem/issue in safety. Extensive reading and critical analysis of safety literature. Specific proposal to instructor before registration. May be repeated. Maximum 12 hrs. Sp

601 Internship/Research in Safety and Health (3-6) Field experience. Significant problem identified, researched, and reported in acceptable form. May be repeated. Maximum 6 hrs. (Same as Health 601.) E
History
(College of Liberal Arts)

MAJOR

DEGREES

History ........................................ M.A., Ph.D.

Russell Buhite, Head

Professors:
Bergeron, Paul H., Ph.D. .................. Vanderbilt
Buhite, Russell Ph.D., Michigan State
Chmielewski, Edward V., Ph.D. ........... Harvard
Cobb, James C., Ph.D. ......................... Georgia
Finger, John R., Ph.D. ...................... Washington
Graf, Leroy P. (Emeritus) (Distinguished Prof.), Ph.D. ................... Harvard
Haas, Arthur G., Ph.D. ..................... Chicago
Hao, Yen-Ping, Ph.D. ....................... Harvard
Haskins, Ralph W. (Emeritus), Ph.D. .... California
Jackson, Charles O., Ph.D. .............. Emory
Klein, Milton M. (Emeritus) (Distinguished Prof.), Ph.D. ................... California
McDonald, Michael J., Ph.D. ............ Pennsylvania
Wheeler, W. Bruce, Ph.D. ................. Virginia

Associate Professors:
Becker, Susan D., Ph.D. .................. Case Western
Bing, J. Danieli, Ph.D. ..................... Indiana
Boohstedt, John, Ph.D. .................. Harvard
Farris, W. Wayne, Ph.D. ................... Harvard
Fleming, Cynthia F., Ph.D. ............... Duke
Johnson, Charles W., Ph.D. .............. Michigan
Miodowny, John, Ph.D. .................... Yale
Pinckey, Paul J., Ph.D. ................... Vanderbilt
Utey, Jonathan Q., Ph.D. ................... Illinois

Assistant Professors:
Brummett, Palmira R. (Liaison), Ph.D. ... Chicago
Burman, Thomas E., Ph.D. ............... Toronto
Diacon, Todd A., Ph.D. ................... Wisconsin
Gavitt, Philip R., Ph.D. ..................... Michigan
Plummer, Betty L., Ph.D. ................. Maryland
Wakeman, Rosemary, Ph.D. .............. California (Davis)

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 I and II fields. Detailed information may be obtained from the Director of Graduate Studies in History who also advises all incoming students.

THE MASTER'S PROGRAM

Admission Requirements

1. Successful completion of a baccalaureate degree from an accredited institution, preferably with a major in history.

2. Acceptable scores on the Graduate Record Examination (general and subject).

General Requirements

Complete 510 and a 600-level research seminar normally during the fall and spring semesters of the first year in the graduate program. Complete 521 in preparation for the M.A. examination. As many as 9 related hours may be taken outside the department. As many as 9 graduate credits taken elsewhere may be applied toward the M.A. degree. Except by prior approval of the Director of Graduate Studies, a student's coursework must be at the 500 level or above.

Thesis Option

Twenty-four hours of coursework and 6 hours of Thesis 500 for a total of 30 hours are required. Thesis students are required to select one M.A. field and write a thesis. At the end of the program the thesis student will stand for a two-hour oral examination on both the thesis and the field.

Non-Thesis Option

A total of 30 hours of coursework is required. At least 6 hours must be completed in each of two M.A. fields. The primary field is examined by a two-hour written examination following within one week by a one-hour oral examination with the single grade of pass/fail given at the conclusion of the oral examination. No examination is given on the secondary field.

M.A. Fields

United States (colonial to present)
Premodern Europe
Modern Europe
Asia
Latin America

Retention and Termination

A 3.0 overall grade-point average is required to remain in good standing. M.A. students must take the M.A. examination no later than the semester following the completion of 30 hours. A student will fail the M.A. examination if the student fails the examination no later than the following semester. A student who fails the examination a second time or does not take the examination when required will be dropped from the graduate program.

THE DOCTORAL PROGRAM

Admission Requirements

1. Successful completion of the M.A. degree from an accredited institution.

2. Acceptable scores on the Graduate Record Examination (general and subject).

Residence and Coursework

Before being admitted to doctoral candidacy, a student must:
1. Complete History 510 at UT Knoxville.
2. Complete a minimum of 6 related hours outside the department.
3. Spend two consecutive semesters in residence.
4. Complete 9 hours in each of two Group I doctoral fields. (The courses in the non-examined field must be graded A-F. There is no minimum hours requirement for a Group II field. Courses taken to fulfill M.A. requirements may be counted toward this requirement.)
5. Fulfill the foreign language requirement.
6. Complete two 600-level research seminars. (One must be completed at UT Knoxville.) Students who have completed a Master's thesis need complete only one research seminar (must be taken at UT Knoxville), and History 621.
7. Maintain a 3.0 overall grade-point average in graduate work attempted.
8. Complete 21 hours of graduate coursework graded A-F at UT Knoxville beyond that required for the M.A.
9. Except by prior approval of the Director of Graduate Studies, a student's coursework must be at the 500 level or above.

Language Requirements

Students must demonstrate competence in one foreign language through coursework or examination. The student's doctoral committee may specify any other languages or research tools, such as statistics, essential for the student's preparation. The foreign language requirement must be fulfilled before taking the comprehensive examination.

Comprehensive Examination

The comprehensive examination is to be taken no later than the semester following the term in which the student has completed the residence, coursework, and language requirements. The student stands examination in one field selected from Group I and a field selected from Group II below. A student who fails any part of the examination must repeat it no later than the following semester. A student who fails the examination a second time or does not take the examination when required will be dropped from the graduate program. A student will be allowed only one failure on the examination. A second failure, no matter on which part of the examination, will result in termination from the program. Upon successful completion of the residence, coursework, and language requirements and passing the comprehensive examination, a doctoral student may be admitted to candidacy.

Doctoral Fields

Group I:
Premodern Europe
Modern Europe
Asian

Group II:
To be defined by the student's doctoral committee from one of the following fields:
Political (U.S.)
Socio-Economic
Military/International Relations
Regional/Local (U.S.)
National/Regional (Non-U.S.)

Dissertation and Defense

Original research forms the basis for the dissertation. Doctoral candidates must register for a minimum of 3 hours of 600 Dissertation Research each semester and must complete 24 hours of dissertation credit. A final oral defense is given on the dissertation in its historical context. The program must be completed within eight years from admission as a potential candidate.

GRADUATE COURSES

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

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

510 Foundations to Graduate Study in History (3) Assumptions and methods of historians. Required of all candidates for advanced degrees. F.
521 M.A. Readings (3) Directed readings in preparation for M.A. examinations. Open only to Master's candidates in history. May be repeated. Maximum 6 hrs. S/N/C only.


532 Topics in Modern Europe (3) Reading seminar: secondary sources on movements and trends that are multinational in focus. Focus varies. May be repeated. Maximum 15 hrs.

533 Topics in European National History (3) Reading seminar: secondary sources on Intra-national topics, usually British, Russian, German or French. Focus varies. May be repeated. Maximum 15 hrs.

541 Topics in Early American History (3) Reading seminar: secondary sources on early North American history. Focus varies. May be repeated. Maximum 15 hrs.

542 Topics in 19th- and 20th-Century United States (3) Reading seminar: secondary sources on 19th- and 20th-century United States. Focus varies. May be repeated. Maximum 15 hrs.

551 Topics in the History of Foreign Relations (3) Reading seminar: secondary sources on foreign relations. Focus varies. May be repeated. Maximum 15 hrs.

552 Topics in Military History (3) Reading seminar: secondary sources on military history; military operations, social impact of war and naval strategy in foreign policy. May be repeated. Maximum 15 hrs.

555 Topics in United States Social and Economic History (3) Reading seminar: secondary sources on U.S. social and economic history. Focus varies. May be repeated. Maximum 15 hrs.

556 Topics in European Social and Economic History (3) Reading seminar: secondary sources on social or economic history of European nations. Focus varies. May be repeated. Maximum 15 hrs.

557 Topics in Cultural and Intellectual History (3) Reading seminar: secondary sources on cultural and intellectual history. Focus varies. May be repeated. Maximum 15 hrs.

558 Topics in United States Regional and Local History (3) Reading seminar: secondary sources on regions, states and cities of the South. Focus varies. May be repeated. Maximum 15 hrs.

559 Topics in Latin American History (3) Reading seminar: secondary sources in Latin America. Focus varies. May be repeated. Maximum 15 hrs.

561 Topics in the History of Foreign Relations (3) Reading seminar: secondary sources on foreign relations. Focus varies. May be repeated. Maximum 15 hrs.

562 Topics in Asian History (3) Reading seminar: secondary sources on Asian history; East Asia and Middle East. Focus varies. May be repeated. Maximum 15 hrs.

571 Historical Editing (3) Seminar to develop practical skills applicable to historical editing.

580 Topics in History (3) Reading seminar: secondary sources for new topics. Focus varies. May be repeated. Maximum 15 hrs.

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

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

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

600 Doctoral Research and Dissertation (3-15) Prereq: Consent of instructor. May be repeated. S/N/C only.

621 Directed Readings (3) Directed readings to prepare candidate for doctoral comprehensive examination. May be repeated. Maximum 1 per doctoral field. S/N/C only.

632 Seminar in Modern European History (3) Research seminar in primary sources culminating in scholarly paper in modern European history. Focus varies. May be repeated. Maximum 15 hrs.


651 Seminar in Military and Foreign Relations History (3) Research seminar in primary sources culminating in scholarly paper in military or foreign relations history. Focus varies. Not restricted by national grouping. May be repeated. Maximum 15 hrs.


655 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.

660 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.


651 Seminar in Military and Foreign Relations History (3) Research seminar in primary sources culminating in scholarly paper in military or foreign relations history. Focus varies. Not restricted by national grouping. May be repeated. Maximum 15 hrs.

Home Economics Education

(College of Human Ecology)

MAJOR DEGREE

Home Economics ....................... M.S.

The Master of Science with a major in Home Economics is a college-wide, multidisciplinary program. This degree provides a flexible graduate program for students wishing to pursue in-depth study across subject areas of home economics/human ecology. Teachers, extension personnel, family life educators and other professionals interested in the broad-based areas will find that a diversity of subject matter combinations can be tailored to meet individual needs.

ADMISSION REQUIREMENTS

A completed file for review includes the Graduate School application file, College of Human Ecology application, Graduate Record Examination (GRE) scores for the general section or Miller's Analogy Test (MAT) score, and three Graduated School Rating Forms completed by individuals who can attest to the potential for graduate education. Forms may be obtained from the Dean's Office, College of Human Ecology. The M.S. in Home Economics requires an undergraduate degree in the field of home economics or human ecology.

THE MASTER'S PROGRAM

The M.S. in Home Economics is designed to meet graduate study needs of professionals who work in programs encompassing all areas of home economics. Thesis (33 hours) or non-thesis (36 hours) options are offered. The program includes 6 hours in statistics and/or methodology, 9 hours in program planning, implementation, and evaluation (may be selected from agricultural extension, home economics education, or other courses approved by committee), 3 hours in the integrative nature of home economics (HE 510), and 9 (thesis option) or 12 (non-thesis option) hours in the College of Human Ecology. At least one course is to be from each department in the college. The option thesis requires 6 hours of Thesis 500, and the non-thesis option requires a creative project (3 hours) and 3 hours of approved electives. An oral/written comprehensive examination will be administered at the end of the program.

Human Ecology

(College of Human Ecology)

MAJOR DEGREE

Human Ecology .......................... Ph.D.

Graduate study leading to the Doctor of Philosophy with a major in Human Ecology is available in the Departments of Child and Family Studies, Nutrition, and Textiles, Retailing, and Interior Design. Concentration areas are child development, family studies, nutrition science, textile science, and consumer environments. A major challenge of the doctoral program in Human Ecology is to draw upon the basic research generated from the natural sciences, social sciences, humanities, and the arts, and to provide a holistic perspective that contributes to the improvements of individual and family well being. For example, the physiological chemist may study metabolic-dietary interrelationships and psychologists may study child behavior. But, it is within human ecology that the nutrient needs of the growing child are considered along with the factors that affect the child's acceptance of different foods. Within the College of Human Ecology, research from one discipline is enhanced by encompassing and utilizing the findings of research from other disciplines.
ADMISSION REQUIREMENTS

A completed file for review includes the Graduate School application, College of Human Ecology application, Graduate Record Examination (GRE) scores for the general section, and three Graduate School Rating Forms completed by individuals who can attest to the potential for graduate education. Forms may be obtained from the Dean’s Office, College of Human Ecology.

THE DOCTORAL PROGRAM

The doctorate is a research degree granted only to individuals who demonstrate proficiency in conducting original research. Course requirements for the degree are determined by the student’s faculty committee, based on college and departmental requirements and student needs and interests. The Graduate School sets minimum requirements for the doctoral degree. Additionally, the college has has the following requirements that include:

1. Selection of a concentration and fulfillment of the requirements as directed by the major professor and approved committee;
2. Minimum of 78 semester hours in courses beyond the baccalaureate degree (exclusive of Master’s thesis), including College Professional Seminar in Human Ecology 610, minimum of 9 semester hours of 600-level coursework (not including dissertation), and 24 semester hours of dissertation;
3. Successful completion of written/oral comprehensive examinations as provided by each department’s procedures and the student’s doctoral committee;
4. Original research project, which culminates in a dissertation;

The doctoral committee shall determine whether a reading knowledge of a foreign language is required.

More specific information about the course of study is given under the individual academic units that administer the Ph.D. concentrations.

CONCENTRATION IN CONSUMER ENVIRONMENTS

The consumer environments concentration is designed to be most appropriate for students with interests in retail and consumer sciences, foodservice and lodging administration or interior design.

Requirements are a minimum of 90 hours including:

1. HEED 530.
2. HE 610.
3. HRA 532, ID 570 and RCS 550.
4. HRA 537 or RCS 590 or ID 590 (2 hours).
5. Minimum 9 hours of statistics and research methods.
7. Twenty-four hours of dissertation.
8. Electives for 34 hours approved by the committee. (Students must take at least 18 hours in one of three specialty areas: foodservice and lodging administration, retail and consumer sciences or interior design; including a minimum of 9 hours required at the 600 level.)

MINOR IN GERONTOLOGY

An interdepartmental/interdisciplinary minor in gerontology gives the graduate student an opportunity for combining the knowledge and experience about aging in American society with his/her own major concentration.

Core courses and a practicum are offered by the College of Social Work and selected departments within the colleges of Human Ecology, Education, and Liberal Arts. A cross-listed seminar between contributing programs is designed to integrate experiences from different sources and to demonstrate the multi-faceted nature of working within an aging society.

Declarations 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 at the Dean’s Office, Room 110, Jesse Harris Building.

Core Experience

Students must complete a core experience of 12 semester hours taken from at least 3 different departments including nine hours taken from outside the department. Coursework must be offered in a regular basis and is offered in the Fall or Spring semesters.

1. Coursework 9 hours: Required. A variety of coursework may be taken toward satisfaction of this requirement. Courses which are offered on a regular basis include: Health 406, 465, Health/Public Health 650, Interior Design 675, Nutrition 518, Public Health 523, Social Work 565, Sociology 415, Technological & Adult Education 522, 513.
2. Applied practicum. Two hours required. Students should register under practicum experiences in the “Home department” of the supervising faculty.
4. Successful completion of written comprehensive exams covering subject material of the minor.

Graduate Committee

At least one faculty member from the Gerontology Policy Committee who is qualified to work with graduate students, must serve on the graduate committee of each student who declares a gerontology minor. Contact Dr. Jim Moran, Associate Dean in Human Ecology, for a current list.

Admission to Candidacy

When application is made for admission to candidacy, the candidate may 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, Arkansas, Kentucky, Louisiana, Mississippi, South Carolina, Virginia or West Virginia. Additional information may be obtained from the Graduates Admissions and Records.

GRADUATE COURSES

500 Thesis (1-15) S/N only. E
501 Microcomputer Research Applications in Human Ecology (3) Advanced microcomputer concepts and applications for research. Overview of statistical analysis software, computer graphics, computer-assisted design and field data base searches.

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 Integrative Nature of Home Economics (3) History and philosophy of home economics. Analysis of current programs and future directions in field. Examination of research, integrative framework, F.A

520 Directed Study in Human Ecology (1-3) Integrative topics. Prereq: At least 9 hrs of graduate study in college including courses from at least two departments or consent of instructor. May be repeated. Maximum 6 hrs. E

525 Practicum in Human Economics (1-6) Field based experiences. Prereq: Consent of instructor. E

530 College Teaching in Human Ecology (3) Instructional effectiveness, techniques, organization, and evaluation. Prereq: Consent of instructor. E

565 Seminar in Gerontology (1) Scope of gerontology as discipline and as related to other academic and professional disciplines. Speakers both internal and external to UTK. Prereq: Consent of instructor. May be repeated. Maximum 3 hrs. S

575 Seminar in Gerontology (1) Scope of gerontology as discipline and as related to other academic and professional disciplines. Speakers both internal and external to UTK. Prereq: Consent of instructor. May be repeated. Maximum 3 hrs. S

585 Seminar in Gerontology (1) Scope of gerontology as discipline and as related to other academic and professional disciplines. Speakers both internal and external to UTK. Prereq: Consent of instructor. May be repeated. Maximum 3 hrs. S


Human Performance and Sport Studies

(Majors of Education)

MAJORS

DEGREES

Human Performance and Sport Studies ................................................................. M.S., Ed.D.
Education ........................................................................................................ Ph.D.

Joan Paul, Head

Professors:

Capen, Edward K. (Emeritus), Ph.D. ................................................................. Iowa
Howley, Edward T., Ph.D. ............................................................................... Wisconsin
Kozar, Andrew J. (University Prof.), Ph.D. ......................................................... Michigan
Lay, Nancy E., Ph.D. ..................................................................................... Florida State
Liemohn, W. P., Ph.D. ................................................................................... Iowa
Mead, B. J., Ph.D. ........................................................................................... Purdue
Morgan, W. J., Ph.D. ...................................................................................... Minnesota
Paul, Joan (Liaison), Ed.D. ........................................................................... Alabama
Phillips, Madge M. (Emeritus), Ph.D. .............................................................. Iowa
Watson, Helen B. (Emeritus), Ph.D. ................................................................. Michigan
Wirsig, C. A., Ph.D. ....................................................................................... Michigan

Associate Professors:

Bassett, David R., Jr., Ph.D. .............................................................................. Wisconsin
Beitel, Patricia A., Ed.D. ............................................................................... North Carolina (Greensboro)
DeSensi, J. T., Ed.D. ...................................................................................... North Carolina (Greensboro)
Jones, Ralph E., Ph.D. ................................................................................... Toledo
Kelley, D. R., Ed.D. ........................................................................................ Georgia State
Namey, Thomas, M.D. .................................................................................. Washington (St. Louis)
The following retention policy applies to all graduate students seeking a degree in the Department of Human Performance and Sport Studies:

1. Graduate students are required to maintain an overall 3.0 GPA.
2. Any student who falls below this standard will be advised in writing by the department head of the need to discuss the matter with his/her advisor.
3. If a student's overall GPA remains below 3.0 for a second semester, the student will have his/her major status revoked.

**MINOR IN GERONTOLOGY**

Graduate students in the Department of Human Performance and Sport Studies may pursue a specialized minor in gerontology. This interdisciplinary/interdisciplinary minor offers the student an opportunity for combining the knowledge about aging in American society with his/her major concentration. Please refer to Human Ecology for specific requirements.

**GRADUATE ASSISTANTSHIPS**

A limited number of graduate assistantships are available for qualified women and men who are graduates of accredited colleges or universities. The 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, Department of Human Performance and Sport 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 Master's program in Human Performance and Sport Studies is available to residents of Georgia and Mississippi (non-thesis program only). Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

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**Human Performance and Sport Studies**

**GRADUATE COURSES**

405 Sociology of Sport (3) (Same as Sociology 405)
411 Advanced Physical Education (3) Developmental disabilities, those with exceptional/handicapped and/or special education needs
423 Readings in Physical Education (2) Review of current and classic literature in physical education
480 Physiology of Exercise (3) Functions of body in muscular work, physiological aspects of fatigue, training and adaptation to environment. Prereq: Human Physiology or general physiology. 2 hrs and 1 lab. (Same as Zoology 480)
500 Thesis (1-15) P/NP only. E
501 Special Project (3) Culminating experience for non-major. Field study suitable for publication or practical research requiring special written work. Prereq: 532
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. SNC only. E
509 Graduate Seminar in Public Health (1) (Same as Public Health 509, Nutrition 509, Nursing 509 and Social Work 509)
511 Administrative/Supervisory Processes in Physical Education (3) Organizational concepts, management strategies, and supervision related to physical education programs at all levels.
512 Application of Theory to Curricular/Methodological Decision in Physical Education (3) Application of current principles and theories to educational situations for development of curricular and instructional programs. Various methodological approaches.
514 Advanced Philosophy of Sport (3) Major philosophical theories of sport. Various conceptual, moral, aesthetic, and social-political issues.
515 Social Theories of Sport (3) Liberal, democratic and Marxist social theories of sport. (Same as Sociology 594)
528 Motor Behavior: A Theoretical Perspective (3) Motor behavior from information processing perspective: overview of current research that supports theoretical bases. Problems: Undergraduate course in general psychology or consent of instructor.
531 Biomechanics of Human Performance (3) Human movement; teaching, coaching and sports medicine. Prereq: 422 or equivalent.
532 Seminar in Research Techniques in Physical Education (3) Evaluates, compares, and contrasts research techniques in physical education with consideration for and experiences in appropriate research design, and analysis procedures, and proposal development.
533 Psychology of Sport (3) Social psychological factors influencing human behavior in sport context; discussion of contemporary theory, research, and methodology. Prereq: General psychology course or consent of instructor.
534 Motor Behavior and Skill Acquisition (3) Topical explanation and application of principles of human movement behavior to acquisition and performance of skills; discussion of current research and methodology.
535 Sport Administration (3) Development of knowledge and analytic skills desirable for middle and upper level managers/administrators in sport business organization.
541 Special Topics (1-3) Advanced study in selected disciplinary or professional areas of physical education and sport. May be repeated.
542 Sociological Aspects of Sport and Physical Education (3) Social and psychological factors influencing sport and physical education. Pertinent issues and research applications. Prereq: Consent of instructor. (Same as Sociology 542)
543 Human Motor Development (3) Changes in selected motor performance and related attributes during developmental period of childhood and adolescence. Prereq: 111
544 Theories of Physical/Movement Education (3) Integration of various theoretical approaches to physical education/movement education within cultural context; research and field work.
553 Advanced Adapted Physical Education (2) Curriculum development and teaching methodologies in programming for children with special education needs. Prereq: 411 or consent of instructor. Coreq: 554
554 Advanced Adapted Physical Education Practicum (1) Curricula and methodologies implemented in lab in school for handicapped. Coreq: 553
555 Motor Assessment and Programming for the Child with Special Education Needs (3) Criticism and norm-referenced tests used in development of individualized education programs for children with special physical education/motor development needs. Testing protocols which permit an assessment at base line which may just measure symptoms of dysfunction; efficacy of remediation theories based on related to testing protocols. Evaluation of motor skill in exceptional children and
development of remedial programs for children assessed appropriate for school/parent implementation.

563 Laboratory Techniques in Exercise Physiology (3) Laboratory course in experimental methodology and instrumentation: respiratory and metabolic measurements, blood chemistry, and gas analysis. Prereq: 480. S/NC or letter grade.

565 Advanced Physiology of Exercise (3) Quantitative approach to current and classical questions in exercise physiology. Prereq: 480 and 565.

567 Exercise Testing and Prescription (3) Physiological adaptations to exercise training, measurement and evaluation of cardiorespiratory function, body composition, strength, and flexibility. Prereq: Undergraduate courses in human physiology and physical exercise.

568 Physical Activity and Positive Health (3) Review of clinical, epidemiological, and experimental evidence concerning relationships and effects of exercises on health-related components of fitness. Prereq: Elementary statistics, 480 and 414/415 or equivalents. Coreq: 569. (Same as Public Health 568.)

569 Fitness Testing, Programming, and Leadership for Diverse Populations (2) Clinical experience in selecting, administering, and evaluating exercise tolerance tests on cycle ergometer and treadmill. Individual fitness programs for diverse populations. Practice in leading various activities aimed at improved fitness. Prereq: 480 and 414/415. Coreq: 569. (Same as Public Health 569.)

585 Seminar in Gerontology (1) (Same as Human Ecology 585, Educational and Counseling Psychology 585, Nursing 585, Psychology 585, Public Health 585, Social Work 585, and Sociology 585.)

593 Directed Independent Studies (1-3) May be repeated. Prereq: 592 or consent of instructor. S/NC only.

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

601 Research Seminar in Physical Education (1) Research topics in different aspects of physical education, sport, and human movement. May be repeated. S/NC only.

622 Directed Independent Research (3-6) Prereq: Doctoral student or consent of instructor. May be repeated. S/NC or letter grade.

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

661 Seminar in Exercise and Applied Physiology (1) Selected topics in exercise and environmental physiology. Prereq: 563 and 565. May be repeated with consent of instructor.

684 Research Participation in Applied Physiology (1-6) Participation in research activity whose interests coincide with those of student. S/NC only.

681 Practicum (1-3) Intern experience in areas of major interest. May be repeated.

The Master's and doctoral programs are offered jointly by the Department of Psychology and the Department of Management. They are designed to prepare students for personnel, managerial, and organizational research; for university teaching; and for consulting relationships with industry. The program emphasizes a scientist/practitioner model in applying and conducting research based on accepted theory, organizational behavior, psychology, management, and statistics. The programs are administered by a joint committee of the two departments, appointed by the Associate Vice Chancellor and Dean of The Graduate School on recommendations from the two department heads and the program director.

It is intended that students entering the I/O Program will represent widely different undergraduate and graduate backgrounds including psychology, business administration, engineering, science, and liberal arts. The first-year program provides the opportunity to take courses that will assist the students in attaining a reasonable level of sophistication in areas of deficiency.

ADMISSION REQUIREMENTS

Applicants for admission should request information and application forms from both The Graduate School and the Director, Industrial and Organizational Psychology Program, 406 Stokely Management Center, 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. Two separate applications must be received by the Graduate Admissions and Records Office by February 1.

General Requirements

At least one year of college mathematics and one course in statistics are required. Ordinarily, an undergraduate grade point average of 3.0 or above is required with no evidence of special weakness in mathematics and physical sciences.

Test scores on each section of the general portion (verbal and quantitative) of the Graduate Record Examination (GRE) are required. Customarily, those students admitted to the program have performed at or above the 69th percentile on the general tests. (This corresponds to a raw score of approximately 600 on each of the tests.)

THE MASTER'S PROGRAM

A thesis is required with 6 semester hours of Management or Psychology 500. The Master's degree can be completed with a minimum of 33 semester hours in the major as follows: Management 567, 568 or Psychology 517-18; Psychology 557; Statistics 537, 538.

Twelve hours of additional coursework to be selected primarily from the following with the approval of the student's advisor: Management 511, 522, 610; Management/Psychology 625, 626, 627, 638; Psychology 505, 590, 610, 620, 624.

Electives, as approved for an individual's plan of study, may be selected from graduate courses in psychology, social work, sociology, management, education, planning, etc. Students who wish to pursue special research interests aside from their thesis may register for Management 525, 526 (Maximum 6 hrs per term; courses may be repeated) or Management/Psychology 690.

An internship, practicum, or field experience is recommended. A student is expected to be in residence full time one year (two years recommended). A Master's candidate must pass a final oral examination.

In addition to course requirements, a Master's student must complete a comprehensive examination in general psychology within no more than two years by attaining a
score of 530 (or 85th percentile) on the Subject GRE (Psychology-81). An overall "B" average is required in the course sequence Management 567-68 or Psychology 517-18 to continue in the program beyond the first year.

THE DOCTORAL PROGRAM
Any student in the doctoral program may be required to prepare a Master's thesis by the Industrial and Organizational Psychology Committee. This policy will be implemented by the committee at such time as a review of the student's record suggests that additional data on the qualifications for pursuing a Ph.D. are required.

A dissertation is required with a minimum of 24 semester hours of Management or Psychology 600.

The doctoral degree can be completed with a minimum of 54 semester hours in the major as follows:

Management 567-68 or Psychology 517-18, Psychology 557, Statistics 537-38
A minimum of five doctoral seminars (15 hours) selected from: Management 610; Management/Psychology 625, 626, 627, 638; Psychology 620, 624. (Fifteen doctoral seminars are viewed as the absolute minimum; more are recommended. Statistics 671 and Psychology 605 are also recommended.)

Electives, as approved for an individual's plan of study, may be selected from graduate courses in psychology, social work, sociology, management, education, planning, etc. Students who wish to pursue special research interests aside from their dissertation may register for Management 525, 526 (Maximum 6 hrs per term); courses may be repeated or Management/Psychology 690.

An internship, practicum, or field experience is recommended. A student is expected to be in residence full time one year (two years recommended).

Doctoral candidates must pass a final oral examination on their dissertation research. In addition to course requirements, a doctoral student must attain a score of 650 (90th percentile) on the Subject GRE (Psychology-81) within two years of entry, successfully complete the qualifying examination covering scientific methodology before or during the third fall semester, and successfully complete the comprehensive examination in the areas of the student's major research and professional interests.

An overall B average is required in the course sequence Management 567-68 or Psychology 517-18 to continue in the program beyond the first year.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. and Ph.D. programs in Industrial and Organizational Psychology are available to residents of the states of South Carolina or Virginia. The Ph.D. program is also available to residents of Arkansas or Kentucky. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

Industrial Engineering

(College of Engineering)

MAJOR

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<tr>
<th>DEGREE</th>
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<tr>
<td>Industrial Engineering</td>
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<td>C. H. Aikens, Head</td>
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Professors:
Bontadelli, J. A., Ph.D. .......... Ohio State
Claycombe, W. W., PE, Ph.D. .... VPI
DePorter, Elden L., Ph.D. ....... VPI
Douillet, Dan C. (Emeritus), PE, M.S. Tennessee
Emerson, H. P. (Emeritus), PE, S.B. MIT
LaForce, R. M. (Emeritus), PE, M.S.   Georgia Tech
Lovess, Howard L. (Emeritus), PE, M.S.  NC State
Schnitt, Harold W., Ph.D. ........ Texas Snider, John N., PE, Ph.D. .......... Ohio State
Associates Professors:
Aikens, C. H., PE, Ph.D. .......... Tennessee
Hailey, Mark L. (UTS), Ph.D. .... Texas Tech
Hungerford, J. C., Ph.D. .......... Ohio State
Hutchinson, D. H., Ph.D. .......... George Tech
Kirby, K. E., Ph.D. ............... Tennessee
Parkinson, E. L. (UTS), Ph.D. .... Florida

Assistant Professors:
Chatterjee, S., PE, Ph.D. .......... VPI
Goodman, Marvin K. (Emeritus), PE, M.S. Tennessee
Jackson, D. F., Ph.D. ............. Tennessee
Sawhney, Rupi S., Ph.D. .......... Tennessee

The Department of Industrial Engineering offers a graduate program leading to the Master of Science degree with major in Industrial Engineering, concentrations in traditional industrial engineering and engineering management. The Ph.D. with a major in Engineering Science is available through the Department of Engineering Science and Mechanics with a specialization in industrial engineering.

THE MASTER'S PROGRAM

Students who enroll in the Master of Science degree may select a concentration in either industrial engineering or engineering management. Admission is open to graduates of ABET-accredited undergraduate curricula in engineering, or to graduates of other technical curricula who satisfy prerequisites depending on their academic background and industrial experience. 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 24 hours of coursework and 6 hours of thesis. The non-thesis option requires 30 hours of coursework plus a 3-hour industrial design project.

Depending upon a student's background and career objectives, graduate work in industrial engineering enables the student to select an area of specialization from operations research, manufacturing systems, human factors engineering, information systems, quality engineering, or general industrial engineering. It is also possible for a student to select minors in engineering, mathematics, psychology, business, computer science, statistics, or economics.

Engineering Management

The engineering management concentration has an additional graduation requirement of two years' 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 capstone project. This concentration is fully supported off-campus utilizing electronic media for video taping and interactive distance teaching methods.

Note: Any 400-level course required in the Bachelor of Science in Industrial Engineering program at UT Knoxville may not be used for graduate credit in the M.S. degree program.

Industrial Engineering

GRADUATE COURSES

402 Production System Planning and Control (3) Theory and application of forecasting systems, regression and time series models, independent demand inventory models, development of safety stock, coverage of all modules of Manufacturing Resource Planning (MRP) systems: master production scheduling, resource requirements planning, bill of material and inventory file structures, material requirement planning, capacity planning, shop floor and production order control. Overview of just-in-time inventory concepts and MRP's role in manufacturing automation. Prereq: 301.
403 Production Facilities Design and Material Handling (3) Design of production facilities: plant layout, analysis and planning for overall moving, packaging and storage of materials. Office layout and service areas. Design of facilities for such diverse groups as hospitals, banking, industry. Prereq: 302, 401.
405 Engineering Economy (3) Methods and problems in selection or replacement of equipment. Decisions among engineering alternatives involving capital recovery, economic life of equipment, and rate of return on investment.

Industrial Engineering
412 Quantitative Methods in Project Management (3) Project planning, scheduling, and control based on network and precedence diagramming methods. Resource allocation, crashing of the critical path, and cost trade-off algorithms: multi-project control, computer applications, andPERT methods of handling uncertainty in activity time estimates.


421 Informational Systems I (3) Systems engineering approach to design, development, implementation, and evaluation of systems of information. Informational aspects of IE systems. Data structures and database management systems. Prereq: 300 and senior standing.

422 Senior Industrial Engineering Problems Analysis (3) Application of industrial engineering to field assignments in local organizations. Problem definitions, analysis, and presentation. Prereq: 402, 403, and 405.


440 Total Quality Management (3) Philosophy of continuous improvement in organizations; management, implementation issues; definition, identification, and analysis of systems as compared to process analysis and improvement; flowcharts, pareto diagrams, cause and effect diagrams, and seven tools; data collection and control strategies: capability analysis; quality of design; components of variation; measurement issues; issues relevant to cost control and management of quality in short-run environments; use of classical statistical tools; correlation and experimental design to improve system value. Lab. Prereq: Quality Control or consent of instructor.

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

501 Design Project (1-3) Enrollment limited to industrial engineering students. Project and laboratory 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 in which a student is officially registered in classes offered in the 114 Industrial Engineering Department. May not be used toward degree requirements. May be repeated. 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 techniques in large-scale production and distribution. Prereq: Production Facilities Design and Material Handling or consent of instructor.

514 Information Systems II (3) Systems analysis and systems control concepts applied to systems of information. Role of IE in office and factory of future. Management support systems, decision support systems, and integrated support systems.

515 Production and Inventory Systems (3) Deterministic and stochastic inventory models. Use of mathematical programming for production mix, process selection, and production scheduling problems. Application of simple and complex queuing models in manufacturing environment. Prereq: 402 or Engineering Management 537 or consent of instructor.

516 Statistical Methods in Industrial Engineering (3) Application of statistics to industrial engineering problems. Statistics and statistical thinking in managerial context of organizational improvement; descriptive statistics; the relationship between statistical process control techniques and classical statistical tools; parameter estimation and hypothesis testing; analysis of variance; linear regression; correlation; analysis of variance; simple and multiple factor experimental design. Prereq: Probability and Statistics for Scientists and Engineers I or equivalent. (Same as Engineering Management 518.)


518 Advanced Engineering Economy (3) Application of engineering economic analysis in complex decision situations. Inflation and price changes; uncertainty evaluation using nonprobabilistic techniques; credit and discounted cash flow; project allocation and prioritization; replacement, interest, capital recovery, and present worth; income tax effects. Prereq: 520.


521 Human Factors Engineering Methodology (3) Background in methodology used by human factors engineer and systems analyst. Observation and data design and experimental techniques, computerized methods, human reliability and human error prediction, training analysis, evaluation of man-machine interface, subjective and objective techniques, scaling techniques, human factors data and survey design, critical incident technique, consensus and Delphi. Experimental and descriptive human behavior instrumentation, performance measurement, statistical techniques, in experimental design, and expert systems. Prereq: 520.

522 Optimization Methods in Industrial Engineering (3) Classical optimization theory, multidimensional search techniques, Lagrangean relaxation, separable programming, linearization techniques, quadratic programming, and dynamic programming. Prereq: 301 or 537.

523 Linear Programming and Extensions (3) Simplex and interior point methods, linear programming, sensitivity analysis, and post-optimality analysis, use of LP software integer programming, and duality, parametric and parametric programming, sensitivity analysis. Prereq: 301 or 537.


591-92-93 Special Topics in Industrial Engineering (3,3,3) Individual or group research projects. Prereq: Consent of instructor. May be repeated.


603 Dynamic Programming (3) Solving multi-stage optimization problems as sequence of single-stage optimization problems. Control theory and mathematical programming applications. Prereq: 522.


691-92-93 Advanced Topics in Industrial Engineering (3,3,3) Forum to study individually or in groups. Prereq: Graduate standing and consent of instructor. May be repeated with consent of instructor.

**Engineering Management**

**GRADUATE COURSES**

501 Capstone Project (3-6) Application-oriented project to show competence in major academic area. Prereq: Enrollment in engineering management. May be repeated. Maximum 6 hrs. S/NC only.

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester in which a student is officially registered in classes offered in the Industrial Engineering Department. May not be used toward degree requirements. May be repeated. S/NC only.

516 Statistical Methods in Industrial Engineering (3) (Same as Industrial Engineering 518.)

518 Advanced Engineering Economy (3) (Same as Industrial Engineering 518.)

531 Motivation and Culture in Engineering Management (3) Motivational theories and practices to improve individual and organizational capabilities. Success in meeting goals, improving creativity/innovation, and leadership and personal interpersonal skills. Improvements through organizational structure, policies, and work design. Prereq: 533 or consent of instructor.

532 Productivity and Quality Engineering (3) Productivity and quality measures defined and used to analyze current comparative position of important sectors of American industry with respect to national and international competition. Study of management theorists and systems which promote or inhibit productivity or quality improvements.

533 Theory and Practice of Engineering Management (3) Manager's perspective: business definition; strategic planning and management; marketing and competition in global economy; finance; human resources; systems thinking; team building; corporate culture and leadership in new organization; and quality, empowerment, and learning organizations. Principle application to work settings and case studies.


535 Management of Technology (3) Creativity and innovation; incorporation of advanced technology equipment; application of systems thinking; new methods in business and manufacturing organizations; justifying technology; assimilating and managing change; changing management roles; and impacts of new technologies. Prereq: 538 and 516.

536 Project Management (3) Development and management of engineering and technology projects. Project proposal preparation: resource and cost estimating; project planning, organizing, and controlling; network diagrams and other techniques. Role of project manager: team building, conflict resolution, and contract
negotiations. Discussion of typical problems and alternatives. Solutions. Case studies and student projects. Prereq: 537 or consent of instructor.

537 Analytical Methods for Engineering Managers (3) Survey of management analysis and control systems through IE techniques. Qualitative and quantitative systems: methods analysis, work measurement, incentive systems, wage and salary development, production and inventory control, facility layout, linear programming, and applied operations research techniques. Not for credit for students with undergraduate degrees in industrial engineering.

538 New Venture Formation (3) Factors other than mechanical or chemical which enter into successful establishment of manufacturing or service enterprise. Organizational and financial planning and evaluation. Cost and location studies and market analysis to determine commercial feasibility of new ventures. Prereq: 539.

539 Strategic Management in Technical Organizations (3) Strategic planning process and strategic management in practice: corporate vision and mission; product, market, organizational, and financial strategies; external factors: commercialization of new technologies; and competition and beyond. Prereq: 533 and Industrial Engineering 516 or consent of instructor.


541 Total Quality Management and Beyond (3) Continuous improvement in capabilities, competitiveness, and productivity of organizations: Principles of total quality management: systems theory and analysis; performance measurement; and application of statistical techniques in continuous improvement. Team building and leadership issues, and case studies. Prereq: 516.

Interdisciplinary Programs
(College of Liberal Arts)

The College of Liberal Arts offers a series of interdisciplinary undergraduate majors and minors through its Interdisciplinary Programs. These programs include African and African-American Studies, American Studies, Ancient Mediterranean Civilizations, Asian Studies, Cinema Studies, Comparative Literature, Latin American Studies, Linguistics, Medieval Studies, Russian and East European Studies, Urban Studies, and Women's Studies. Certain courses within these programs are available for graduate credit as listed below. See the Undergraduate Catalog for program descriptions and directors.

African and African-American Studies

GRADUATE COURSES


450 Issues and Topics in African-American Studies (3) Problems, topics, issues, and individuals. May be repeated. Maximum 6 hrs.

452 Black African Politics (3) (Same as Political Science 452).

461 African Prehistory (3) (Same as Anthropology 461).


483 African-American Women in American Society (3) Historical and contemporary socio-eco-political factors in American society as related to Black women. (Same as Women's Studies 483.)

492 French Cinema (3) (Same as French 492.)

412 Topics in Italian Literature and Cinema (3) (Same as Italian 421.)

489 Special Topics in Film (3) (Same as English 489.)

Cinema Studies

GRADUATE COURSES

420 French Cinema (3) (Same as French 420.)

421 Topics in Italian Literature and Cinema (3) (Same as Italian 421.)

489 Special Topics in Film (3) (Same as English 489.)

Comparative Literature

GRADUATE COURSES

401-02 Special Topics in Comparative Literature (3, 3) Content varies. May be repeated. Maximum 9 hrs.

Latin American Studies

GRADUATE COURSES

401 Cultural Plurality and Institutional Changes in Latin America (3) Value systems, behavioral patterns, political parties, role of military, church, educational institutions, dictatorship and nationalism.

402 Latin American Studies Seminar (3) Selected topics. May be repeated. Maximum 6 hrs.

Linguistics

GRADUATE COURSES

400 Topics in Linguistics (3) Content varies. May be repeated. Maximum 6 hrs.

411 Linguistic Anthropology (3) (Same as Anthropology 411.)

420 The Development of Historical Linguistics as a Science (3) Cognitive understanding of language change. Emergence of Neogrammarian paradigm from 19th-century intellectual trends. Impact of synchronic, descriptive, structural and transformational-generative linguistics on contemporary diachronic theory. Prereq: 6 hrs of courses required for linguistics concentration or consent of instructor.

425 Introduction to Descriptive Linguistics (3) (Same as French 425, German 425, Russian 425, and Spanish 425.)

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 (1) (Same as English 474.)

475 Teaching English as a Second or Foreign Language II (3) (Same as English 475.)

485 Special Topics in Language (3) (Same as English 485.)

Urban Studies

GRADUATE COURSES

401 The City in the U.S. (3) (Same as Planning 401.)

441 Urban Geography (3) (Same as Geography 441.)

464 Urban Ecology (3) (Same as Sociology 464.)

Women's Studies

GRADUATE COURSES

400 Topics in Women's Studies (3) Content varies. May be repeated.

422 Women Writers in Britain (3) (Same as English 422.)

426 Women's Health (3) (Same as Health 426.)

434 Psychology of Gender (3) (Same as Psychology 434.)

466 Rhetoric of the Woman's Rights Movement to 1930 (3) (Same as Speech Communication 466.)

476 Rhetoric of the Contemporary Feminist Movement (3) (Same as Speech Communication 476.)

485 African-American Women in American Society (3) (Same as African and African-American Studies 485.)

Journalism

(College of Communications)

MAJOR

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

James A. Crook, Director

Professors:

Adamson, June N. (Emeritus), M.S., Tennessee

Ashdown, Paul G., Ph.D. .................................. Bowling Green

Bowie, Dorothy, Ph.D. ................................ ........ Wisconsin

Cade, Doris E. (Emeritus), Ph.D. ....................... Iowa

Crook, James A., Ph.D. ........................................ Iowa

Everett, George A., Ph.D. ........................................ Iowa

Haskins, Jack B. (Emeritus), Ph.D. .................. Minnesota

Lange, John L. (Emeritus), M.A. ......................... Iowa

Leiter, Jr., B. Kelly (Emeritus), Ph.D. .............. Southern Illinois

Littman, Mark, Ph.D. ........................................ Northwestern

Miller, M. Mark, Ph.D. ........................................ Michigan State

Singleton, Michael W., Ph.D. ............... Southern Illinois

Tucker, Willis C. (Emeritus), M.S. .................. Kentucky

Associate Professors:

Caudill, C. Edward, Ph.D. .................. North Carolina

Heller, Robert B., M.A. ................................. Syracuse

Lucarelli, Susan M., Ph.D. .......................... Tennessee

Morrow, Jerry L., Ph.D. .............................. Toledo

Puett, Sammie Lynn, M.S. ....................... Tennessee

472 American English (3) (Same as English 472.)

474 Teaching English as a Second or Foreign Language (1) (Same as English 474.)

475 Teaching English as a Second or Foreign Language II (3) (Same as English 475.)

485 Special Topics in Language (3) (Same as English 485.)
460 Mass Communications History (3) Development and operations of mass communications channels and agencies. Comparative analysis of media, media practices, and flow of news throughout the world. Print and broadcast systems in terms of relevant social, political, economic, and cultural factors. Relation of communications practice to international affairs and understanding. Sp

412 Opinion Writing (3) Analysis of editorial positions, practices, and pages. Writing of editorials and columns for newspapers, magazines, and company publications. Rhetorical devices and use of logic. Prereq: Communications 200, or consent of instructor.

414 Magazine Article Writing (3) Techniques of writing in-depth articles of mass circulation and specialized magazines. Organizing magazine articles, problems in specialized areas: business, science, agriculture, humanities. Prereq: Communications 200, or consent of instructor.

416 Issues in Journalism (3) Topics vary. Prereq: of instructor. May be repeated. Maximum 6 hrs.

420 Print Media Management (3) Current business practices among print news media, especially newspapers. Problems in management and production and outlook for new technologies. Prereq: 6 hrs mathematics and/or accounting and senior standing. Sp

430 Public Affairs Reporting (3) Reporting and writing about courts, governments, and public agencies. Event and issue-oriented journalism of politics and public affairs. Prereq: 360, E.

433 Advanced Editing (3) Sensitivity to language and editing skills. Headline writing, layout, and production. Prereq: 203.

444 Journalism as Literature (3) Study of writers from 17th century to modern era whose works have endured as both journalism and literature. Emerging genre called literary journalism. Analysis of cultural reporting with personal narrative style. Prereq: Consent of instructor.

450 Writing About Science, Technology, and Medicine (3) Writing workshop to analyze examples of successful science writing and write series of articles for general publications based on scientific journals, news conferences, technical meetings, and interviews. Prereq: Consent of instructor. (Same as Library and Information Science 450.) Sp

451 Environmental Reporting (3) Writing for media on such environmental issues as strip-mining, water pollution, air pollution, allergens, nuclear power, fossil fuel power, and solid wastes. Presentations from and interviews of experts in environmental science and reporting. Examples of popular culture in environmental reporting. Prereq: Editing for majors; consent of instructor for non-majors.

455 Issues in Science Communications (3) Topics vary. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

456 Science Writing as Literature (3) Survey of important science writing for general public across spectrum of science, engineering, and medicine. Works by authors such as Arthur C. Clarke, Samuel S. Gould, and Richard Selzer. Analysis of literary qualities in quest to understand why some science writing succeeds. Prereq: Consent of instructor.

460 Mass Communications History (3) Development and operations of mass communications channels and agencies. Comparative analysis of media, media practices, and flow of news throughout the world. Print and broadcast systems in terms of relevant social, political, economic, and cultural factors. Relation of communications practice to international affairs and understanding. Sp

470 Public Relations Campaigns (3) Research, planning and programming, communication and evaluation of public relations campaigns. Oral and written presentation of public relations project from inception to completion. Extensive out-of-class work. Prereq: Public Relations Principles.

480 Journalism in the High School (3) Functions and methods of high school publications. Problems related to staff selection, content of publications, copy, layout, photography, printing, advertising, and business. Prereq: Planning course and curriculum for journalism mass media studies.

490 Advanced Photography (3) Advanced principles and processes of black-and-white photography. Introduction to color photography, news and feature photography and photo essays. Prereq: 290 or consent of instructor.

516 Seminar in Journalism Issues (3) Topics vary. May be repeated. Maximum 6 hrs.


525 Public Opinion (3) Role of press in developing and influencing public consciousness. Social theories of public opinion and analysis of mass media’s response.

535 Publications Management (3) Problems in management, production, marketing, and design. Techniques of writing, editing, and presenting comprehensive articles and other material; regional and specialized magazines. Individual editorial projects. Prereq: 420 or consent of instructor.

550 Writing and Editing Projects (3) Specialized writing or editing reviews, articles for newspapers, magazines, and company publications. Theories of rhetorical devices and use of logic. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

571 Seminar in Public Relations (3) Analysis and management of communication between professionals and organizations and their publics. Measurement and evaluation of effectiveness of communication programs. Prereq: 470 or consent of instructor.

580 Seminar in Visual Communication (3) Behavioral aspects of communication with images. Theories of psychological effect in color, shape, texture, and other design elements. Prereq: 205 or Advertising 350 or Marketing 430 or equivalent.

590 Communications and International Development (3) Relationship between mass communications and development of nations. Role of communications media of developed nations in the Third World regions of the globe. Communications as facilitator of international cooperation.

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

598 Internship (3) Professional work in journalism supervised by editor or manager with faculty approval. No retroactive credit for previous work experience. Prereq: Completion of core curriculum.

Law

(Major in Law)

DEGREES

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

Richard S. Wirtz, Dean

Professors:

Best, Reba, M.L.S. ..................... Florida
Blaze, Douglas A., J.D. ............. Georgia
Cohen, Neil P., LL.M .................. Harvard
Cook, Joseph G., LL.M ............. Yale
Dessew, Lawrence, J.D. .......... Harvard
Gray, R. Macdonald (Emeritus) .... Louisiana
Harden, Patrick, J.D. .............. Chicago
Hess, Amy M., J.D. ................. Virginia

Jones, Durward S. (Emeritus), J.D. .... North Carolina
King, Joseph H., J.D. ............. Pennsylvania
Lacey, Forrest W. (Emeritus), S.J.D. .... Michigan
LeCain, Frederic S., LL.B .......... Duke
Lloyd, Robert M., J.D. .......... Michigan
Miller, Charles H. (Emeritus), J.D. .... Duke
Overton, Elvin E. (Emeritus), S.J.D. .... Harvard
Phillips, Jerry J., J.D. ......... Yale
Picquet, Cheryn, M.S.L.S. ....... Tennessee
Rivkin, Dean H., J.D. .......... Vanderbilt
Sewell, Tom E. (Emeritus), J.D. .... Michigan
Wirtz, Richard S., J.D. ....... Stanford

Associate Professors:

Aarons, Dwight, J.D. ........ UCLA
Anderson, Gary L., LL.M ........... Harvard
Ansfeld, Frances Lee, LL.M ........ Washington
Beitler, William J., J.D. .......... Miami
Black, Jerry P., J.R., J.D. .......... Vanderbilt
Bunker, Mary Garrett, J.D. ....... George Washington
Cornett, Judy M., J.D. .......... Tennessee
Davies, Thomas Y., J.D. .......... Northwestern
Gray, Grayford B., J.D. .......... Vanderbilt
Mitter, Robert L., J.D. ........... Georgetown
Parker, Carol M., J.D. .......... Illinois
Reid, Carl A., J.D. ............. Yale
Reynolds, Glenn H., J.D. .......... Yale
Stark, Barbara, J.D. ............... New York
Stein, Gregory M., J.D. .......... Columbia
Thompson, James E., J.D. ........ Florida
Wertheimer, Barry M., J.D. ....... Duke

Assistant Professor:

Thorp, Steven R., J.D. ........... Mercer

Instructors:

Hoover, Mary Jo, J.D. .......... Brooklyn
Moore, Jean, M.A.L.S. .......... Michigan
Wimberly, Plyllis, J.D. .......... Alabama

The College of Law offers the Doctor of Jurisprudence degree program; a dual program with the College of Business Administration leading to the B.B.A. and the Master of Business Administration degree; and a dual degree program with the Department of Social Science, College of Liberal Arts, leading to the B.A. and Master of Public Administration. In addition graduate students may be eligible to take a limited number of law courses to count toward a graduate degree.

Current information regarding admission, financial aid, course requirements, academic policies, extracurricular activities, and student services is available in the College of Law Bulletin from the Admissions Office, University of Tennessee, College of Law, 1505 West Cumberland Avenue, Knoxville, Tennessee 37996-1800. Completed application should be received before February 1 of the year of requested admission.

DEGREE OF DOCTOR OF JURISPRUDENCE

The degree of Doctor of Jurisprudence will be conferred upon candidates who complete, with the required average, six semesters of resident law study and who have 89 semester hours of credit, including all required courses. The required average is 2.0 and that average must be maintained on the work of all six
sемesters and also for the combined work of the grading periods in which the last 28 credit hours taken in residence were earned. Averages are computed on weighted grades. Grades are on a numerical basis from 0.0 to 4.0. A grade of 0.9 or below is a failure.

Eligible law students may receive up to six (6) semester hours of credit toward the J.D. degree for acceptable performance in upper-level courses that materially contribute to the study of law and which are taken in other departments at The University of Tennessee. Course selection and registration are subject to guidelines approved by the law faculty which include the requirement that any such course be acceptable for credit toward a graduate degree in the department offering the course. Refer to the Law Bulletin for current degree requirements.

DUAL J.D.-M.B.A. DEGREE PROGRAM

The College of Business Administration and the College of Law offer a coordinated dual degree program leading to the conferral of both the Doctor of Jurisprudence and the Master of Business Administration degrees. A student pursuing the dual program is required to take fewer hours of coursework than would be required if the two degrees were to be earned separately.

Admissions

Applicants for the J.D.-M.B.A. program must make separate application to, and be competitively and independently accepted by, the College of Law for the J.D. degree and The Graduate School and College of Business Administration for the M.B.A. degree, and by the Dual Degree Committee. Students who have been accepted by both colleges may commence studies in the dual program at the beginning of any term subsequent to matriculation in both colleges provided, however, that dual program studies must be started prior to entry into the last 28 hours required for the J.D. degree and the last 16 hours required for the M.B.A. degree.

Curriculum

A dual degree candidate must satisfy the graduation requirements of both colleges. Dual degree students withdrawing from the dual degree program before completion of both degrees will not receive credit toward graduation from either college for courses in the other college, except as such courses qualify for credit without regard to the dual degree program. For students continuing in the dual degree program, the J.D. and M.B.A. degrees will be awarded upon completion of requirements of the dual degree program.

The College of 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. Except while completing the first year courses in the College of Law, students are encouraged to maximize the integrative facets of the dual program by taking courses in both colleges each year.

Awarding of Grades

For grade recording purposes in the College of Law for graduate business courses and 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 courses were earned. The College of Law will award a grade of Satisfactory for a graduate business course in which the student has earned a B grade or higher and a No Credit for any lower grade. The College of Business Administration will award a grade of Satisfactory for a College of Law course in which the student has earned a 2.3 grade or higher and a No Credit for any lower grade. Grades earned in courses of either college may be used on a regular graded basis for any appropriate purpose in the college offering the course. The official academic record of the student maintained by the Registrar of the University shall show the actual grade assigned by the instructor without conversion.

Non-Law Elective Course Credit

Students enrolled in the J.D.-M.B.A. degree program may not receive credit toward their 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 Liberal Arts offer a coordinated dual degree program leading to the conferral of both the Doctor of Jurisprudence and Master of Public Administration degrees. In this program, a student may earn the M.P.A. and J.D. degree in 5 years rather than the five years that otherwise would be required. Students pursuing the dual degree program should plan to enroll in coursework or an internship for one summer term in addition to taking normal course loads for four academic years.

Admission

Applicants for the J.D.-M.P.A. program must make separate application to, and be independently accepted by, the College of Law for the J.D. degree and the Department of Political Science for the M.P.A. degree. Applicants must also be accepted by the Dual Degree Committee. All applicants must submit a Law School Admission Test (LSAT) score. An applicant's LSAT score may be substituted for the Graduate Record Examination (GRE) score, which is normally required for admission to the M.P.A. program. Application may be made prior to or after matriculation in either the J.D. or the M.P.A. program, but application to the dual program must be made prior to entry into both the last 28 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 both colleges and in 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 M.P.A. candidates, but an internship is not required.

During the first two years in the dual program, students will spend one academic year completing the required first year of the College of Law curriculum and one academic year taking courses solely in the M.P.A. program. During those first two years, students may not take courses in the opposite area without the approval of the J.D.-M.P.A. coordinators in both academic units. In the third and fourth years, students are strongly encouraged to take both law and political science courses each semester.

Dual degree students who withdraw from the program before completion of the requirements for both degrees will not receive credit toward either the J.D. or the M.P.A. degree for courses taken in the other program except as such courses qualify for credit without regard to the dual program.

Awarding of Grades

For grade recording purposes in the College of Law and the Department of Political Science, grades awarded in courses in the other unit will be converted to either Satisfactory or No Credit and will not be computed in determining a student's GPA or class standing. The College of Law will award a grade of Satisfactory for an approved M.P.A. course in which the student earns a grade of B or higher and a grade of No Credit for any lower grade. The Political Science Department will award a grade of Satisfactory for an approved law course in which the student earns a grade of 2.3 or higher and a grade of No Credit for any lower grade. The official academic record of the student maintained by the Registrar of the University shall show the actual grade assigned by the instructor without conversion.

POLICY FOR GRADUATE STUDENTS TAKING LAW COURSES

Students pursuing a graduate degree in another college may, upon approval of the College of Law and the major chairperson, take up to 6 semester hours of law courses and receive credit toward the graduate degree. The graduate student must register for the law course during regular registration at the College of Law requesting an S/NC grade only. If a 2.0 or above is earned in a law course, an S will be recorded on the transcript. If a student earns below a 2.0, an NC will be recorded, and the course cannot be used toward meeting degree requirements. Grades for law courses will not be reflected in the cumulative average. Law courses may be taken for credit only by students enrolled in a graduate degree program.

Different rules apply to the student enrolled in the Dual J.D.-M.B.A. or J.D.-M.P.A. Programs. Grades must be earned according to the
4. Increased research quality and productivity.

**ADMISSION REQUIREMENTS**

Applicants to the GSLIS 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 MSLS degree.

The verbal and quantitative aptitude portions of the Graduate Record Examination (GRE) are required of all applicants unless a graduate degree has been completed prior to application for admission. Applicants should take the GRE at least one semester in advance of application for admission and are expected to score in the 50th percentile or above on the verbal portion of the GRE.

A personal data sheet and three recommendations (obtained from the Graduate School of Library and Information Science) should be returned to the director of the school. Foreign applicants are required to take the Test of English as a Foreign Language.

**MASTER OF SCIENCE IN LIBRARY SCIENCE**

The program leading to the Master of Science in Library Science involves a total of 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 Graduate School of Library and Information Science, allowing up to 6 hours outside the school with a maximum of 5 from outside the University. Upon completion of the program, all students are subject to a final examination. For students who elect the thesis option, the examination will be a defense of the thesis. Students who elect the non-thesis option will be given a written comprehensive examination.

**Core Curriculum**

The core curriculum is a 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 core curriculum includes a non-credit electronic information and communications laboratory experience required of students during the first semester: 504.

The 15 core hours are prerequisite to all elective courses for students enrolled in the MSLS degree program. Elective courses may begin in the final semester of core coursework with permission of the advisor and the instructor of each elective course selected.

**Concentrations**

Upon completion of the core curriculum, students may select a concentration from one of the following:

**Youth Services in Public and School Libraries:**

The concentration includes two specializations: public library youth services and school library media services. Within the concentration, 21 hours (465, 571, 572, 573, 585, 589, one elective) are common and 6 hours are taken in the specialization (public library: 554, 592; school library: 475, 551).

**Scientific and Technical Information**

The concentration includes 18 hours (450, 532, 535, 540, 555, 599) of required courses and 9 hours of elective courses.

**Information Systems and Technology:**

The concentration includes 12 hours (540, 583, 585, 589) of required courses and 15 hours of elective courses.

**FINANCIAL ASSISTANCE OPPORTUNITIES**

Employment with the University of Tennessee Libraries may prove a work-study opportunity for selected students who wish to obtain experience in academic librarianship while pursuing the degree. Such students usually work at least 20 hours each week and thus may extend the period required for the degree. Similar opportunities exist with some other libraries and information agencies in the Knoxville area.

Work opportunities in a scientific-technical environment are available through subcontracts with Oak Ridge National Laboratory and the Department of Energy.

A limited number of graduate teaching assistantships are available through the school. Assistantships of this type carry a waiver of tuition and fees as well as a stipend and require that recipients work 10 hours per week in the school.

For application forms and information about financial aid and other information about the M.S.L.S. in Library and Information Science, write to Admissions, Graduate School of Library and Information Science, University of Tennessee, 604 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 in-state tuition basis. The M.S.L.S. program in Library Science is available to residents of the states of Arkansas, Georgia, Virginia, or West Virginia.

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

**GRADUATE COURSES**

430 History of the Book (3) History of writing and various methods of bookmarking.

450 Writing About Science, Technology and Medicine (3) (Same as Journalism 450.)

475 Utilization of Instructional Media (3) (Same as Curriculum and Instruction 475.)

485 Electronic Communications and Information Resources on Internet (3) Exploration of worldwide information and communication resources including e-mail, gopher, Archie, Veronica, WAIS, WWW, and newsgroups.

490 Information Environment (3) Generation, production, management, dissemination, and use of information. Roles of information in society, information seeking and user behavior, information industry, economics of information products and services, technological and organizational change, information professions, and issues.

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

502 Registration and Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. SNC only.
504 Electronic Information and Communications Laboratory (6) Methods for creating and managing information in electronic form. Communication of electronic information in networked environment. Location and use of electronic information resources. For GSLIS graduate students only; must be completed satisfactorily in first semester. SNC only.

520 Information Content Representation (3) Principles of distinguishing, describing, and indexing intellectual works; current approaches; citation systems, descriptive cataloging, non-subject indexing, pre- and post-coordinate subject indexing, classification and categorization; authority control of index terms; standards.

521 Cataloging and Classification (3) Basic library orientation to cataloging and classification techniques, tools, and supporting operations. Descriptive cataloging, choice and form of non-subject entries, subject heading work, general classification application control; bibliographic utilities, online library catalogs.


523 Abstracting and Indexing (3) Philosophies, standards, and procedures for manual and automatic document indexing, subject heading systems, and bibliographic control, thesaurus construction, and abstracting.

530 Information Access and Retrieval (3) Media for information storage, logical and physical information structures, query logic and languages, search strategies and heuristics, evaluation of retrieval system performance. Search techniques for various types of databases including multi-media, full-text, numeric, bibliographic.

531 Sources and Services for the Social Sciences (3) Informative sources in political science, sociology, psychology, geography, history, anthropology, business, and education.

532 Sources and Services for Science and Engineering (3) Information sources in engineering, physical and life sciences.

533 Sources and Services for the Humanities (3) Information sources in philosophy, religion, fine arts, performing arts, literature and language. Organization and management of regional collections.

534 Government Information Sources (3) Selection, acquisition, preservation, and utilization of government information in variety of formats from legislative, judicial and executive branches of federal, state, local, and international government and intergovernmental agencies.

535 Advanced Information Retrieval (3) Bibliographic, non-bibliographic, full-text databases, e.g., non-bibliographic formula and structure databases, contents-page/ full-text databases, patents, document delivery alternatives, evaluation, and testing. Prereq: SCS.

536 Creation and Distribution of Information and Knowledge Resources (3) Historical, political, and societal dimensions of creation, dissemination, growth, and institutionalization of information and knowledge from Ancient to Lye's and the twentieth-century university and research environments.

537 Information Industry (3) Issues and trends concerning information industry; products and services, standards, enabling technologies, choice of distribution media, entrepreneurship, innovation, economic, social, and ethical issues and concerns.

538 Economics of Information (3) Costing and pricing of information; value of information and value added services; cost benefit analysis and economic policies; economics of e-commerce; data exchange and transfer.

539 National Information Policy (3) Role of government in creation and exchange of information; review of key policy areas relevant to information creation, production, and use.

540 Research Methods (3) Research methods in variety of information environments; primary and secondary research; research project design; research results interpretation; analysis of published research; techniques supporting research process.

550 Management of Information Agencies and Services (3) Management and organizational theories, strategies, techniques applicable to libraries, archives, records management programs, and other information centers. Prereq: 530.

551 School Library Media Centers Plan, implementing, and evaluating school library programs. Curricular involvement, role of technology, relationships with district and state services.

552 Information Centers in Higher Education Development, mission, trends, issues, users, cultures, and environment of campus information centers including libraries and alternatives: learning resource centers and library-computer center models.

553 Specialized Information Agencies Development and present status, scope of objectives, and institutionalization of information and knowledge centers.

554 Public Library Management and Services Development, roles, political environment, governance, organization, fiscal management, services, marketing, and performance evaluations.

555 Scientific and Technical Communications Evolution of scientific and technical communication; current trends; role of formal and informal communications; major STI organizations and their roles.

557 User Instruction Theory, strategy, design, and practice in providing instructional services and technology for end users of information systems. Includes practical experience.

560 Information Resources Selection, Acquisition, and Evaluation Principles of development and management of collections in information agencies; community analysis; users and uses; policies and procedures; evaluation of items and collections; selecting items to meet particular needs.

561 Contemporary Book Publishing Creation, design, production, marketing, and distribution; various types of publishers.

562 Serials Serials collections: selection, acquisition, storage, preservation, use, and public services.

563 Graphic Design and Media (3) Principles and practice in visual aspect of communications. Graphic design, typography, printing and production techniques, and publication design, as these apply to electronic information delivery systems.

564 Corporate Information Systems Objectives and functional elements of records systems, archival programs, management information systems and technologies within the corporation.


566 Environmental Scanning for Information Professionals Principles and practice of environmental scanning; information evaluation and synthesis; role of strategic information in modern organization. Prereq: 565.

567 Advanced Production of Audiotextual Software (3) Same as Curriculum and Instruction 569.

569 Life Sciences (121) Life Sciences .................. M.S., Ph.D.

580 Foundations of Information Sciences and Technologies (3) Definitions of information, information sciences, and information technology; theories of information, information representation, retrieval, and transformation; information processing and distribution; research front; bibliometrics and infometrics; relationships with other disciplines.

582 Library Automation Computer-based applications and systems for libraries including MARC, bibliographic utilities, retrospective conversion, circulation systems, online catalogs, computer-based reference services, acquisitions and serials control, systems planning, and implementation. Prereq: 585.

583 Information Systems Systems concept, defining system, analysis and design of information systems. Selecting and using information systems to support various activities. User involvement in the development process. Prereq: 585.

584 Database Management Systems Defining data needs, data structures, role of operating systems in data management, file organization, database management systems, logical data models, internal data models, database administration and evaluation. Design and implementation of application using database management system. Prereq: 585.

585 Information Technologies (3) Fundamental concepts and terminology of information technology. Computer systems communication, computer architecture and standards, network hardware and software.

586 Information Retrieval Systems Historical perspective on information retrieval research; statistical and probabilistic retrieval techniques; cognitive user modeling; expert interactive systems; associations, relations and hypernets. Prereq: 585.

587 Information System Design Project (3) Supervised and structured experience in design and development of computer-based information systems. Prereq: 585, 586, 588, and 589.

588 Psychology of Human-Computer Interaction (3) Survey of human-computer interaction and introduction to psychological and other behavioral science knowledge and techniques useful in design of computing systems for human use. Basic psychological phenomena of human cognition, memory, problem solving, and language and how these processes relate to and condition interaction between humans and interactive computing systems. Prereq: 585.

590 Problems in Library and Information Science (3-6) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

591 Supervised Readings in Library and Information Science (3-6) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

592 Seminar in Library and Information Science (3-6) Prereq: Consent of instructor. May be repeated with consent of advisor. Maximum 6 hrs.

593 Independent Study (3-6) Prerequisite: Consent of advisor. Maximum 6 hrs.

594 Graduate Research Participation Advanced research techniques under supervision of staff research director whose area coincides with interests of student. Prereq: Consent of advisor and research director. SNC only.

599 Practicum (3-6) Opportunity to translate theory into practice under guidance of qualified information professionals. Prereq: Completion of core and pertinent advanced courses relevant to student's practicum design. Minimum 3.0 cumulative GPA. Written consent of advisor and approval of practicum coordinator. Prereq: 599. Must be repeated. Maximum 6 hours.
Coordinating Council:
Becker, Jeff M., Cellular, Molecular and Developmental Biology
Richard S. Saudargas, Ethology
Schwarz, O. J., Plant Physiology and Genetics
Doughall, D. K., Biotechnology
Farkas, W. R., Environmental Toxicology
Vaughan, Gerald, Physiology

The programs leading to the M.S. and Ph.D. degrees in Life Sciences are interdepartmental and intercollegiate programs which augment the programs of individual departments.

The Life Sciences Council supports studies and research in the following concentrations: physiology; biotechnology (M.S. only); cellular, molecular and developmental biology; environmental toxicology; ethology; and plant physiology and genetics. Students interested in any of these areas should contact either the chair of the Life Sciences or the director of the area of interest. Each program is overseen by a committee and may have unique admission and graduation requirements.

ADMISSION REQUIREMENTS

1. A Bachelor's degree with a major in a biological, behavioral, or physical science.
2. GRE (general) scores.
3. Three letters of recommendation.
4. Coursework including a year of calculus (differential and integral), one year of chemistry, and a year of physics. Specific course deficiencies may be corrected during the first year.

DEGREE REQUIREMENTS

The Master's degree requires a minimum of 30 semester hours of study approved by the student's committee, a thesis, and an oral examination. Within the biotechnology program only, a non-thesis M.S. option is available. Students choosing this option are expected to complete: (1) two summers' co-op experience in an appropriate industry. An evaluation by supervisor and a written report are required (529, Biotechnology Practicum Cooperative Experience, maximum 4 hrs.); (2) A written report in the form of a scientific paper in an area of specialization chosen by the student and advisor. The minimum requirements for the doctoral degree include at least 6 hours above the 600 level, 24 semester hours of course 600, a pattern of courses approved by the student's committee, a comprehensive examination, a doctoral dissertation, and a defense of dissertation. Individual programs may have additional requirements.

CONCENTRATIONS

Biotechnology

The biotechnology program will prepare students to participate in the wide variety of opportunities presented by the use of living cells and their components for the production of useful materials. This will be achieved at the M.S. level by a prescribed course of study 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, bioprocess engineering, bioproducts and biotransformations, liposomes, microscopy and image processing, monoclonal antibodies and hybridoma technology, plant tissue culture, recombinant DNA technology and risk assessment, and modeling. The production of a research thesis or an industrial co-op experience plus an area of specialization will also be an important part of the training experience.

Required courses are Life Sciences 509, 511, 512, 531, 532; Biochemistry 511; Microbiology 410; Botany 451; Chemical Engineering 475; and Zoology 507.

Cellular, Molecular and Developmental Biology

The interdepartmental program in cellular and molecular developmental biology includes research in structural or functional aspects of cells or subcellular components, or the interactions between cells.

Required courses are Life Sciences 511, 512, 531, and 532.

Environmental Toxicology

The toxicology program provides intensive training in basic toxicological principles and techniques. Courses and research expose trainees to mechanisms of intended and unintended interactions between living systems and potentially toxic agents from the point of view of biochemistry, ecology, public health, environmental law and regulation, pest management, pollution control and repair, and testing and residue analysis of toxicants.

Required courses are Biochemistry 561, 562, 604; and Life Sciences 616.

Ethology

Ethology is the naturalist study of normally occurring animal and human behavior. The program provides intensive training in basic ethology with specialized studies available in the development, evolution, and physiology of behavior; comparative psychology; human ethology; and behavioral ecology and sociobiology.

Required courses for the Master's are Psychology/Zoology 450, 455; Zoology 524, 529; Statistics 531-32; and Zoology/Psychology 516.

The Ph.D. requirements are the same as for the Master's with the additional requirements of one additional statistics course and six semester hours of courses numbered above 600 approved by student's committee.

Physiology

The interdepartmental program in physiology includes research in the areas of cellular, comparative, developmental, exercise, muscle, neurophysiology, regulatory, or reproductive.

Required courses are Zoology 520, 521; Human Anatomy. Comparative Vertebrate Biology, 420; Biochemistry 410; four 600-level seminars; and a statistics sequence.

Plant Physiology and Genetics

This program provides the opportunity for intensive training and research experience in areas transcending the usual boundaries of botany, biochemistry, and agricultural plant sciences. It devotes itself to seeking solutions of problems concerning the interactions of physiology and genetics in applied and fundamental aspects of plant science.

Required courses are Life Sciences 510; Botany 521, 522; Biochemistry 511, 512; Plant and Soil Science 471 or Zoology 560; Plant and Soil Science 551; Microbiology 410.

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/N only. E
509 Biotechnology Seminar (1-2) Topics of importance to biotechnology. May be repeated. Maximum 6 hrs.
510 Special Topics in Life Sciences (1-3) Specializations in biotechnology, cellular, molecular, 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; cell surface communication; receptors and membrane flow; growth regulation and oncogenesis; plant cell structure and function; contractility and motility; mitosis and meiosis, blood and immune cells.
512 Advanced Molecular Biology (4) (Same as Biochemistry 512.)
529 Research Practicum in Life Sciences (1-3) Individual sections for each of biotechnology; cellular, molecular and developmental biology; environmental toxicology; ethology; plant physiology and genetics; and physiology. May be repeated. Maximum 9 hrs.
530 Doctoral Research and Dissertation (3-15) P/NP only. E
610 Advanced Topics In Life Sciences (1-3) Topics vary. May be repeated. Maximum 6 hrs.

Logistics

See Marketing, Logistics and Transportation

Management

(College of Business Administration)

MAJOR

BUSINESS ADMINISTRATION

Oscar Fowler, Head

Professors:

Boiling, Ronald W. (Emeritus), Ph.D., Stanford
Dewhurst, H. Dudley, Ph.D., Pennsylvania
Dobbins, Gregory H., Ph.D., Texas
James, Lawrence R., Ph.D., Pennsylvania
Keally, A. H. (Emeritus), M.B.A., Pennsylvania
Larsen, John M., Jr. (Emeritus), Ph.D., Purdue
Neal, C. Warren, Ph.D., Alabama
Reese, Don (Emeritus), Ph.D., Iowa
Rush, Michael C., Ph.D., Akron
Stanton, Ph.D., Pennsylvania
Vanos, S. C. (Emeritus) (W.B. Stokely Prof.), Ph.D., Pennsylvania

DEGREES

BUSINESS ADMINISTRATION

MBA, PH.D.
Wagoner, George A. (Emeritus), M.S. Indiana
Whitlock, G. H. (Emeritus) (Distinguished Prof.), Ph.D. Tennessee

Associate Professors:
Fowler, Oscar S., Ph.D. ....... Georgia
Fryxell, Gerald E., Ph.D. ....... Indiana
Gilbert, Kenneth C., Ph.D. ....... Tennessee
Ladd, Robert T., Ph.D. ....... Georgia
Maddox, Robert C., Ph.D. ....... Texas
Miller, Alex, Ph.D. ............ Washington
Noon, Charles E., Ph.D. ....... Michigan
Russell, Joyce E. A., Ph.D. ....... Akron
Srinivasan, M. M., Ph.D. ....... Northwestern

Assistant Professors:
Bowers, Melissa R., Ph.D. ....... Clemson
Clelland, Iain J., Ph.D. ....... Southern California
Dean, Thomas J., Ph.D. ....... Colorado
Edirisinghe, Chanaka F., Ph.D. British Columbia
Greenwood, Thomas G., Ph.D. ....... Tennessee
Judge, William Q., Ph.D. ....... North Carolina

BUSINESS ADMINISTRATION CONCENTRATIONS

For complete list 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, 591, 593. Business Administration 510, 590. Selection must be approved by the Management Department MBA advisor. For forest industries management—511; Forestry 560, 565. Environmental management: 561 plus two approved courses from the following list: Ecology 520, 530, 537, 555; Environmental Engineering 510, 555, 556; Chemical Engineering 581; Economics 677, 678; Agricultural Economics 570; Sociology 560, 665; Law 866, 867; Geography 577. Additional courses may be accepted subject to approval by Management Department Chairperson or designated faculty.
Ph.D. Concentration: Management.
Minimum course requirements are: For operations management—541 and 542; two semesters of 640 (may be repeated for credit); one additional semester of approved doctoral seminar work. For strategic management—510, 511, 612, 613.

MINOR IN ENVIRONMENTAL POLICY

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

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
504 Management of Organizational Behavior (3) Integration of individual and group differences, organizational theory and design, motivation, leadership, human resources planning, and career implications with strategy, planning, and decision making. 511 Organizational Theory: Integrated Structure and Behavior (3) Cases, group projects, discussion; organizational theories, organizational effectiveness; contextual factors of organizations; environment, size, technology, organizational structure, and processes; organization design; social influences on organization effectiveness; motivation, leadership, group behavior, interpersonal relations, organization change and development.
512 Personnel Administration (3) Personnel functions and human resources management. Community relations, recruiting, selection, training, performance evaluation, wage and salary administration, legal framework as it affects personnel, performance appraisal/merit review, and training and development. Prereq: 567, 568, consent of instructor. May be repeated. (Same as Psychology 627.)
521 Seminar in Strategic Management (3) Role of technology and innovation in forming and maintaining competitive advantage. Prereq: 567, 568, consent of instructor. May be repeated. (Same as Economics 592.)
525-26 Industrial and Organizational Psychology (1-3-3) Readings in industrial and organizational psychology. Available only by prearrangement with supervising faculty member. May be repeated. Maximum 6 hrs. S/NC or letter grade.
531 Management of Technology-Based Organizations (3) Role of technology and innovation in formation and maintenance of competitive advantage. Prereq: 567, 568, consent of instructor. May be repeated. (Same as Economics 592.)
541 Operations Management I (3) Techniques applicable to design of systems in operations function.
542 Operations Management II (3) Operations planning and control function. Application of models to real-world systems.
551 Management of New Ventures (3) Integration of various organizational functions and their application to general management of ventures formed both within large corporations and independently. Preparation of a business plan, case analysis.
552-68 Proseminar in Industrial/Organizational Psychology (1-3-3) Readings in industrial and organizational psychology. Available only by prearrangement with supervising faculty member. May be repeated. Maximum 6 hrs. S/NC or letter grade.
553 Management of Environmental Policy (3) Role of technology and innovation in forming and maintaining competitive advantage. Prereq: 567, 568, consent of instructor. May be repeated. (Same as Psychology 517-18.)
571 International Management (3) Analysis of environment of international business firms and impact of internal and external factors on management strategies.
581 Environmental Management (3) Managerial frameworks for addressing environmental issues. Most pressing environmental challenges; options compatible with sustained business performance. Cases, field projects, research papers.
593 Directed Independent Study (1-3) Topic of mutual interest. Available only by prearrangement with supervising faculty member. May be repeated. Maximum 6 hrs. S/NC or letter grade.
595 Selective Topics in Current Management Issues (3) In-depth consideration of current issues. May be repeated. Maximum 6 hrs. S/NC or letter grade.
600 Doctoral Research and Dissertation (3-15) P/NP only. E
601 Research Methods (3) Seminar covering broad range of issues; research process as applied to study of strategic management; literature review and synthesis of research proposal.
610 Seminar in Advanced Organization Theory (3) Analysis of functioning of complex organizations; classical and modern perspectives; organization growth and change, organization effectiveness; design and 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.
562 Seminar in Organizational Psychology (3) In-depth analysis of current theories, cases, and issues associated with psychology of organizational leadership and work motivation. Prereq: 567, 568, consent of instructor. May be repeated. (Same as Psychology 625.)
563 Seminar in Industrial Psychology (3) In-depth analysis of current issues and problems; performance appraisal/criterion development, and training and development. Prereq: 567, 568, consent of instructor. May be repeated. (Same as Psychology 626.)
627 Seminar in Applied Industrial Psychology (3) In-depth analysis of the current issues, concepts, and methods: advanced quantitative psychometrics and employment selection. Prereq: 567, 568, consent of instructor. May be repeated. (Same as Psychology 627.)
636 Current Topics in Industrial/Organizational Psychology (3) In-depth analysis of various topics: organizational change and development, psychology and problems of interviewing, consumer behavior. Prereq: 567, 568, consent of instructor. May be repeated. (Same as Psychology 636.)
640 Seminar in Operations Management (3) Research and concepts. Application of quantitative methods to operations management problems. May be repeated.
660 Field Work in Industrial and Organizational Psychology (1-12) Supervised field practice in industrial and organizational psychology, 1 hr per 30 hrs of practice. May be repeated. Maximum 12 hrs. (Same as Psychology 660.)

Management Science

(College of Business Administration and Intercollegiate Program)

MAJORS

DEGREES

Management Science ......... M.S., Ph.D.
Business Administration ......... MBA

Charles E. Noon, Chairperson

Associate Professors:
Gilbert, Kenneth C., Ph.D. .......... Tennessee
Noon, Charles E., Ph.D. .......... Michigan
Srinivasan, M. M., Ph.D. .......... Northwestern

Assistant Professors:
Bowers, Melissa R., Ph.D. ....... Clemson
Edirisinghe, Chanaka F., Ph.D. British Columbia
Greenwood, Thomas G., Ph.D. .......... Tennessee

Additional Committee Members:
Fowler, Oscar S., Management
Leitnaker, Mary G., Statistics
Ristaino, Bruce A., Geography

THE MASTER'S PROGRAM

The M.S. program in Management Science is an interdisciplinary program and is designed as preparation for careers in the application of quantitative techniques for the solution of complex problems. The program's flexibility makes it appropriate as preparation for doctoral study in Management Science.

Management Science coursework will expose students to both the theoretical and development of quantitative techniques and their application to managerial decision making. In addition to the development of sufficient mathematical maturity for creative use of quantitative skills, the program requires concentrated study in a supporting area.
Supporting areas are available in other departments of the College of Business Administration (excluding statistics) as well as in computer science, public administration, ecology, and other areas, subject to approval by the Management Science Committee.

Admissions Requirements
The Master's program requires three applicant recommendation forms and the GRE or GMAT. Applications are encouraged from all majors, but mathematics background equivalent of the completion of at least two years of college calculus and proficiency in a computer language is required. The program is designed to be completed in three semesters by full-time students. However, students may start the program in any semester and may pursue an M.S. degree in Management Science on a part-time basis.

Course Requirements

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<th>Course Requirements</th>
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<td>Core Requirements</td>
<td>14</td>
</tr>
<tr>
<td>Management Science 531, 532, 533, 534 Statistics 563</td>
<td>9</td>
</tr>
<tr>
<td>Applied specialization area (approved by advisor) Statistics elective—500 level or above (approved by advisor) Mathematics—400 level or above (approved by advisor)</td>
<td>6</td>
</tr>
<tr>
<td>Electives selected from mathematics, computer science, and/or management science area</td>
<td>9</td>
</tr>
<tr>
<td>TOTAL</td>
<td>38</td>
</tr>
</tbody>
</table>

A thesis option is available to qualified students which substitutes 6 hours of thesis credit for the following 8 hours of coursework: Management Science 534, 3 hours in the applied concentration area and 3 hours of electives in any area. The Management Science Committee will work closely with the student in tailoring a program to his/her needs. The committee must approve a tentative overall program during the student's first semester and must approve all courses on a semester-by-semester basis.

Recognizing the diverse backgrounds and needs of Management Science M.S. students, the Management Science Committee is prepared to waive some of the above requirements on an individual basis. For example, an undergraduate mathematics major with strong background may be allowed to take 6 additional hours of electives in place of the mathematics requirements. On the other hand, a student lacking experience in rigorous senior-level mathematics courses will be asked to take such courses to fulfill the 6-hour mathematics requirement. The total course load will remain 38 hours for full-time students and 36 hours for all thesis students; however, the number of hours of electives can be reasonably expected to vary between 6 and 12 as a function of prior background.

THE DOCTORAL PROGRAM

The Ph.D. program in Management Science under the College of Business Administration is designed to prepare students for research related to the application of mathematical tools to complex decision making. The three primary objectives of the program are:

1. to provide, through management science coursework, a thorough knowledge of common mathematical models and their uses;
2. to provide sufficient advanced study in a supporting area to qualify the graduate for a joint faculty position in the supporting area and management science.
3. to develop in the student, through coursework in management science and an area of interest, a high degree of mathematical maturity to enhance a potential career in management research, or teaching.

Admission Requirements
The doctoral program requires three applicant recommendation forms and the GRE or GMAT, in addition to the Graduate School's requirements.

Coursework
A minimum of 48 semester hours of coursework taken for graduate credit (exclusive of thesis or dissertation) is required. Some of this may be the coursework from a Master's program although a Master's is not a prerequisite for the Ph.D. The candidate must complete a minimum of 24 semester hours at The University of Tennessee, Knoxville, at least 6 of which must be at the 600 level. Both of these requirements are also exclusive of thesis or dissertation credits. Entering students who have completed graduate studies in applicable fields will be granted course credits for work which is equivalent to required coursework in the program.

The program includes approximately 16 to 20 semester hours of coursework in the applied area.

Qualifying Examinations
The student must demonstrate mastery of probability theory and statistical inference, Statistics 563, 564, by passing a written qualifying examination.

Mastery of 12 to 14 semester hours in mathematics coursework must be demonstrated by passing a written qualifying examination. Topics normally include numerical analysis, either Mathematics 401, 402, 403, 404, and 501, or 502, and real analysis, Mathematics 455, 456. Other options may be approved. In exceptional circumstances, the faculty will consider waiving the mathematics and/or statistics qualifying examinations.

These requirements generally are completed by the end of the first year of the program. There is no foreign language requirement.

Comprehensive Examination
Prior to admission to candidacy for the degree, and normally after completion of the second year of the program, the student must pass a written comprehensive examination covering the theory of deterministic and stochastic management science models. Topics included in this examination are determined on an individual basis. Students will be expected to demonstrate an integrative ability that goes beyond simple mastery of course content.

Research and Dissertation
The student must complete 24 semester hours of Management Science 600: Doctoral Research and Dissertation, through which he/she is expected to make a significant contribution to the science. A final oral examination is conducted over the dissertation and such other segments of the program that the faculty committee deems appropriate. This effort, which is beyond the minimum 48 hours of coursework, normally is completed in the third year of the program.

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

PREREQUISITES FOR MANAGEMENT SCIENCE COURSES

The Management Science Program is interdisciplinary and students in other degree programs are encouraged to enroll in management science courses. Course prerequisites are designed to indicate the level at which courses are taught. Interested students whose prior coursework does not match the prerequisites are encouraged to seek the instructor's guidance and consent to enroll.

BUSINESS ADMINISTRATION CONCENTRATION
For complete listing of MBA program requirements, see Business Administration.

MBA Concentration: Management Science
Minimum course requirements are 531, 532, and 534.

GRADUATE COURSES

500 Thesis (1-15) P/NP only E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only E
533 Computational Mathematical Programming (3) Advanced modeling, computational and reporting techniques in practical mathematical programming. Prereq: 531 and proficiency in PASCAL.
534 Application of Management Science Methods (3) Application of methods from 531 and 532 to real world problems. Exposure to existing problem in industry or elsewhere.
BUSINESS ADMINISTRATION CONCENTRATIONS

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

MBA Concentration: Marketing

Minimum course requirements are 511 and 512.

Ph.D. Concentration: Marketing

Minimum course requirements are 12 hours from among the following courses: 601, 602, 603, 604, 605, 606.

GRADUATE COURSES

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

503 Buyer Behavior-Analyses for Marketing (3) Consumer behavior concepts and processes developed and applied to market analysis and design, and control of marketing programs. Social psychology and demographic factors that affect consumer product, brand and patronage decisions. Prereq: Business Administration 504 and 505 or consent of instructor.

504 Analyzing Market Opportunity for Marketing Decisions (3) Major determinants of opportunity in markets. Framework for analyzing markets and developing them for opportunity. Application of marketing strategic relationships to marketing strategy decisions. Prereq: Business Administration 504 and 505 or consent of instructor.

505 Marketing Research and Information Planning (3) Design of a rigorous marketing study from inception to implementation of results. Emphasis on recognizing key decision points and critically evaluating merit of research project. Prereq: Business Administration 504 and 505 or consent of instructor.

506 Marketing Strategy (3) Integration of concepts and analytical skills from each component area of marketing to formulate cohesive, well-organized marketing programs. Prereq: Business Administration 504 and 505 or consent of instructor.

510 Principles of Marketing Management for Non-MBA Students (3) For students from other disciplines interested in obtaining knowledge of marketing discipline at graduate level.

511 MBA Marketing Concentration I (6) Determination of customer value. Principles of consumer behavior, marketing research, and building customer value. Prereq: Business Administration 504 and 505 or consent of instructor.

512 MBA Marketing Concentration II (6) Delivery of customer value. Communication of customer value, marketing strategy, and providing customer responsive organizations. Prereq: Business Administration 504 and 505 or consent of instructor.

550 Market Opportunity Analysis for New Ventures (3) Concepts for understanding coverage of new venture MOA and various information sources and procedures. Identify and analyze sales opportunities in markets for new product or service. Prereq: Consent of instructor.

593 Independent Study (3) Directed research and study. Prereq: MBA Core and consent of instructor. May be repeated. Maximum 6 hrs.

599 Special Topics Seminar (3) Topics vary: nonbusiness marketing applications, macroenvironmental issues, market segmentation, international marketing, services marketing, marketing channels, and related issues. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

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

601 Marketing Theory (3) Nature and scope of marketing, role of theory development and theory testing important to marketing research.

602 Research Methods I (3) Research process: problem formulation, research and experimental design, measurement and implementation of results. Design: experimental, survey research, and measurement.

603 Marketing Thought (3) Marketing literature across number of research areas. Evaluate individual works, determine state of research in each area, and identify areas that merit further study.

604 Seminar in Buyer Behavior Research (3) Behavioral study of people in their roles as buyers and users of goods and services both individual and group processes.

605 Research Methods II (3) Analytical approach to marketing decisions and role of quantitative methods. Models and models building in marketing consideration of decision theory, linear programming, simulation and other mathematical representations of marketing phenomena.

606 Special Topics (3) Topics vary: marketing strategy, advanced consumer behavior, influence and persuasion theory and strategy, pricing issues, international marketing issues, and nonprofit organization marketing issues.

Logistics and Transportation

Professors:


Assistant Professor:

Foggin, J. H., DBA (Indiana)

Assistant Professor:

Holcomb, M. C., Ph.D. (Tennessee)

BUSINESS ADMINISTRATION CONCENTRATIONS

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

MBA Concentration: Logistics and Transportation

Minimum course requirements are 501, 508, and one course from the following: 504, 506, 507, 593, and 599.

Ph.D. Concentration: Logistics and Transportation

Minimum course requirements are 12 hours to include 601, 602, 603.

GRADUATE COURSES

501 Survey of Logistics and Transportation (3) U.S. logistics and transportation; physical, economic, social, and political environment; financing, managing, maintaining, and enhancing U.S. transport infrastructure.

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

504 Freight Carrier Systems and Management (3) Analysis of freight carrier management's efforts to provide services demanded by consumers in logistics and transportation marketplace.

506 Logistics Systems Management (3) Development of strategy for management of logistics systems. Executive level integration of logistics operations with market-
ing, distribution, and other decision areas. Practical applications through case approach and simulation game.

507 International Logistics and Transportation
(3) Logistics strategy in the multi-national firm; materials management, international sources and distribution, and importing/exporting. Issues: international carrier management and operations and comparative national transport systems analysis.

508 Executive-In-Residence Seminar in Logistics and Transportation Strategy (3) Capstone, integrative case course in logistics and transportation strategy; participation in Executive-In-Residence program that provides students with top-level logistics and transportation executives.

593 Independent Study (3-6) Directed research and study. Prereq: Consent of instructor. May be repeated.

599 Special Topics in Logistics and Transportation (3-6) Seminar designed to study specific current problem areas in logistics and transportation. Topic announced prior to offering. Prereq: Consent of instructor. May be repeated.

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

601 Seminar in Logistics and Transportation Models (3) Analysis of contemporary models and methodologies in logistics and transportation research, topical coverage at discretion of instructor.

602 Seminar in Evolution of Logistics Thought (3) Traces evolution of logistics and transportation thought: dynamic development of principles and tools developed as organizational missions and environmental change. Economic and policy issues peculiar to transportation and other service organizations.

603 Research Methodology in Logistics and Transportation (3) Various research methods used in logistics and transportation. History and development of body of knowledge. Review of literature. Discussion of contemporary research issues. Development of student's dissertation research proposal.

Materials Science and Engineering
(College of Engineering)

MAJORS DEGREES
Metallurgical Engineering ................. M.S., Ph.D.
Polymer Engineering .......................... M.S., Ph.D.

Joseph E. Spruiell, Head

Graduate programs are offered leading to the degrees of Master of Science and Doctor of Philosophy in Metallurgical Engineering or Polymer Engineering. Both the metallurgical and polymer programs are flexible and interdisciplinary in nature. Students may be admitted from a wide range of disciplines; these include physics, chemistry, chemical engineering, mechanical engineering, electrical engineering, materials engineering, and engineering science programs. Prospective students should consult materials science and engineering faculty concerning development of individual concentrations or special programs compatible with their backgrounds and goals.

Areas of concentration within the metallurgical engineering program include physical metallurgy; materials processing; welding metallurgy and materials joining; corrosion behavior; failure analysis, and mechanical and physical behavior of materials. Specializations in electronic and ceramic materials are available.

THE DOCTORAL PROGRAM

Thesis Option

A total of 30 semester hours is required for the M.S. degree in either Metallurgical Engineering or Polymer Engineering. Additional requirements include:

1. A major consisting of 12 to 18 semester hours of graduate courses in metallurgical engineering or polymer engineering. The polymer engineering major must include 540, 541, 543, 546, 549, 550 and 572 unless similar material has been covered in prior coursework.
2. Additional courses amounting to 6 to 12 hours total in any approved engineering, chemistry, mathematics, physics, or other related fields.
3. Master's thesis, totaling 6 to 12 hours. All resident students are required to register for and participate in the graduate seminar in metallurgical engineering or polymer engineering, as appropriate, during each semester in which it is offered. Credits for the seminar do not count towards satisfying the coursework requirements.

Non-Thesis Option

Under certain conditions, a candidate may apply for a non-thesis option. To be eligible, the candidate must show evidence of significant professional experience after the baccalaureate degree, at least five years of industrial experience or research publications. Additional evidence of such experience should be presented. A departmental faculty meeting will consider each applicant individually. Upon acceptance, a supervisory committee of three will be appointed, at least one being from the Department of Materials Science and Engineering. The requirements for completion of the non-thesis option are as follows:

1. A total of at least 33 hours in graduate courses in metallurgical engineering, polymer engineering and related areas. The minimum requirements are 21 hours in the Department of Materials Science and Engineering and up to 12 hours in other engineering or science courses. The candidate's degree program must be approved by the faculty committee.
2. Satisfactory completion of a critical review of the literature in an area related to metallurgical, polymer, or materials engineering (580).
3. Satisfactory performance in an oral examination to be conducted by the faculty committee and covering the review paper and other areas of metallurgical or polymer engineering.

THE DOCTORAL PROGRAM

Students applying for entrance into the doctoral program must display concrete evidence of ability to perform and report independent research to the satisfaction of the department. The Master's thesis may be offered as such evidence.

Department requirements consist of the satisfactory completion of:

1. Graduate courses in materials science and engineering amounting to approximately 24 semester hours, at least 8 of which must be in 600 series courses.
2. Supporting courses in related scientific and engineering fields amounting to approximately 24 semester hours, subject to approval by the student's faculty committee. These related fields will normally include chemistry, mathematics, physics, and engineering.
3. The comprehensive examination, usually given in two parts, and covering such topics as materials science and engineering, metallurgical or polymer engineering operations and processes, thermodynamics, technology, mathematics, physics, chemistry, and other related fields.
4. Active participation in graduate seminars conducted by the department. Resident students must register for the appropriate 503 or 504 every semester offered.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The Ph.D. program in Metallurgical Engineering is available to residents of the state of Virginia; the M.S. and Ph.D. programs in Polymer Engineering are available to students of Arkansas, Kentucky, Louisiana, Texas, or Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

405 Structural Characterization of Materials (4) X-ray diffraction and fluorescence; scanning and transmission electron microscopy; microanalytical techniques.

421 Mechanical Behavior of Materials II (3) Description of stress and strain; linear elastic constitutive equations; isotropic and anisotropic models in various materials; yield criteria; brittleness; fracture; fatigue; plasticity; strain constitutive equations, forming operations and limit criteria. Prereq: Mechanical Behavior of Materials, Mechanics of Materials I, sophomore mathematics.

422 Chemical Process Metallurgy (3) Application of chemical thermodynamics to metallurgical processing. Ferrous and nonferrous pyrometallurgical refining; slag and melt equilibrium; solidification, gas-melt processing. Prereq: 503.

426 Materials Joining (3) Processes for joining metals, polymers and ceramics: mechanical, adhesive, fusion, solidification/crystallization; surface characteristics necessary for joining and chemical bonding; thermal effects on structure and fracture of joints; design of joints. Prereq: Introduction to Materials Science and Engineering.

443 Polymer Processing (3) Rheological measurements; flow through tubes and dies, end effects and extrudate swell; selected application, screw extrusion.
504 Graduate Seminar in Polymer Engineering (1) Lectures, laboratories and field trips, unit operations of plastics fabrication; plastics classification; design and selection criteria; processing techniques; characterization laboratory. 30

470 Environmental Degradation of Materials (3) Mechanisms, measurement techniques and control of environmental degradation processes in metals, polymers, ceramics and composites; materials selection and design considerations. Prereq: Introduction to Materials Science and Engineering. Recommended for chemical engineering, mechanical engineering and environmental engineers; science and engineers majors.

472 Fundamental Principles of Composite Materials (3) Establishment of physical principles basic to design, manufacture and application of fiber reinforced polymers, metals and ceramics. Prereq: 302 or equivalent.

474 Biomaterials (3) Metals, polymers and ceramics used in orthopedic, cardiovascular, and dental surgery; implant devices; corrosion and degradation problems; material properties of primary importance; tissue response to synthetic materials. Prereq: 201. Recommended for engineering science and mechanics majors.

475 Fracture-Safe Design (3) (Same as Engineering Science and Mechanics 423.)

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 limits for degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

503 Graduate Seminar in Metallurgical Engineering (1) Prereq: Admission to graduate program. May be repeated. S/NC only. E

504 Graduate Seminar in Polymer Engineering (1) Prereq: Admission to graduate program. May be repeated. S/NC only. E

505 Engineering Analysis (3) (Same as Chemical Engineering 505.)

522 Defects in Crystals (3) Analytical and experimental analysis of defect interactions in solids. Prereq: 421 or consent of instructor.

523 Plastic Deformation of Metals (3) Geometry and mechanisms of single crystal plastic deformation: slip, twinning, and cleavage, work hardening, effect of temperature, loading rate effects; effect of ordering and solid solution strengthening on flow behavior in terms of single crystal plastic deformation mechanisms; texture formation. Prereq: 301, 320 or consent of instructor.

524 Metallurgical Thermodynamics (3) Application of chemical thermodynamics to metallurgical problems; refining, oxidation, sulfation, surface treatments, alloy systems. Prereq: 570 or equivalent.

525-26 Welding Metallurgy (3,3) Welding processes; physical metallurgy of welding; phase transformations; heat flow; residual stresses; theories of hot cracking; cold cracking and porosity formation; applications to process utilization.

529 Diffusion in Solids (3) Phenomenology and atomic mechanisms of diffusion in solid state. Solution and application of diffusion equations; random walk probabilities and mechanisms of diffusion; diffusion in dilute and concentrated alloys; Kirkendall effect, high diffusivity paths.

530 Phase Transformations in Metallic Materials (3) Thermodynamic properties of metallic phases; eutectics, phase equilibria, theory of nucleation in solids; kinetics and morphology of diffusion controlled growth; kinetics of interface controlled phase transformations; metallurgy and kinetics of martensitic transformations.

531 Advanced Corrosion (3) Analyses of corrosion processes in terms of polarization measurements and Pourbaix diagram. Influence of environmental and mechanical parameters on pitting, crevice, fretting, wear, fatigue and stress corrosion. Prereq: 470 or consent of instructor.

532 Metallurgy of Deformation and Fracture (3) Analysis of effect of stress state, strain rate, environment, temperature and metallurgical structure on mechanical behavior. Brittle fracture, creep, stress rupture and fatigue. Prereq: 505; May be repeated. S/NC only. E

540 Basic Polymer Chemistry (3) Synthesis, reactions and degradation of polymers. Molecular characterization; solution methods and spectroscopy. Prereq: Semester of organic chemistry and thermodynamics or equivalent.

541 Fluid Mechanics and Polymer Processing (3) Navier-Stokes equations and illustrative problems: applications 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, viscosity, light scattering and osmotic pressure. Prereq: Undergraduate physical chemistry.

546 Mechanical Properties of Solid Polymers (3) Types of mechanical behavior; Hookean and rubber elasticity; plastic deformation; fracture; linear viscoelasticity; dynamic mechanical behavior and testing; loss tangent; experimental methods. Introduction to mechanical properties of high performance materials. Prereq: 302 or equivalent.

549-50 Laboratory Methods in Polymer Engineering (1,1) Basic experimental techniques and instrumentation associated with characterization, X-ray and light scattering, calorimetry, rheometry, mechanical properties of solid polymers; processing operations. Coreq: 540 or consent of instructor.

550 Principles of Ceramic Processing (3) Treatment of ceramic processing; raw materials preparation and characterization; powder consolidation; drying, firing, sintering techniques, mechanisms and kinetics. Prereq: 300 or equivalent.

551 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 chalcogenide glasses. Prereq: 360, Chemistry 371.

562 Experimental Mechanics of Composite Materials (3) (Same as Engineering Science and Mechanics 562.)

570 Chemical Thermodynamics (3) Enthalpy and entropy of mixing; Gibbs function and chemical potential methods of measuring activity; solution theories; phase rule; heat capacity; heat of gases, liquids and solids; calculation of phase diagrams. Prereq: 303 or equivalent.

571 Electron Microscopy (3) Operation of electron microscope; kinematical and dynamical diffraction theories; structure determination; analysis of lattice defects. Prereq: 304 or equivalent.

572 X-Ray Diffraction (3) Symmetry of crystals, space group theory, reciprocal lattice and application to definition of structures; powder and single crystal X-ray techniques; introduction to crystal structure determination; characterization of orientation and distribution in metallic, polymeric and ceramic structures.

573 Biomaterials Analysis and Development (3) Physical-property limitations of current surgical implant materials; structural, mechanical resistances to corrosion and mechanical damage; detrimental effects of specific metal ions; development of new biomaterials and new materials processing techniques. Prereq: 470, 474 or consent of instructor.

574 Formability of Materials (3) Modeling and analysis of finite plastic strain with application to primary and secondary forming operations; crystalline and noncrystalline materials; flow localization, instability, predictive testing. Prereq: Consent of instructor.

576-77 Special Topics in Materials Science and Engineering (3,3) Topics of current significance and interest. Prereq: Consent of instructor. May be repeated.


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

621-22 Theoretical Metallurgy (3,3) Topics in solid state physics as applied to metallurgy; introduction to quantum theory; specific heats, electron theory of solids, electrical and thermal conductivity, magnetic properties, theories of alloy formation. Prereq: Consent of instructor.

623-24 Solidification and Crystal Growth (3,3) Theories of solidification, fluid flow effects, magnetohydrodynamics of incompressible fluids, growth stability theory, thermodynamic applications, rapid solidification theory, metastability. Prereq: Consent of instructor.

641 Advanced Rheology and Viscoelastic Theory (3) Continuum mechanics, formulation of viscoelastic theories for describing deformation and flow of polymeric materials. Application to polymer processing problems. Recommended for MS candidates working in rheological areas. Prereq: 541.

642 Advanced Topics in Polymer Processing (3) Application of theories of polymer science and rheology to structure development and analysis of polymer processing operations. Prereq: 541. (Same as Chemical Engineering 642.)

643 Phase Transformations in Polymers (3) Glass transition and glassy state, properties of primary importance; glass forming glasses; crystallization of polymers; nucleation, growth and morphology; secondary nucleation theory; solidification of copolymers; crystallization under stress. Prereq: 543.

671 Quantitative Microscopy (3) Principal acoustic, optical, X-ray, neutron, electron and field ion techniques for examination of microstructures of materials. Prereq: 405.


676-77 Advanced Topics in Materials Science and Engineering (3,3) Latest developments and advanced special topics. Prereq: Consent of instructor. May be repeated.

678-79 Seminar in Recent Advances in Materials Science and Engineering (3,3) Directed and independent study of advanced topics. Prereq: Consent of instructor. May be repeated.

Mathematics (College of Liberal Arts)

MAJOR DEGREES

Mathematics M.M., M.S., Ph.D.

John B. Conway, Head

Professors:

Albert, G. E. (Emeritus), Ph.D. Wisconsin
Alexiades, V., Ph.D. Delaware
Allokas, N., Ph.D. Brown
Anderson, D. F., Ph.D. Iowa
Baker, G. A., Ph.D. Chicago
Bauer, S., Ph.D. Iowa
Caruth, J. H., Ph.D. Louisiana State
Clark, C. E., Ph.D. Wisconsin
Conway, J. B., Ph.D. Louisiana State
Daverman, Robert J., Ph.D. Wisconsin
Dessart, Donald J., Ph.D. Maryland
Dubbs, D. E., Ph.D. Cornell
Dykack, B., Ph.D. Warsaw
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 numbered above 500 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.

THE DOCTORAL PROGRAM

For the Ph.D. in Mathematics, the student must meet the following additional requirements in addition to those of The Graduate School:

1. Satisfy either of the following: the standard program or the mathematical ecology concentration.

A student intending to work in mathematics may complete either, but he/she is encouraged to choose the mathematical ecology concentration. A student may elect to switch from one to the other provided the constraints of the latter option have not been violated. A student’s status after electing such a transfer is determined by the complete history of his/her earlier examinations from the standard program and part 1 of the mathematical ecology concentration. A description of both programs is below.

2. Demonstrate proficiency in one foreign language, normally French, German or Russian.

This requirement is to be met prior to the examination in the area of specialization. The student’s doctoral committee may require that the student pass a second language exam.

3. Pass an examination in the field of specialization. This examination will be given by a committee appointed by the department head at some time after the requirements in 1. have been met. A student may take this specialty examination only twice.

4. Take a one-year, 600-hour level sequence in mathematics outside of his/her area of specialization. The use of the course selected to fulfill this requirement must be approved by the department head and the student’s doctoral committee (such approval may occur after completion of the course).

Standard Program

Pass written examinations covering four subjects, at least three of which must be from the following list:

a. Modern Algebra 551-52
b. Complex Analysis 543-44
c. Topology 561-62
d. Real Analysis 541-42
e. Applied Linear Algebra 547-48
f. Partial Differential Equations 536-36
g. Ordinary Differential Equations 531-32
h. Numerical Mathematics 571-72
i. Statistics 525-26
j. Probability 523-24

Students may not count examinations in both d. and e., in f. and g., nor in i. and j. toward the required four passes. Those who choose four from this list must choose at least two from a. through e., and the students who choose only three from this list must choose one from a. through e.

Students selecting only three from the above list will also be required to pass a written exam in an area of applied mathematics (e.g., fluids, elasticity, mathematical ecology) approved as an examination topic for the graduate student by the Graduate Committee and the Applied Mathematics Committee. The Graduate Committee will appoint a section of faculty who will submit a list of topics and references to the Graduate Committee and the Applied Mathematics Committee for approval.

Students may take as many of the written examinations as desired at any time these exams are given, subject to the following conditions:

1. The exams to be taken must be approved in advance by the student’s advisory committee.

2. At most, 4 minus n exams may be taken at any one time, where n denotes the number of exams previously passed by the student.

3. Students may take a collection of written examinations a maximum of four times, but no one failing five exams, counting possible repetitions, will be permitted to take another round of exams.

Mathematical Ecology Concentration

Students must pass examinations in two areas:

1. Three subjects in mathematics. One must be mathematical ecology and two must be from the list under the standard program. Students may not count passes on examinations in both d. and e., in f. and g., nor in i. and j. toward the required three passes. At least one exam must be chosen from a. through e.

Students may take as many written examinations as desired at any time these exams are given subject to the following conditions:

a. The exams to be taken must be approved in advance by the student’s advisory committee.

b. At most 3 minus n exams may be taken at any one time, where n denotes the number of exams previously passed by the student.

c. Students may take a collection of written examinations a maximum of three times, but not failing four exams, counting possible repetitions, will be permitted to take another round of exams.

2. Ecology, covering material selected from nine hours of coursework outside of mathematics at the 500 level or above.

a. The course submitted for examination must be approved by the student’s doctoral committee and the departmental Graduate Committee.
GRADUATE COURSES

400 History of Mathematics (3) Development of major ideas in mathematics from ancient to modern times and influence of ideas in science, technology, philosophy, art, and other areas. Writing emphasis course: at least one in-class essay examination and 3000 words of writing outside classroom. Prereq: Calculus.

401 Mathematics and Microcomputers (3) Primarily for students seeking certification as mathematics teachers at secondary level. Use of microcomputers to study concepts of mathematics and to satisfy the major requirements for B.S. or M.S. in mathematics. Prereq: Calculus I.

404 Applied Vector Calculus (3) Topics from multivariable and vector calculus, line and surface integrals, divergence theorem and theorems of Gaus and Stokes. Prereq: Calculus III.

405 Models in Biology (3) Difference and differential equation models of biological systems. May not be counted toward graduate degree. Prereq: Calculus II or equivalent.


421 Combinatorics (3) Introduction to problems of construction and enumeration for discrete structures: sequences, partitions, graphs, finite fields and geometries, or experimental designs. Prereq: 323 or consent of instructor.

423 Probability I (3) Axiomatic probability, multivariate distributions, conditional probability and expectations, moment generating functions, Laws of large numbers and central limit theorem. Prereq: Calculus III. Recommended prereq: 300-level probability.


443 Complex Variables I (3) Theory of functions of complex variable: residue theory and contour integrals. Prereq: Calculus III. Recommended prereq: 300- or 400-level mathematics course.

444 Complex Variables II (3) Applications of complex variables to steady-state temperatures, electrostatics, and fluid flow. Prereq: 443.

447-48 Honors: Advanced Calculus II (3), Honors version of 445-446. Prereq: 341 or consent of instructor.

451 Topology in Algebra (3) Number theory and theory of polynomial equations such as quadratic reciprocity law and Sturm separation. Prereq: Algebra I or consent of instructor.

453 Matrix Algebra II (3) Matrix theory including Jordan canonical form. Prereq: Matrix Algebra I.

455-56 Abstract Algebra II (3,3) Algebraic structures: groups, rings, fields, vector spaces and linear transformations. Prereq: 351 or consent of instructor.

457-58 Honors: Abstract Algebra II (3,3) Honors version of 455-465. Prereq: 351 or consent of instructor.

460 Geometry (3) Axiomatic and historical development of Riemannian geometry and differential geometry; tensor proof technique and critical reasoning. Models of Non-Euclidean geometries. Prereq: Calculus II, and Discrete Mathematics I; or consent of instructor.

461 Topology (3) Topology of line and plane, separation properties, compactness, connectedness, continuity functions, homeomorphisms, continuity and topological invariants. Prereq: 341 or consent of Instructor.

471 Numerical Analysis (3) Computer, instabilities, and rounding, Interpolation and approximation by polynomials and piecewise polynomials. Quadrature and numerical solution of initial and boundary value problems of ordinary differential equations, stiff systems. Prereq: Numerical Algorithms I or consent of instructor. (Same as Computer Science 471.)


490 Readings in Mathematics (1-3) Open to superior students with consent of department head. Independent study with faculty guidance. Prereq: Consent of faculty mentor to supervise independent work. May be repeated. Maximum 9 hrs.

499 Seminar in Mathematics (1-3) Topics vary. Requires out-of-class projects and in-class presentations by students. Credit hours announced for each seminar. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

500 Thesis (1-15) P/N/P 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/N/C only.

504 Discrete Mathematics for Teachers (3) Mathematical logic and methods of argument, sets, functions and relations, combinatorics. Normally first graduate course for students seeking M.M. degree. For students in Master of Mathematics program and for students in graduate programs in College of Education. May not apply toward M.S. degree in mathematics. Prereq: 1 year calculus or equivalent.


521 Enumerative Combinatorics (3) Sieve methods, recursion, generating functions, and permutation groups applied to enumeration of discrete structures. Incidence algebras and combinatorics of partially ordered sets.


525-26 Statistics (3,3) Pertinent facts from probability theory; formulation of statistical models; sufficiency, Fisher's and Neyman-Pearson families of tests; Bayesian families; methods of estimation and optimality theory; uniform minimum variance unbiased estimate, sufficient statistics, efficiency, the confidence procedures and hypothesis testing; optimal tests and confidence intervals, the Neyman-Pearson lemma, uniformly most powerful tests; general linear models, estimation and tests in linear models; non-parametric models, rank methods for comparison, linear regression and independence, robust tests; topics from decision theory. Prereq: 445-46. Recommended prereq: 425.

527 Stochastic Modeling (3) Models in probability applied to real world situations; queuing theory; branching processes; Monte Carlo simulation. Prereq: 445-46 or consent of instructor.


534 Calculus of Variations (3) Necessary conditions for extrema, Euler's equation, broken extremals, Weierstrass-Erdmann conditions. Sufficient conditions for extrema Legendre's and Jacobi's conditions, conjugate points. Multiple integrals. Prereq: 431.

535-36 Partial Differential Equations (3,3) First order equations, classification of equations and properties of elliptic, hyperbolic, and parabolic equations in several variables. Prereq: 445-46 and 251 or consent of instructor.

557-38 Mathematical Principles of Continuum Mechan-
581-82 Mathematical Ecology (3,3) Deterministic and stochastic models of populations, communities, and ecosystems. Prereq: 431, 453 or consent of instructor.

593 Mathematical Evolutionary Theory (3,3) Population genetics and evolutionary ecology. Prereq: 431, 453 or consent of instructor.

594 Advanced Topics in Numerical Partial Differential Equations (3) Topics from current literature. Subject matter varies according to interest and preparation of students. Prereq: 531-32 or consent of instructor. May be repeated with consent of department. Maximum 12 hrs.

600 Doctoral Research and Dissertation (3-15) P/NP Independent study with faculty guidance. Prereq: Graduate standing and consent of instructor. May be repeated. Maximum 6 hrs.

619 Seminar in Applied Mathematics (1-3) May be repeated. Maximum 12 hrs.


631-32 Advanced Ordinary Differential Equations (3,3) Theory of ordinary differential equations from advanced viewpoint. Topics from current literature. Subject matter varies according to interest and preparation of students. Prereq: 531-32 or consent of instructor. May be repeated with consent of department. Maximum 12 hrs.

641-42 Functional Analysis (3,3) Functional vector spaces, distributions, and Banach algebras with applications to Fourier analysis and differential equations. Prereq: 541-42 or 547-48 or consent of instructor. May be repeated with consent of department. Maximum 12 hrs.

643-44 Harmonic Analysis (3,3) Fourier series and Fourier transforms on Euclidean spaces or topological groups: convergence, summability, uniqueness, inversion, duality. Prereq: 541-42, MATH 440 or 443. May be repeated with consent of department. Maximum 12 hrs.

649 Seminar in Analysis (1-3) May be repeated with consent of department. Maximum 12 hrs.

651-52 Advanced Modern Algebra (3,3) Selected topics in modern algebra or number theory. Prereq: 551-52 or consent of instructor. May be repeated with consent of department. Maximum 12 hrs.

659 Seminar in Topology (1-3) 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.

670-70 Advanced Topics in Numerical Partial Differential Equations (3,3) Topics from current literature. Subject matter varies according to interest and preparation of students. Prereq: 531-32 or consent of instructor. 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 disease ecology, mathematical epidemiology, environmental change, and resource management. Prereq: 581-82. May be repeated.

683-84 Advanced Control Theory (3,3) Selected topics in advanced control theory. Prereq: 581-82 or consent of instructor. May be repeated. Maximum 12 hrs.

685-86 Advanced Control Theory (3,3) Selected topics in advanced control theory. Prereq: 581-82 or consent of instructor. May be repeated. Maximum 12 hrs.

687-88 Advanced Control Theory (3,3) Advanced topics in advanced control theory. Prereq: 581-82 or consent of instructor. May be repeated. Maximum 12 hrs.

693 Seminar in Topology (1-3) May be repeated. Maximum 12 hrs.
coursework that includes at least 12 semester hoursof graduate (500 level or above) courses.

In addition, Mechanical Engineering offers courses in kinetics, machine design and dynamics, power generation, and stress analysis. Aerospace Engineering offers courses in structures and stress analysis, aerodynamics, flight mechanics, and aeroacoustics. Each student must satisfactorily complete a program of study that has been approved by the student's committee. Specific program requirements are given below.

THE MASTER'S PROGRAM

Entrance into the Master of Science program is available to qualified students who have had the equivalent of a bachelor's degree in engineering or related fields. The student must satisfactorily complete a program of study that includes:

1. A minimum of 24 semester hours in coursework that includes at least 12 semester hours of graduate (500 level or above) courses.
2. A minimum of 6 semester hours of graduate (500 level or above) courses.

The student must satisfactorily complete an approved program of study that includes a minimum of 72 semester hours credit beyond the bachelor's degree, exclusive of credit for the M.S. thesis or problems, including:

1. Twenty-four semester hours in doctoral dissertation.
2. A minimum of 12 semester hours of graduate credit in mathematics in courses numbered 400 or above with a minimum of 6 semester hours numbered 500 or above.
3. A minimum of 24 semester hours in the department in courses numbered 500 and above, with at least 12 of these semester hours in the major. A minimum of 9 semester hours of courses is required at the 600 level. These are exclusive of thesis, problems, or dissertation credit.

ACADEMIC COMMON MARKET

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

GRADUATE CREDIT FOR UNDERGRADUATE COURSES

Senior (400-level) mechanical and aerospace engineering courses may be taken for graduate credit by non-mechanical or non-aerospace engineering majors, if approved by the student's major department. Mechanical or aerospace engineering majors may not normally use more than one 400-level engineering course to meet their advanced degree requirements. Non-mechanical or non-aerospace engineering graduate students should consult with instructors regarding prerequisites for undergraduate courses.

Mechanical Engineering

NOTE: Not all the courses listed below are available at both the UT Knoxville and the UTSI campuses.

GRADUATE COURSES

422 Environmental Noise (3) Basic principles of acoustics: measurements and control of noise in industrial and community environments. Prereq: Senior standing in engineering or consent of instructor.
ferin internal and external flows, forced and buoyancy
Analysis of laminar and turbulent convection heat trans-
time-dependent heat conduction by numerical methods.
Prereq: Heat Transfer.
and time-dependent heat conduction by analytical meth-
with other heat transfer modes. Analysis of steady-state
fer modes. Analysis of steady-state and time-dependent

575 Applied Artificial Intelligence (3) (Same as Nuclear Engineering 575 and Engineering Science and Mechanics 567)
577 Neural Networks in Engineering (3) (Same as Nuclear Engineering 577 and Engineering Science and Mechanics 577)
581 Rocket Propulsion I (3) Rocket propulsion funda-
microscopic thermodynamics of reactions and turbulence
reacting ideal gases, rocket nozzle design; ideal rocket performance parameters; rocket heat transfer; chemis-
relations; liquid rocket engine systems; ground testing; introduction to solid propellant rockets.
Prereq: Consent of instructor.
582 Rocket Propulsion II (3) Solid propellant rocket performance, homogeneous and heterogeneous prop-
and three-dimensional. Ideal cycle analysis of turbine engines, real cycle analysis, component performance analysis, component design and systems integration (inlets, nozzles, combustors, engines, propulsors, turbines), flowthrough theory, turbine engine com-
ponent matching, transition, operation, surge and rotating stall, engine control systems and accessories.
Prereq: First year graduate standing and consent of instructor.
587 Dynamic Modeling and Simulation (3) Modeling and simulation of dynamic systems, system identifi-
Design applications. Prereq: 451, Aerospace Engineering 422, or equivalent.
588 Measurement Science I (3) (Same as Nuclear Engineering 558, Chemical Engineering 558, Engineering Science and Mechanics 558, and Aerospace Engineering 558)
590 Selected Engineering Problems (2-6) Enrolment limited to students in problems program. Prereq: Con-
Seminar (1) All phases of mechanical engineering, reports on current research at UTK and UTSA. May be repeated. S/NC only.
599 Special Topics in Mechanical Engineering (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.
600 Doctoral Research and Dissertation (3-15); P/NP only.
610 Advanced Topics in Fluid Mechanics and Heat Transfer (3) Advanced theory and application of fluid dynamics and heat transfer; natural convection, multiphase flow, high speed reacting and nonequilibrium flows, advanced boundary layer techniques, combustion, turbomachinery design and applications. Prereq: Consent of instructor.
612 Numerical Modeling in Heat Transfer, Fluid Mechanics (3) A study of numerical methods and algorithms for the solution of Navier-Stokes equations in two and three dimensions. Numerical modeling techniques for solution of flow fields over complex geometries. Numerical methods for solving internal viscous laminar and turbulent flows with heat and mass transfer; trans-

549-65 Selected Topics in Mechanical Engineering (1-1,4) Problems and topics related to developments and practice in mechanical engineering. Prereq: Consent of instructor. E
550 Thesis (1-15) P/NP only. E
552 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or facuty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
555 Microcomputer-Based Control of Electromechanical Systems. Computerization of mechanical and electric control mechanisms. Hardware and software. Prereq: Consent of instructor.
556 Computational Mechanics (3) (Same as Engineering Science and Mechanics 556)
556 Computer-Aided Mechanical Design (3) Applications of matrices and computational techniques in design of mechanical systems. Prereq: 556 and 454 or consent of instructor.
557 Dynamics of Machinery (3) Kinematics and kinetics of machined parts. Kinematics and control of manipulator arms. Prereq: Consent of instructor.
557 Warm prospecting for energy resources; new methods of exploration and evaluation. Prereq: Consent of instructor.
559 Computational Mechanics Laboratory (1) (Same as Engineering Science and Mechanics 559)
561 Introduction to Design (2) Engineering economy, optimization, design for automation, reliability, patents and product liability, design of mechanical engineering solid mechanics system. Participation in team design effort; design report. Prereq: Dynamics and Vibrations of Machines.
562 Advanced Strength of Materials (3,3) Elements of structural mechanics, Continuum mechanics, dynamics of manipulator arms, controller design for robotics. Prereq: First year graduate standing and consent of instructor.
563 Development of Superior Products and Processes (3) Case studies of latest techniques of superior product and process development in industry. Prereq: Consent of instructor.
566 Computational Solid Mechanics (3) (Same as Engineering Science and Mechanics 553)
567 Dynamics of Machinery (3) Kinematics and kinetics of machined parts. Kinematics and control of manipulator arms. Prereq: Consent of instructor.
569 Vibrations (3) Forced and free vibration of single and multiple degree of freedom systems, linear and nonlinear. Prereq: Undergraduate vibrations course.
571 Metal Machining and Forming (3) Mechanics of cutting and metal behavior during cutting processes. Mechanics of friction and tool wear and effects of temperature. Selection of cutting fluids and tool materi-
575 Applied Artificial Intelligence (3) (Same as Nuclear Engineering 575 and Engineering Science and Mechanics 575)
578 Expert Systems in Engineering (3) (Same as Nuclear Engineering 578 and Engineering Science and Mechanics 578)
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 airfoils. PreReq: 370. F

423 Viscous Flow (3) Boundary layer theory; laminar and turbulent flow; compressibility effects; numerical solution methods. Pre Req: 422 or Heat Transfer or consent of instructor. Sp

424 Aeronautics (3) Propulsion, trajectories, guidance, control, and atmospheric reentry of space vehicle systems. PreReq: 362, Mechanical Engineering 332. Sp

425 Propulsion (3) Principles of propulsion devices: turbojet, ram jet and rocket engines. PreReq: 351. F

426 Introduction to Aerospace Design (2) Design process, synthesis, safety, reliability, patents, product liability, economic analysis, optimization, design standards, design studies. Individual design reports. PreReq: 351, 370, 363, Coreq: Mechanical Engineering 344. F

429 Aerospace System Design (4) Synthesis and design of complete aerospace system, economic and technical aspects. Participation in team design effort, formal presentations and design report. PreReq: 425, 426. Sp

449 Aerospace Engineering Laboratory (3) Designing, testing, and conducting reports results of experimental exercises. Test standards and specifications. Analysis of data and formation of conclusions. PreReq: 345, 351, 3 labs. F

494-95 Selected Topics in Aerospace Science (1-4, 1-4) Current problems and topics in aerospace science. 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 in which the student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/N/C only. E

511 Inviscid Flow (3) Kinematics and dynamics of inviscid fluids. Potential flow about bodies, conformal mapping. PreReq: 422 or Mechanical Engineering 531, Mathematics 425 or equivalent.

512 Viscous Flow (3) Equations of viscous fluid flow: laminar and turbulent flow, transition, separation; boundary layer theories; exact and approximate solutions. PreReq: Mechanical Engineering 531 or equivalent.

513 Experimental Methods in Fluid Mechanics (3) Experimental techniques with laboratory experiments; representative experiments; hot wire anemometry and turbulence measurements, flow visualization, wind tunnel tests, water table experiments, supersonic flow experiments, boundary layer measurements. PreReq: 423 or Mechanical Engineering 531.

515-16 Air Vehicle Aerodynamics and Performance (3, 3) Application of aerodynamics principles to air vehicles; provide estimates of performance, stability, and control characteristics; fundamentals of supersonic flow. Relations among thrust, drag, lift and attitude, propulsion systems, vehicle configurations, and trajectory optimization. PreReq: 422; 425 for 515. F

519-20 Aerodynamics of Compressible Fluids (3, 3) One-dimensional internal and external flow; waves, small perturbation theory; slender body theory; similarity rules; method of characteristics. Pre Req: 422 for 519; 521 for 520. F

525 Hypersonic Flow (3) slender body theory; similarity rules; Newtonian theory; blunt body theory; viscous interactions; free molecule and rarefied gas flow. PreReq: 512.

527-28 Aerospace Ground Test Facilities (3, 3) Atmospheric models and similarity considerations; aero-Aerodynamic test fast data reduction and interpretation of data; 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 Gas Dynamics (3) Binary elastic collisions; kinetic theory; flow regimes; Boltzmann and model equations, transfer equation, gas-surface interactions; slip boundary conditions, free molecule, slip and transition flow; Monte Carlo simulation; experimental techniques; introduction to hypersonic real gas flows. PreReq: 522, Mechanical Engineering 522.

531 Magnetohydrodynamics I (3) Electromagnetic field theory; chemical kinetics; thermodynamic and thermophysical properties of gas plasmas; governing equations and applications. PreReq: 422 and Mathematics 471. F

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.

544 Transonic Flow (3) Nature of flow at transonic speeds; small disturbance theory; shock wave properties; shock-freewountains; strong viscous interaction phenomena; solution techniques. PreReq: 522.


554-555 Aerospace Vehicle Stability and Control (3, 3) Static and dynamic longitudinal and lateral stability and control of space vehicles. Motion with free and fixed flight control surfaces. Automatic control systems. PreReq: 423, 551.

556 Vertical or Short Take Off and Landing Aircraft (3) Performance, stability, control of rotary wing, tilt wing, vectored lift and vertical takeoff type aircraft, Vertical and transition flight modes. High lift airfoils. Automatic controls. Simulation facility types and flight testing. PreReq: 555.


561 Fundamentals of Aeroacoustics (3) Generation, propagation and absorption of sound in static and moving media. PreReq: Consent of instructor.


574 Space Engineering: Satellite Technology (3) Satellites and rockets (orbit, launch vehicles and launchings), spacecraft structure, power systems, attitude control systems, telemetry, tracking command, and communication systems, spacecraft testing, reliability, and application of satellites (communication, weather, Earth observation, and future applications. PreReq: 425, Mathematics 471, 404.


590 Selected Engineering Problems (2-6) Enrollment limited to students in approved problems program. PreReq: Consent of advisor.

595 Seminar (1) All phases of aerospace engineering, reports on current research at UTK. May be repeated. S/NC only.

599 Special Topics in Aerospace Engineering (1-3) May be repeated. Maximum 6 hrs.

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

631 Magnetohydrodynamics I (3) Electromagnetic field equations, motions of single charged particle, statistical description of plasma, Boltzmann equation, conduction and diffusion in ionized gases, continuum magnetohydrodynamic equations. PreReq or coreq: 512. PreReq: Mathematics 651 or equivalent.

632 Magnetohydrodynamics II (3) Alfven and shock waves, exact solution for magnetohydrodynamic channel flow, one-dimensional model of channel flow, engineering applications of magnetohydrodynamics, propulsion and power generation. PreReq: 631 and Mathematics 562.


645 Theory of Turbulence (3) Same as Engineering Science and Mechanics 645.

651-52 Advanced Aerodynamics (3, 3) Subsonic, transonic, supersonic, and hypersonic flows treated in generalized and unified manner with emphasis on viscous/inviscid effects. Relationships among various regimes of fluid flows. Fundamental assumptions, limitations of approximations and consequences. Foundations of gas dynamics. Application to aircraft, rocket, ground testing and jet propulsion. Discussion of special topics according to interest of students. PreReq: 511, 522.


690 Advanced Topics in Aerospace Engineering (2-6) PreReq: Consent of instructor. May be repeated. Maximum 6 hrs.
Medical Biology

(Graduate School of Medicine-Medical Center
Knoxville)

Carmen B. Lozio, Acting Chair

Professors:

Carroll, R., Ph.D. .........................Cornell
Chen, J. P., Ph.D. .........................Penn State
Congdon, C. C. (Emeritus), M.D. ....Michigan
Farkas, W., Ph.D. .........................Duke
Fuhr, J. E., Ph.D. .........................St. John's
Ichiki, A., Ph.D. .........................UCLA
Lange, R. D. (Emeritus), M.D. ....Washington (St. Louis)
Lollozio, Carmen B., M.D. ..........Buenos Aires
McDonald, T. P., Ph.D. ...............Texas A&M
Wigler, P. W., Ph.D. .....................California
Wust, Carl J., Ph.D. .....................Indiana

Associate Professors:

Hanna, W. T., M.D. ......................Ain-Shams
Mateson, K., Ph.D. ......................Wisconsin
Schroeder, E. C., D.V.M. .............Michigan State
Wimalasena, J., Ph.D. ..................Colorado

Assistant Professors:

Karlstad, M. D., Ph.D. .................Loyola
Potter, N. T., Ph.D. ......................Duke
Switzer, R. C. III, Ph.D. .............Michigan State
Tyler, J., Ph.D. .........................SUNY Buffalo

The Department of Medical Biology of The University of Tennessee Graduate School of Medicine was formed from the faculty of The University Memorial Research Center and Hospital in 1978. The Research Center was established in 1956. The faculty has research, education, and service interests in cancer, blood diseases, metabolism, toxicology, neuroscience, birth defects, cytogenetics, and clinical genetics. Courses in these areas are offered to students at the graduate and undergraduate levels. Elective courses are also available to students in the College of Medicine.

The faculty with the College of Veterinary Medicine participates in the graduate program leading to M.S. and Ph.D. in Comparative and Experimental Medicine. Other advanced degree students can do thesis research in the department by arrangement. Permission is required by other life science departments at the University.

GRADUATE COURSES

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

502 Registration for Use of Facilities (0-15) 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

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

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

531 Principles of Hematology (3) Pathophysiology of blood and blood forming systems. Lectures, class discussions, and laboratory work will provide an understanding of the interaction of the blood and blood forming systems. Prereq: Upper division biology and cell biology, Zoology 410 and 420.

533 Biochemistry of Coagulation, Fibronolysis and Hemostasis (2) Biochemical mechanisms underlying processes of coagulation and fibrinolysis and involvement of platelet in hemostasis. Hemostatic dysfunctions arising from delirium syndrome, thrombosis, and clotting factor deficiencies. Prereq: Biochemistry 410-419 or equivalent. F, Sp

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

543 Metabolism of Drugs (1) Drug mechanisms of action: membrane transport, enzyme reactions, ionization, stereochemistry and metabolic pathways. For students interested in biochemical pharmacology. Prereq: Biochemistry 310. Sp

545 Clinical Genetics (3) Human genetic disorders: new developments in cytogenetics, molecular genetics, clinical diagnosis and prevention. Prereq: Biology and genetics background or consent of instructor.

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

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

611 Advanced Topics in Medical Biology (1-3) New developments in biological research applicable to clinical 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. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. F, Sp

Metallurgical Engineering

See Materials Science and Engineering

Microbiology

(College of Liberal Arts and College of Veterinary Medicine)

MAJOR DEGREES

Microbiology ............................... M.S., Ph.D.
Veterinary Medicine .......................... D.V.M.

Dwayne Savage, Head

Professors:

Beck, Raymond W. (Emeritus), Ph.D. Wisconsin
Becker, Jeffrey M., Ph.D. ...............Cincinnati
Monte, T. C., Ph.D. .......................Maryland
Moore, R. N., Ph.D. ......................Texas
Riggsby, W. Stuart (Liaison), Ph.D. ......Yale
Rouse, B. T., Ph. D. .......................Geissip
Savage, Dwayne C., Ph.D. .............California
Sayler, Gary S., Ph.D. ...................Idaho
Staley, G., Ph.D. .........................Texas
White, D. C. (Distinguished Scientist), Ph.D. .....Rockefeller
Woodward, J. M. (Emeritus), Ph.D. ....Kansas
Wust, Carl J. (Emeritus), Ph.D. .........Indiana

Assistant Professor:

Hacker, David, Ph.D. .................Michigan State
Lampson, Bert C., Ph.D. ..............Missouri
Villafane, Robert J., Ph.D. ..........NYU

Microbiology

The Department of Microbiology offers both the M.S. and Ph.D. 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 no exceptions. Three letters of recommendation should be submitted by current or former faculty members.

Each new graduate student meets with an advisory committee chaired by the departmental Director of Graduate Studies to plan a program of study for the first 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 assignment of a research professor. Usually the students select a research professor toward the end of the laboratory rotation period. The major professor assists in the selection of and carrying out of a thesis or dissertation committee.

THE MASTER'S PROGRAM

The program leading to the M.S. is designed to provide the student with broad basic knowledge, to permit the acquisition of technical competence in the fundamentals of research, and to encourage creative and independent thinking. Two to three calendar years are usually needed for the course of study that has the following requirements: (1) 90 hours including 6 thesis credits; (2) a 3.0 GPA in all courses taken for graduate credit after 12 hours of credit have been earned in courses graded on the A-F system; (3) 3.0 GPA in courses taken in the department; (4) a complete course sequence in biochemistry or molecular biology; (5) presentation of a research thesis and its oral defense.

THE DOCTORAL PROGRAM

The program leading to the Ph.D. is designed to develop the student's ability to pursue independent and original research in microbiology and related 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 Ph.D.
complete the degree. Departmental requirements are: (1) a 3.0 GPA in all courses taken for graduate credit after 12 hours of credit have been earned in courses graded on the A-F scale; (2) a 3.0 GPA in courses taken in the department; (3) satisfactory performance in at least one semester as a teaching assistant; (4) one semester of physical chemistry; (5) one course in statistics; (6) two semesters of biochemistry or molecular biology; (7) satisfactory performance in a comprehensive examination that must be passed before admission to candidacy; and (8) the presentation of a research dissertation and its oral defense.

GRADUATE COURSES

410 Bacterial Physiology (3) Modern concepts of structure and function of bacterial cell. Prereq: Introduction to Microbiology. F

411 Bacterial Genetics (3) Transmission and expression of genetic information by bacteria. Prereq: Introduction to Microbiology. Sp

420 Medical Microbiology (3) Disease-producing microorganisms, infecting bacteria, tissuedecay, chlamydia and fungi. Prereq: Introduction to Microbiology. Sp

429 Medical Microbiology Laboratory (2) Laboratory exercises designed to accompany 420. Prereq: Introduction to Microbiology Laboratory. Coreq: 420. Sp

430 Immunology (3) Principles of inflammation and immunity; immunoglobulin structure and theories of formation and disease. Prereq: junior and senior status. Cell cooperation and recognition in immune mechanisms; soluble factors. Prereq: Biology 220. (Same as Zoology 439). F

439 Immunology Laboratory (2) Laboratory exercises designed to accompany 430. Coreq: 430. (Same as Zoology 439). F


449 Virology Laboratory (1) Laboratory procedures for isolation, handling, and culturing of animal viruses. Prereq: 310. Coreq: 440. Sp

470 Microbial Ecology (3) Physiological diversity and taxonomy of microorganisms from natural environments. Functional role of microorganisms in natural and simulated ecosystems. Prereq: 310. F

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

502 Registration for Use of Facilities (1-15) Surcharge for the use of department facilities. Prereq: 310, 315. Must be registered for minimum of 15 hours. May not be used toward degree requirements. May be repeated. S/NC only. E

510 Microbial Physiology (3) Topics in microbial physiology and metabolism. Prereq: 410, Biochemistry 410, or consent of instructor. May be repeated. Maximum 12 hrs.

520 Pathogenesis of Infectious Disease (3) Topics in pathogenesis: microbial factors and host responses. Prereq: 420, 430, or consent of instructor. May be repeated. Maximum 12 hrs.

530 Immunology and Immunopathology (3) Topics in molecular and genetic aspects of immune response, immunobiology, and immunopathology. Prereq: 420, 430, or consent of instructor. May be repeated. Maximum 12 hrs.

540 Molecu lar Virology (3) Topics in replication, assembly, and expression of viruses. Prereq: 440 or consent of instructor. May be repeated. Maximum 12 hrs.

550 Microbial and Molecular Genetics (3) Topics in transcription and expression of genetic information at the molecular level. Prereq: 411, Biochemistry 410, or consent of instructor. May be repeated. Maximum 12 hrs.

570 Applied and Environmental Microbiology (3) Topics in applied and environmental microbiology that elucidate physiology, metabolism, and genetics of microorganisms in the natural environment. Prereq: 470 or consent of instructor.

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

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

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

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

594 Selected Topics in Microbiological Research (2-4) Literature surveys and discussions of selected topics. Prereq: Graduate standing. May be repeated. Maximum 8 hrs. S/NC only.

595 Genetics Seminar (1) Lectures and seminars by invited speakers 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

605 Current Topics in Biological Membrane Research (1) (Same as Biochemistry 605.)

610 Advanced Topics in Microbial Physiology (3) Prereq: 510 or consent of instructor. May be repeated. Maximum 12 hrs.

620 Advanced Topics in Microbial Pathogenesis (3) Prereq: 520, 530 or consent of instructor. May be repeated. Maximum 12 hrs.

630 Advanced Topics in Immunology (3) Prereq: 530 or consent of instructor. May be repeated. Maximum 12 hrs.

640 Advanced Topics in Virology (3) Prereq: 440, 450, or consent of instructor. Maximum 12 hrs.

650 Advanced Topics in Microbial and Molecular Genetics (3) Prereq: 550 or consent of instructor. May be repeated. Maximum 12 hrs.

670 Advanced Topics in Environmental Microbiology (3) Prereq: 570 or consent of instructor. May be repeated. Maximum 12 hrs.

Microbiology-Veterinary Medicine

See Veterinary Medicine for program description.

Music

(College of Liberal Arts)

MAJOR DEGREES

Music .............................................. M.M.

Kenneth A. Keeling, Sr., Head

Professors:

Ball, Charles H., Ph.D........................... Peabody
Bitzas, George C., M.M........................ Converse
Brock, John P. (Liaison), M.M................ Alabama
Carter, W. J. (Emeritus), D.M.A. .......... Eastman
Coker, J., M.A.................................. Sam Houston
Combs, F. M., M.A............................. Missouri
DeVine, George F. (Emeritus), Diploma..................... Schurz
Dorn, W. (Emeritus), M.A...................... Columbia
Fried, Herbert W. (Emeritus), Ph.D............. North Carolina
Hofford, A. G. (Emeritus), M.M. .... Northwestern
Huber, Calvin R., Ph.D....................... North Carolina
Julian, W J (Emeritus), Ph.D. ............... Northwestern
Lennon, J. A., D.M.A. ......................... Michigan
Keeling, Kenneth A., Sr., D.M.A. ........ Catholic
McClelland, D. K., M.A. ..................... Columbia
Meacham, John J., M.M. .................. Northwestern
Moore, C. M., Ph.D............................ Michigan
Northfield, D. B., D.M.A. .................. Yale
Pederson, D. M., Ph.D. ..................... Iowa
Starr, W. J. (Emeritus), M.M. ............. Eastman
Stutzenberger, D. R., D.M.A. ............ Maryland
Tipps, A. W., Ph.D............................ Michigan
VanVactor, D. (Emeritus), M.M. .... Northwestern

Associate Professors:

Adams, Fay, M.M. ................................ Tennessee
Boling, M. E., M.M. ......................... Tennessee
Bommejwe, W. (Emeritus), M.M. ........ Tulsa
Carter, P. S., M.M. ........................... Colorado
Hordysky, P. M., M.M. ...................... Manhattan
Hough, Don, M.M. ............................ Tennessee
Hough, Dolly C., M.M. ..................... Tennessee
Jacobs, K. A., D.M.A. ....................... Texas
Johnson, A. E., D.M.A. ..................... Stanford
Leach, C. F., M.M. ............................ New Mexico
MacMorran, W. S., M.M. ................. Wisconsin
McDaniel, Walter H. (Emeritus), M.S. .......... Tennessee
Michailos, L. W., M.A. ..................... Columbia
Mintz, J. O., Ed.D. ......................... Columbia
Root, Patricia, M.A. ......................... Washington State
Scarlett, William P., M.M. ............... Louisiana State
Searle, S. M., M.M. ......................... Tennessee
Sparks, J. R., M.S. ............................ Tennessee
Sper, G. R., M.M. ............................. Indiana
Young, S. E., Ph.D. ......................... North Carolina

Assistant Professors:

Brown, Donald R. ............................. Yale
Dubberty, T. S., D.M.A. ..................... Hawthorne, W., Ph.D. ............... Cincinnati

The Department of Music offers the Master of Music degree with concentrations in accompanying, choral conducting, composition, instrumental conducting, jazz, music education, musicology, performance (organ, piano, strings, voice, winds, and percussion), piano pedagogy and literature, sacred music, string pedagogy, and theory.

Applicants must have completed an undergraduate degree approximately equivalent in music requirements to those required in degrees conferred by UT Knoxville, appropriate to the applicant's prospective area of concentration on the Master's level.

Applicants who plan to pursue the concentration in performance or music education are required to audition before the appropriate area faculty committee. Applicants for admission to
the program in composition must submit scores and tape recordings of representative works. Applicants for the concentration in jazz must audition in jazz improvisation and jazz piano proficiency and interview with members of the faculty in this area. Other applicants are required to have an interview with members of the faculty of the prospective area of concentration. All applicants are required to take the Diagnostic Examinations in music theory, ear-training, and music history/literature. These examinations are given by the Department of Music at the beginning of each semester.

THE MASTER'S PROGRAM

A minimum of 30-33 semester hours of coursework is required for the Master of Music degree. These hours are specifically distributed according to the area of concentration. All concentrations require coursework in music history/literature and music theory and allow for elective courses. Specific curricula are available from the department.

The graduate recital is given in lieu of thesis by students with concentrations in performance, pedagogy, jazz, and accompanying. A performance project is given in lieu of thesis by students with concentrations in choral conducting, instrumental conducting, and sacred music. A thesis is required of students in composition, musicology, and theory.

All concentrations require a written and oral final examination.

Concentration in Music Education

The concentration in music education is designed for persons who hold a Bachelor's degree in Music or Music Education and certification to teach music in the public schools. Students seeking initial certification should consult the requirements for the Master of Science degree in the College of Education.

The program requires 510 and 520; 9 hours of music education electives at the 500 level; 6 hours of Thesis 500; 3 hours of 400-level courses in music theory or history; 2 hours of applied music at either the 400 or 500 level; 3 hours of music ensemble at the 500 level; and 3 hours of electives at the 500 level.

A three credit research problem and three extra hours coursework in Music Education may be substituted for Thesis. If a larger thesis problem is desired, the thesis credit may be increased to 9 hours, and 3 hours of Music Education electives may be dropped. Diagnostic tests in theory, ear training, and music history will be required.

Music Education

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester 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 analysis of existing research in music education. Prereq: Consent of instructor.
530 Advanced Band Literature and Conducting (3) Reading, conducting, and interpreting band scores suitable for school, college, and community bands; contemporary and standard band literature. Prereq: Consent of instructor.
550 Curriculum Development and Evaluation in Music Education (3) Principles of curriculum development applied to music education programs. Formulating objectives; constructing evaluation instruments, surveys of appropriate literature. Prereq: Consent of instructor.
555 Administration and Supervision of School Music (3) Problems of supervision, research, and in-service education, teacher preparation, guidance. Prereq: Consent of instructor.
560 Psychology of Music Teaching (3) Research on musical perception and cognition and its application to teaching of music. Definition and measurement of musical ability. Prereq: Course in general psychology and 1 yr of music theory or consent of instructor.
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

501 Woodwind Choir (1) May be repeated.
503 Small Jazz Ensemble (1) May be repeated. Maximum 12 hrs.
504 Jazz Ensemble (1) May be repeated.
505 Studio Orchestra (1) May be repeated. Maximum 12 hrs.
506 Trombone Choir (1) May be repeated.
509 Tubas Ensemble (1) May be repeated.
510 Percussion Ensemble (1) May be repeated.
511 Marimba Choir (1) May be repeated.
514 Brass Choir (1) May be repeated.
515 Chamber Music Ensemble (1) May be repeated. Maximum 12 hrs.
520 UT Singers (1) May be repeated.
530 Chamber Singers (1) May be repeated.
534 Saxophone Choir (1) May be repeated.
540 Opera Theatre (1) May be repeated.
550 Concert Band (1) May be repeated.
552 Campus Band (1) May be repeated.
554 Saxophone Band (1) May be repeated.
556 Laboratory Band (1) May be repeated.
559 Marching Band (1) May be repeated.
570 Symphony Orchestra (1) May be repeated.
580 Concert Choir (1) May be repeated.
582 University Chorus (1) May be repeated.
583 Men's Chorale (1) May be repeated.
589 Women's Chorale (1) May be repeated.
599 Accompanying (1) May be repeated.

Music History

GRADUATE COURSES

410 Music History Genre (3) Topics vary. May be repeated. Maximum 6 hrs.
420 History of Opera (3) Dramatic, vocal, and orchestral elements in opera of Italian, French, and German schools, 1600-present.
430 Symphonic Literature (3) Literature for orchestra from Baroque to present, evolution of symphony.
440 Music of North America (3) Folk and art music of U.S. and Canada from colonial times to present.
450 Composer Seminar (3) Life and works of single composer. Subjects vary.
460 Music Aesthetics (3) Nature of music and musical experience, sense perception and emotions, music, and role of artist in society. Aesthetic viewpoint of individuals and historical eras through selected writings.
480 Music in Christian Worship (3) Hymnody, liturgies, and liturgical music.
490 Church Music Methods and Administration (3)
510 Music Bibliography (2) Bibliographic methodology in music.
520 Music Research (1) Principles of research methodology applied to writing of research proposal and project.
530 Music in the Middle Ages (3) Gregorian and medieval chant, secular monophony, and rise of polyphony.
540 Music in the Renaissance (3) From 1400 to 1600. Mass, motet, chansons, madrigal, and other vocal and instrumental forms and genres.
550 Music in the Baroque Period (3) From c.1600 to 1750; rise of opera and oratorio, sacred and secular cantatas, instrumental forms, performance practice.
560 Music in the Classic Period (3) Evolution of classical style from pre-classic music to music of Haydn, Mozart, and early Beethoven.
570 Music in the Romantic Period (3) Nineteenth-century musical styles from Beethoven to post-romanticists.
580 Music in the Twentieth Century (3) From 1890, Debussy, to present, Stockhausen and others.
590 World Music (3) Attitudes and techniques of ethnomusicology. Survey of world music cultures. Interview and transcription projects.
593 Independent Study (1-15) See College of Liberal Arts. Prereq: Consent of department head.
## Music Instrumental

### GRADUATE COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>490</td>
<td>Instrumental Conducting (3)</td>
<td>Development of knowledge and skills in instrumental conducting; study of various periods and composers and relationship of different styles to conductor's art; musical analysis and practice in conducting.</td>
</tr>
<tr>
<td>570</td>
<td>Advanced Suzuki Pedagogy (2)</td>
<td>Study of psychological procedures and literature utilized by Shinichi Suzuki in Japan.</td>
</tr>
<tr>
<td>580</td>
<td>Band Literature (3)</td>
<td>Band literature and origins of band, its important expanded cultivation during past century in United States and Europe.</td>
</tr>
<tr>
<td>582</td>
<td>Instrumental Conducting Performance (1)</td>
<td>Jury performance; conducting band or orchestra in public.</td>
</tr>
<tr>
<td>583</td>
<td>Practicum for Instrumental Conductors (1)</td>
<td>Intern experience in choral music.</td>
</tr>
<tr>
<td>584</td>
<td>Practicum for Instrumental Conductors (1)</td>
<td>Intern experience in field other than area of major interest.</td>
</tr>
<tr>
<td>595</td>
<td>Instrumental Conducting Seminar (3)</td>
<td>Rehearsal and performance problems and techniques allied to score reading and preparation. Particular attention to individual problems.</td>
</tr>
</tbody>
</table>

## Music Jazz

### GRADUATE COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>410</td>
<td>Advanced Improvisation (3)</td>
<td>Further development of individual skills and solving individual problems in jazz improvisation.</td>
</tr>
<tr>
<td>420</td>
<td>Jazz Pedagogy (1)</td>
<td>Methods and materials relating to teaching of jazz, designing and administering jazz programs, and rehearsal techniques for jazz ensembles.</td>
</tr>
<tr>
<td>530</td>
<td>Analytical Techniques (3)</td>
<td>Analytical techniques, contemporary approaches, tonal and atonal music.</td>
</tr>
<tr>
<td>540</td>
<td>Opera Production (1-3)</td>
<td>Prereq: Consent of instructor. May be repeated for credit. Maximum 4 hrs.</td>
</tr>
<tr>
<td>550</td>
<td>Vocal Literature Seminar (3)</td>
<td>Topics vary. May be repeated. Maximum 6 hrs.</td>
</tr>
</tbody>
</table>

## Music Keyboard

### GRADUATE COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>420-30</td>
<td>Piano Literature I,II (3,3)</td>
<td>From 1750 to middle 19th century; 430—Middle 19th century to present.</td>
</tr>
<tr>
<td>460-70</td>
<td>The Organ and Its Literature I,II (3,3)</td>
<td>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.</td>
</tr>
<tr>
<td>485-85</td>
<td>Suzuki Piano Method I,II (2,2)</td>
<td>Psychology, procedures, and literature of Suzuki piano method. Must be taken in sequence.</td>
</tr>
<tr>
<td>520</td>
<td>Piano Literature Seminar (3)</td>
<td>Topics vary. May be repeated. Maximum 6 hrs.</td>
</tr>
<tr>
<td>531-11</td>
<td>Recital Project (2,2)</td>
<td>Preparation and accompaniment of full recital for accompanying concentrations only.</td>
</tr>
<tr>
<td>540-50</td>
<td>Advanced Piano Pedagogy I,II (2,2)</td>
<td>Evaluation and study of methods and materials for teaching piano at all levels. Supervised laboratory teaching.</td>
</tr>
<tr>
<td>550-59</td>
<td>Organ Literature Seminar (3)</td>
<td>Topics vary. May be repeated. Maximum 6 hrs.</td>
</tr>
</tbody>
</table>

## Music Performance

### GRADUATE COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>403</td>
<td>Flute (1-4)</td>
<td></td>
</tr>
<tr>
<td>405</td>
<td>Oboe (1-4)</td>
<td></td>
</tr>
<tr>
<td>410</td>
<td>Bassoon (1-4)</td>
<td></td>
</tr>
<tr>
<td>415</td>
<td>Clarinet (1-4)</td>
<td></td>
</tr>
<tr>
<td>420</td>
<td>Saxophone (1-4)</td>
<td></td>
</tr>
<tr>
<td>425</td>
<td>Horn (1-4)</td>
<td></td>
</tr>
<tr>
<td>430</td>
<td>Trumpet (1-4)</td>
<td></td>
</tr>
<tr>
<td>435</td>
<td>Trombone (1-4)</td>
<td></td>
</tr>
<tr>
<td>440</td>
<td>Baritone (1-4)</td>
<td></td>
</tr>
<tr>
<td>445</td>
<td>Tuba (1-4)</td>
<td></td>
</tr>
<tr>
<td>450</td>
<td>Percussion (1-4)</td>
<td></td>
</tr>
<tr>
<td>455</td>
<td>Violin (1-4)</td>
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</tr>
<tr>
<td>460</td>
<td>Violin (1-4)</td>
<td></td>
</tr>
<tr>
<td>465</td>
<td>Viola (1-4)</td>
<td></td>
</tr>
<tr>
<td>470</td>
<td>Cello (1-4)</td>
<td></td>
</tr>
<tr>
<td>475</td>
<td>String Bass (1-4)</td>
<td></td>
</tr>
<tr>
<td>476</td>
<td>Electric Bass (1-4)</td>
<td></td>
</tr>
<tr>
<td>479</td>
<td>Guitar (1-4)</td>
<td></td>
</tr>
<tr>
<td>480</td>
<td>Piano (1-4)</td>
<td></td>
</tr>
<tr>
<td>485</td>
<td>Harpsichord (1-4)</td>
<td></td>
</tr>
<tr>
<td>490</td>
<td>Organ (1-4)</td>
<td></td>
</tr>
<tr>
<td>495</td>
<td>Composition (1-3)</td>
<td></td>
</tr>
<tr>
<td>496</td>
<td>Composition (1-3)</td>
<td></td>
</tr>
<tr>
<td>497</td>
<td>Improvisation (1-2)</td>
<td>May not be used toward applied music requirement.</td>
</tr>
<tr>
<td>503</td>
<td>Flute (1-4)</td>
<td></td>
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<tr>
<td>505</td>
<td>Oboe (1-4)</td>
<td></td>
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<tr>
<td>510</td>
<td>Bassoon (1-4)</td>
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<tr>
<td>515</td>
<td>Clarinet (1-4)</td>
<td></td>
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<tr>
<td>520</td>
<td>Saxophone (1-4)</td>
<td></td>
</tr>
<tr>
<td>525</td>
<td>Horn (1-4)</td>
<td></td>
</tr>
<tr>
<td>530</td>
<td>Trumpet (1-4)</td>
<td></td>
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<tr>
<td>535</td>
<td>Trombone (1-4)</td>
<td></td>
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<tr>
<td>540</td>
<td>Baritone (1-4)</td>
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<tr>
<td>545</td>
<td>Tuba (1-4)</td>
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<tr>
<td>550</td>
<td>Percussion (1-4)</td>
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<tr>
<td>551</td>
<td>Accompanying and Coaching (1-4)</td>
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</tr>
<tr>
<td>555</td>
<td>Voice (1-4)</td>
<td></td>
</tr>
<tr>
<td>560</td>
<td>Violin (1-4)</td>
<td></td>
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<tr>
<td>565</td>
<td>Viola (1-4)</td>
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<tr>
<td>570</td>
<td>Cello (1-4)</td>
<td></td>
</tr>
<tr>
<td>575</td>
<td>String Bass (1-4)</td>
<td></td>
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<tr>
<td>576</td>
<td>Electric Bass (1-4)</td>
<td></td>
</tr>
<tr>
<td>579</td>
<td>Guitar (1-4)</td>
<td></td>
</tr>
<tr>
<td>580</td>
<td>Piano (1-4)</td>
<td></td>
</tr>
<tr>
<td>585</td>
<td>Harpsichord (1-4)</td>
<td></td>
</tr>
<tr>
<td>590</td>
<td>Organ (1-4)</td>
<td></td>
</tr>
<tr>
<td>594</td>
<td>Composition (1-3)</td>
<td></td>
</tr>
<tr>
<td>595</td>
<td>Composition with Electronic Media (1-3)</td>
<td></td>
</tr>
</tbody>
</table>

## Music Theory

### GRADUATE COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>410</td>
<td>Ear Training Review (1)</td>
<td>Review and application of harmonic and melodic dictation skills for graduate and advanced undergraduate students.</td>
</tr>
<tr>
<td>450</td>
<td>Choral Arranging (2)</td>
<td>Analysis of scores and writing of arrangements for choruses. Prereq: Theory IV or consent of instructor.</td>
</tr>
<tr>
<td>510</td>
<td>Musical Styles (3)</td>
<td>Elements of design and their role in definition of musical styles. Prereq. Consent of instructor.</td>
</tr>
<tr>
<td>520</td>
<td>Analytical Techniques (3)</td>
<td>Analytical techniques, contemporary approaches, tonal and atonal music.</td>
</tr>
<tr>
<td>530</td>
<td>Music Theory Pedagogy (3)</td>
<td>Techniques, methods, and materials involved in college-level theory programs. Prereq. Consent of instructor.</td>
</tr>
<tr>
<td>540</td>
<td>Computer Projects (1-3)</td>
<td>Programming languages, design and implementation of projects in computer-managed instruction. Prereq: Consent of instructor.</td>
</tr>
<tr>
<td>593</td>
<td>Independent Study (1-15)</td>
<td>See College of Liberal Arts. Prereq: Consent of department head.</td>
</tr>
</tbody>
</table>

## Music Voice

### GRADUATE COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>425</td>
<td>Functional Diction for Singers (3)</td>
<td>Comprehensive survey of singing diction in six languages: English, French, German, Italian, Latin and Spanish.</td>
</tr>
<tr>
<td>520</td>
<td>Music Theatre Performance Techniques (1)</td>
<td>Improvisation, movement, and basic techniques for dramatic vocal performance.</td>
</tr>
<tr>
<td>530</td>
<td>Opera Performance (2)</td>
<td>Prereq: Consent of instructor. May be repeated. Maximum 4 hrs.</td>
</tr>
<tr>
<td>540</td>
<td>Opera Production (1-3)</td>
<td>Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.</td>
</tr>
<tr>
<td>550-60</td>
<td>Advanced Vocal Pedagogy I,II (2,2)</td>
<td>Study of vocal production, examination of different methods.</td>
</tr>
<tr>
<td>570</td>
<td>Vocal Chamber Music Performance (2)</td>
<td>Prereq: Consent of instructor.</td>
</tr>
<tr>
<td>580-85</td>
<td>Choral Literature I,II (2,2)</td>
<td>Choral music from Middle Ages to present with consideration of historical development of major choral genres.</td>
</tr>
<tr>
<td>590</td>
<td>Advanced Choral Conducting (3)</td>
<td>Expansions and continued refinement of conducting techniques; development of choral rehearsal skills. Prereq: Consent of instructor.</td>
</tr>
<tr>
<td>594</td>
<td>Project in Choral Conducting Performance (1-3)</td>
<td>Public performance, critical document; recording project. Prereq: Consent of instructor. May be repeated.</td>
</tr>
<tr>
<td>595</td>
<td>Choral Conducting Seminar (3)</td>
<td>Score reading and preparation; problems of interpretation, performance practices, and conducting techniques. Prereq: 590 or consent of instructor. May be repeated.</td>
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</table>
Nuclear Engineering
(College of Engineering)

MAJOR DEGREES
Nuclear Engineering ................................................... M.S., Ph.D.

Thomas W. Kerlin, Head

Professors:
Dodds, H. L., PE, Ph.D. .................................. Tennessee
Kerlin, T. W. (Liaison), Ph.D. ........................ Tennessee
Mihalcz, J. T., Ph.D. .............................................. Tennessee
Miller, L. F., PE, Ph.D. .......................................... Texas A&M
Perez, R. B., Ph.D. .............................................. Madrid
Stevens, P. N., PE, Ph.D. ............................... Northwestern
Uhrig, R. E. (Distinguished Prof.), PE, Ph.D. .... Iowa
Upadhyaya, R. R., Ph.D. .................................. California

Associate Professors:
Groer, P. G., Ph.D. ........................................ Vienna
Katz, E. M., PE, Ph.D. ............................... Tennessee
Scott, T. H., PE, Ph.D. ......................................... Florida

Assistant Professor:
Ruggles, A. E., Ph.D. ........................................... Rensselaer

The Department of Nuclear Engineering offers programs leading to the Master of Science or Doctor of Philosophy degrees. Students may elect a traditional nuclear engineering M.S. or Ph.D. program (focusing on fission energy or fusion energy) or a radiation protection engineering concentration at the Master's level.

The radiation protection engineering concentration prepares students for careers in radiation safety fields (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 not for graduate credit.

THE MASTER'S PROGRAM

A graduate program leading to the Master of Science is available to graduates of recognized undergraduate curricula in engineering and physics. Each applicant will be advised as to the necessary prerequisite courses before he/she enters the program.

The student must complete 24 semester hours of coursework approved by the student's advisory committee that includes the following:

1. A major consisting of a minimum of 12 semester hours of graduate courses in nuclear engineering. This must include at least one of the following sequences: 511, 512; 551, 552; 571, 572.

2. A minor of 6 semester hours of elective courses in mathematics, statistics or computer science.

3. Six semester hours in either nuclear engineering or a related field.

The M.S. candidate must also demonstrate research or design capability. This requirement may be satisfied by a thesis project or engineering practice projects as described below:

**Thesis** - The student performs independent research on a topic approved by the graduate committee. He/she submits a thesis on this research. The student then must pass an oral examination on the thesis and all graduate coursework. The student must enroll for six semester hours of NE 500 (Thesis).

**Engineering Practice** - The student performs independent research on two to four separate topics approved by his/her graduate committee. Each project is similar to a thesis project but smaller in scope. He/She submits a report, in thesis format, on each project. The student must then pass an oral examination on his/her engineering practice reports and all graduate coursework. The student must enroll for six semester hours of NE 598 (Nuclear Engineering Practice).

**THE DOCTORAL PROGRAM**

**Grades**

Graduate Admissions and Records:

**GRADUATE CREDIT FOR UNDERGRADUATE COURSES**

A candidate may use for graduate credit courses numbered 500 or above from a graduate program in nuclear engineering. The student must have at least 9 semester hours of graduate coursework from the University of Tennessee, Knoxville.

**Graduate Admissions and Records**

**A. Academic and Personal Qualifications**

A candidate must successfully defend, in an oral examination, all work presented for the degree - all coursework and the dissertation.

**ACADEMIC COMMON MARKET**

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The Ph.D. program in Nuclear Engineering is available to residents of the states of Alabama, Kentucky, Mississippi, or South Carolina. The M.S. program is available to residents of the states of South Carolina or Virginia (concentration in radiation protection only). Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

**GRADUATE CREDIT FOR UNDERGRADUATE COURSES**

400-level courses in nuclear engineering may be used for graduate credit. However, students must recognize that at least two-thirds of the minimum required hours (30) in a Master's degree program must be taken in courses numbered 500 or above.

**GRADUATE COURSES**

403 Nuclear Engineering Laboratory (3) Cross-section measurement, diffusion properties of neutrons, criticality problems, critical experimentation, control rod calibration, statistical weight, shielding, xenon poisoning, dynamical and control experiments. Prereq: Nuclear Engineering Laboratory or equivalent. Coreq: 471, 405.

404 Nuclear Fuel Management (3) Variety of topics relative to nuclear fuel cycle, mining and milling, fuel fabrication, core fuel management, reprocessing and waste disposal. Economic and regulatory issues. Prereq: 470.


406 Radiation Shielding (3) Types of radiation sources, fundamentals of gamma ray and neutron attenuation, biological effects, approximate methods of design, discrete ordinates, and Monte Carlo. Prereq: Physics 232.

421 Introduction to Nuclear Reactivity Theory (3) Fundamentals of nuclear criticality safety, criticality accidents, safety standards, overview of experiments, computational methods, and applications. Prereq: Introduction to Nuclear Engineering.

463 Introduction to Fusion Energy (1) (3) Same as Electrical and Computer Engineering 463.

464 Introduction to Fusion Energy II (3) (Same as Electrical and Computer Engineering 464.)

470 Nuclear Reactor Theory I (3) Fundamentals of reactor physics relative to reactor design, interaction of neutrons and matter, and nuclear data. Analytical and numerical methods applicable to general reactor design, lattice theory, and reactor kinetics. Prereq: 470.

471 Nuclear Reactor Theory II (3) Thermal spectrum computational methods; heterogeneous effects in fast and thermal spectra; considerations in reactor design; reactor kinetics and reactor systems and nuclear data. Analytical and numerical methods applicable to general reactor design, lattice theory, and reactor kinetics. Prereq: Introduction to Nuclear Engineering.

472 Special Topics in Nuclear Engineering (3) Problems related to recent developments and practice. Prereq: Senior standing or consent of instructor. May be repeated. Maximum 6 hrs.

500 Thesis (1-15) IP/N only. E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or fall outside before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

511-12 Transport Processes in Nuclear Engineering (3) Rheology of nonisotropic and non-isothermal fluids; integral and system conservation equations for single and multi-component fluids; applications to nuclear reactor design. May be repeated. S/NC only.

521 Nuclear Systems Dynamics and Control (3) Introduction to state variable methods for system dynamics and control analysis and application of these methods to nuclear plant dynamics, simulation and control problems.


541 Reactor Fuel Management (3) Topics relative to in-core fuel management. Applicable topics in reactor physics, fuel depletion, isotopic inventories, reactivity control and numerical methods. Prereq: 451.


543 Selected Topics in Nuclear Criticality Safety (3) Criticality safety, computational and experimental methods for enrichment, fabrication, storage, reprocessing, and transport applications; overview of safety practices and regulatory requirements. Prereq: 421 or consent of instructor.

550 Nuclear Instrumentation (3) Physics and electronics associated with radiation detection, methods of data analysis, applicability of particular instrument measurements and fundamentals of nuclear instrumentation operation.

551 Radiation Protection (3) Interactions of photons, neutrons, beta particles, and heavy charged particles with matter and mechanisms of energy loss; methods of radiation detection, internal and external radiation dosimetry; chemical and biological effects of radiation; regulations and standards. Prereq: Introduction to Nuclear Engineering and Differential Equations I or equivalents.

552 Radiation Monitoring and Dose Assessment (3) Methods for area- and environmental monitoring; dose assessment; pathways analysis; risk projections and regulations. Prereq: 551.

561 Plasma Diagnostics I (3) (Same as Electrical and Computer Engineering 561.)

562 Plasma Diagnostics II (3) (Same as Electrical and Computer Engineering 562.)

563 Plasma Engineering I (3) Integration of plasma physics models, fusion engineering design criteria, and fusion technology into design of future plasma experiments and reactors. Particle, momentum, and energy balance equations. Description of various fusion reactor plasmas. Prereq: 464 or consent of instructor.

571 Reactor Theory and Design (3) Analytical and numerical techniques for neutronics modeling of nuclear systems. Forward and adjoint Boltzmann transport equation, Multigroup diffusion theory. Core analysis methods and codes. Prereq: 401 or equivalent.

572 Nuclear System Design (3) Design and analysis of a nuclear system, interface with non-nuclear aspects of system design: system reliability and economics; class project. Prereq: 571 or consent of instructor.

575 Applied Artificial Intelligence (3) Symbolic methods for artificial intelligence systems with focus on application to engineering problems. Prereq: Consent of instructor. (Same as Engineering Science and Mechanics 575 and Mechanical Engineering 575.)

576 Expert Systems in Engineering (3) Application of expert systems in engineering logic and rationale, developing expert systems, programming, advanced topics. Prereq: 575 or consent of instructor. (Same as Engineering Science and Mechanics 576 and Mechanical Engineering 576.)

577 Neural Networks in Engineering (3) Neural network technology and its application to system identification, control, and optimization. Prereq: Consent of instructor. (Same as Engineering Science and Mechanics 577 and Mechanical Engineering 577.)

561 Reactor Shielding (3) Application of analytic/numerical methods for occupational shielding. Multidisciplinary methods and techniques. Practical analysis, coupled analysis, and fast reactor shield design. Prereq: 406 or equivalent.


585 Process System Reliability and Safety (3) Qualitative and quantitative techniques for assessing and improving process systems reliability and safety. Fault tree analysis and associated dependent failure analysis. (Same as Chemical Engineering 565.)


587 Measurement Science II (3) Modern industrial measurement systems, advanced topics in measurement. Prereq: 586. (Same as Aviation Systems 586 and Engineering Science and Mechanics 586.)

589 Special Topics in Nuclear Engineering (3) Lectures and recitation on recent advances in nuclear engineering. Prereq: Consent of instructor. May be repeated with consent of department.

598 Nuclear Engineering Practice (3) Experience in radiation measurement and control analysis and associated dependent failure analysis. (Same as Chemical Engineering 565.)

599 Nuclear Engineering Practice (3) Experience in radiation measurement and control analysis and associated dependent failure analysis. (Same as Chemical Engineering 565.)

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

611-12 Selected Topics in Reactor Theory (3,3) Transport theory, control rod theory, stochastic methods. Selected topics from literature. Prereq: 572.

621 Selected Topics in Radiation Protection (3) Prereq: 561, 552. May be repeated with consent of department.

631 Plasma Engineering II (3) Detailed modeling of plasma breakdown, start-up, burn dynamics. Prereq: 564.

652 Special Topics in Fusion Engineering (3) Selected advanced topics in fusion engineering and fusion reactor design. Prereq: 651.


671 Advanced Topics in Applied Artificial Intelligence (3) Recent advances in engineering applications of artificial intelligence. Prereq: 577. (Same as Engineering Science and Mechanics 571 and Mechanical Engineering 671.)

679 Special Topics in Nuclear Engineering (3) Investigation of new developments. Prereq: Consent of instructor.

Nursing (College of Nursing)

MAJOR DEGREE

Nursing ..................... M.S.N., Ph.D.

Joan E. Uhl, Dean
Mildred M. Fenice, Associate Dean for Academic Programs
Sandra Thomas, Director of Ph.D. Program
Inez Tuck, Director of MSN Program

Professors:
Alligood, Martha R., Ph.D. ............ New York
Goodfellow, Dale H., Ph.D. ............ Peabody
Mozingo, Johnnie N., Ph.D. .......... Walden
Thomas, Sandra P., Ph.D. .......... Tennessee
Uhl, Joan, Ph.D. .................. Utah

Associate Professors:
Bowie, Sheila, Ph.D. ............. Tennessee
Davis, Mitzi, Ph.D. .............. Tennessee
Droppeleman, Patricia G., Ph.D. ........ Tennessee
Dyer, Theresa, Ed.D. ........... Tennessee
Fenske, Mildred M. (Liaison), Ph.D. .............. Vanderbilt
Jolly, Mary Lue, Ed.D. ........... Kentucky
McGuire, Sandra, Ed.D. ........ Tennessee
Modrin-McCarth, Mary Anne, Ph.D. ........ Tennessee
Sharp, Theresa G., Ed.D. .......... Tennessee
Shoffner, Davy, Ph.D. ........... Tennessee
Smith, Helen, Ph.D. .................. Maryland
Tuck, Inez, Ph.D. .......... North Carolina (Greensboro)

Assistant Professors:
Kollar, Mary, Ph.D. .............. 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, parent-child nursing, mental health nursing, family nurse practitioner, and nursing administration.

Admission Requirements
1. Meet requirements for admission to The Graduate School.
2. Hold a Bachelor's degree in Nursing from a National League for Nursing accredited program or complete the equivalent of an upper division undergraduate major in nursing in addition to meeting all M.S.N. degree requirements. May have an undergraduate GPA of 3.0 or higher or a GPA of 3.3 for courses in the undergraduate major.
3. Submit scores of the general portion of the Graduate Record Examination.
4. Submit Graduate Program Data Form.
5. Submit Graduate School Rating Forms from three individuals familiar with the applicant's current work performance or academic aptitude.
6. New students normally are admitted to the program only at the beginning of fall semester. However, under special circumstances and approval of the program, a student may be admitted at the beginning of spring or summer terms in a temporary non-degree status. Applications for fall admission must be received by March 15.

Special Requirements
1. Each student must hold personal professional liability insurance.
2. Registered nurses must be licensed to practice nursing in Tennessee.
3. Each student must present proof of hepatitis B vaccination and rubella immunization or sufficient titer for immunity.
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 hours of behavioral science courses.

**Thesis and Non-Thesis Options**

The thesis option is available for interested students and is especially encouraged for those who are considering pursuit of doctoral degrees sometime in the future. Students who choose the non-thesis option must register for 580-582 Supervised Research.

**Program Requirements**

All students must complete a minimum of 36 semester hours distributed as follows:

**Core (12 credits)**

503-04 Holistic Nursing 6
510 Theoretical Foundations of Nursing 3
520 Nursing Resource Management 3

**Research (9-12 credits)**

--- Graduate level statistics course 3
501 Nursing Research: Methods, Design & Analysis 3
500 Thesis 6
OR
580 Nursing Project 3
OR
582 Supervised Research 3

**Concentration (12 credits)—choose one**

520-31 Adult Health Nursing I, II 12
540-41 Family Nurse Practitioner I, II 12
550-51 Parent-Child Nursing I, II 12
560-61 Mental Health Nursing I, II 12
590-91 Nursing Administration I, II 12

**Elective (3 credits)—waived for those who choose thesis option**

Students who enter the program as non-RNs must complete the following undergraduate nursing courses in addition to meeting the requirements listed above:

301 Pharmacology 3
302 Introduction to Professional Nursing 5
304 Nursing Assessment and Health Promotion 4
311 Acute Care Nursing 10
313 Nursing Research 3
414 Community Mental Health Nursing 6
415 Family/Community Health Nursing 6

Registered nurses whose bachelor’s degrees are not in nursing must have complete courses in chemistry, nutrition, microbiology, anatomy, and physiology plus 12 hours of behavioral science courses. They must also complete 304, 305, 313, 315, and 403 and complete or successfully challenge the following:

301 Pharmacology 3
306 Health Deviation Concepts I 4
316 Health Deviation Concepts II 4
325 Nursing of Children and Adults 6
402 Family Health Nursing Theory 3
412 Psychosocial Long Term Nursing Theory 3

**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 oral written or oral questions designed to measure student mastery of the entire program of study. For non-thesis students, the written examination will cover the entire program of study and may, at the discretion of the student’s committee, be followed by an oral examination.

**Special Policies**

1. If the clinical performance of any student for any course is found to be unsatisfactory, the student will receive a grade of “F” for the course.
2. If a student achieves a final grade of “D” or “F” for any required undergraduate or graduate nursing course, he or she will not be permitted to repeat the course and will be required to withdraw from the program.
3. If the clinical performance of any student is characterized by unethical, unprofessional or unsafe behavior, or behavior that places the client in jeopardy, the student will be required to withdraw from the program.

**THE DOCTORAL PROGRAM**

The College of Nursing offers a doctoral program leading to the Doctor of Philosophy degree with a major in Nursing. This is a unified program offered jointly with the University of Tennessee, Memphis College of Nursing. Students may complete all or part of the program at either site. The dissertation must be completed in its entirety at one site.

The doctoral program prepares nursing scholars capable of integrating research, theory, and practice into their roles as researchers, educators, and/or administrators. Specifically, the graduate of this program should be able to:
1. Analyze, test, refine, extend, and expand the theoretical basis of nursing practice.
2. Conduct nursing research that generates knowledge and advances nursing as a discipline.
3. Provide leadership as nurse researchers, educators, and/or administrators in current and emerging health care settings.
4. Collaborate with members of other disciplines in health-related research of mutual concern.
5. Analyze, develop, and recommend health care policy at various levels.

**Admission Requirements**

1. Meet requirements for admission to The Graduate School.
2. Hold a Master’s degree in nursing from a program accredited by the National League for Nursing. Some outstanding applicants who are prepared at the bachelor’s level in nursing may be considered. In such cases, graduate level courses in nursing theory, concentration specialty, and/or research will be integrated into the formal program of doctoral degree requirements.
3. Have a minimum cumulative grade point average of 3.0 on a 4.0 scale for previous college work.
4. Have a cumulative score of at least 1000 on the verbal and quantitative sections of the Graduate Record Examination.
5. Have successfully completed a basic statistics course and graduate nursing theory and research courses prior to enrollment in nursing doctoral level courses.

6. Have TOEFL scores of at least 550 if native language is not English.
7. Complete Graduate Program Data Form, College of Nursing.
8. Submit Graduate School Rating Forms from three 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 March 15.
12. Schedule a personal interview with the College of Nursing PhD Student Admissions Committee prior to March 15 of the year preceding Fall admission.

**Program Requirements**

The following courses are required for all students:

- 620 Directed Research 3
- 601-2 Theory Analysis & Construction I, II 6
- 605-6 Nursing Research Seminar 3
- 607 Qualitative Nursing Research 3
- 608 Quantitative Nursing Research 3
- 610 Nursing Science Seminar 2
- 611 Advanced Nursing Seminar 2
- 614 Nursing Preceptorship 3
- Statistics 3
- Electives 12
- 600 Dissertation 24
- TOTAL 68

Possible cognate areas include, but are not limited to, anthropology, child and family studies, psychology, education, management, medical ethics, public health, social work, philosophy, and statistics.

**Doctoral Committee**

Early in the student’s program, a nursing faculty advisor will be selected by the student in consultation with the program director. The advisor will chair the student’s comprehensive examination committee which consists of the faculty teaching core courses and one representative from the cognate area. The student then selects the dissertation committee. Five faculty holding the rank of assistant professor or above comprise the committee. Three of whom (including the chair) must be approved by the Graduate Council to direct doctoral dissertations. At least two members of the committee must be from an academic unit other than nursing.

**MINOR IN GERONTOLOGY**

Graduate students in the College of Nursing may pursue a specialized minor in gerontology. This interdepartmental/interdisciplinary minor gives the student an opportunity for combining the knowledge about aging in American society with his/her major concentration. Please refer to Human Ecology for specific requirements.

**ACADEMIC COMMON MARKET**

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain
500 Thesis (1-15) P/NP only. E

501 Nursing Research: Methods, Design, and Analysis (3) Methodology, design, and data analysis issues and their application in research, implementation, and evaluation of nursing and health-related research. Investigation of computer applications to data analysis. Prereq or coreq: Graduate level statistics course. 510. Sp.Su.

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 Holistic Nursing: Wellness (3) Examination of the philosophy of holistic nursing and new paradigms for nursing assessment, diagnosis, and intervention. Exploration and application of principles of health promotion, education, and innovative strategies for achievement of wellness. Role of health habits, psychosocial factors, and environment in the achievement of wellness. Prereq: 504 or consent of instructor. F

504 Holistic Nursing: Illness (3) Exploration, analysis, and application of principles of holism to nursing clients with acute and chronic pathophysiological problems. Mind-body influences and interactions. Prereq: Nursing Assessment and Wellness Promotion and Physiological Principles or equivalents. Prereq or coreq: 503. F

505 Advanced Clinical Pharmacology (3) Pharmacological agents utilized to treat common, recurrent health problems: indications, contraindications, side effects and interactions. Prereq: 504 or equivalent or consent of instructor. F

506 Graduate Seminar in Public Health (1) (Same as Public Health 509, Nutrition 509, Physical Education 509 and Social Work 509.)

510 Theoretical Foundations of Nursing (3) Historical evolution of nursing science; examination and critical analysis of nursing's metaphysical and selected conceptual models, philosophies, and theories; contemporary ethical issues and application to nursing practice dilemmas. Sp.

520 Nursing Research Management (3) Organizational, conflict-management, decision-making, leadership, professional, technological, and other theories, principles, and concepts applicable to advanced clinical nursing practice. F, Sp.

530 Adult Health Nursing I (6) Exploration and application of advanced nursing, physiological, developmental, and psychosocial theories to nursing care and management of clients and their families who are experiencing episodes of acute and chronic illnesses and related crises; role of clinical nurse specialist in helping clients and families achieve optimal wellness. Prereq: 504. Prereq or coreq: 501, 520. 2 hrs and 4 labs. Sp.

531 Adult Health Nursing II (6) Further emphasis on role of clinical nurse specialist in providing and managing nursing care for acutely and chronically ill adults across life span; exploration, analysis, and application of selected advanced management, supervisory, organizational, and leadership theories; application of health related concepts and research to implementation of clinical nurse specialist role. Prereq: 530. 2 hrs and 4 labs. F


541 Family Nurse Practitioner II (6) Continuation of 540. Seminar and clinical practicum: management of chronic health problems and development of life styles; role refinement and exploration of major issues in delivery of holistic primary nursing care; clinical experiences in variety of settings. Prereq: 540. 2 hrs and 4 labs. F


550 Parent Child Nursing I (6) Exploration and application of selected advanced nursing, physiological, psychological, developmental, environmental, cultural, and other theories, principles, and concepts to child-bearing or child-rearing families and their families in community, hospital, or other health care settings. Prereq: 504. Prereq or coreq: 501, 520. 2 hrs and 4 labs. Sp.

551 Parent Child Nursing II (6) Continuation of 550. Seminar and clinical practicum designed to facilitate further development of specialized knowledge and skills used for advanced practice. Role refinement of clinical nurse specialist or nurse practitioner in nursing management of women and/or child-bearing or child-rearing families in community, hospital, or other health care settings. Prereq: 504. Prereq or coreq: 501, 520. 2 hrs and 4 labs. Sp.

552 Parent Child Nursing Field Work and Seminar (5) Seminar and intensive clinical practicum designed to facilitate further development of specialized knowledge and skills utilized for advanced practice. Prereq: 550. Prereq or coreq: 501, 520. 2 hrs and 4 labs. F

560 Mental Health Nursing I (6) Exploration and application of advanced theories of therapeutic nursing intervention to clients experiencing mental health problems. Options for clinical practice with clients of various age groups. Prereq: 504 or consent of instructor. F

565 Teaching Practicum (1-6) Individually designed teaching experience in collegiate nursing program or nursing practice setting. Objectives to be developed collaboratively by student and faculty. Prereq or coreq: 564 and consent of instructor. S/NC or letter grade. Sp.

566 Educational Principles and Strategies (3) Exploration and analysis of selected educational curriculums, teaching-learning, measurement, and evaluation principles and strategies as applied to instruction of undergraduate students, staff development, and patient education. Prereq: Consent of instructor. Su.

577 Special Topics (1-3) Topic is determined by faculty and student interest. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. F

580 Nursing Project (3) Research culminating in scholarly paper. Student initiated project with faculty permission, small research utilization project, pilot study, or "state of the science" paper in clinical area. Original research projects may require human subject approval in prior semester or extension to two semesters. Prereq: Consent of instructor, 501, 510. May be repeated. Maximum 6 hrs. F, Sp.


583 Directed Clinical Practice (1-9) Additional opportunities for advanced nursing practice. Objectives to be developed collaboratively by student and faculty. Prereq: Enrollment in or completion of graduate level courses in clinical nursing. Maximum 9 hrs. S/NC or letter grade. E


591 Nursing Administration II (6) Continuation of 590. Utilization of human and financial resources, conflict resolution, and organizational development applied to application of 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. F, Sp.

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

601-02 Theory Analysis and Construction I, II (3,3) Theory construction and development of existing nursing theory and theory building from existing knowledge. Prereq: 510 or equivalent or consent of instructor. F, Sp.

606-07 Nursing Research Seminar (2,2) Selected topics pertaining to dissertation proposal research, research experience and defense. Prereq: Completion of core course. F, Sp.

607 Qualitative Nursing Research (3) Exploration and analysis of philosophical bases, theoretical implications, methods, and data analyses of qualitative nursing research. F

608 Quantitative Nursing Research (3) Exploration and analysis of philosophical bases, theoretical implications, methods, and data analyses of quantitative nursing research. F

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. S/NC or letter grade. E

610 Nursing Science Seminar (2) Critical Analysis and synthesis of literature in selected focus area within nursing science. Prereq: Admission to doctoral program in nursing or consent of instructor. Sp.

611 Advanced Nursing Seminar (2) Exploration of historical and current issues of interest to doctoral prepared nurses. F

612 Health and Nursing Policy Planning (3) Policies affecting nursing education and practice; health policies and political processes; interactions between health professionals, consumer groups, and government in health policy development and health planning activities. Sp.

613 Nursing Management of Complex Systems (3) Contemporary organizational management. Contemporary organizational and management theories and techniques needed for effective administrative leadership in nursing education, practice, research, and entrepreneurial settings. F

614 Nursing Preceptorship (3) Individually designed practicum, field, or internship experiences in a variety of administrative, educational, research, clinical practice settings. Prereq: 620, 601, 602, 607, 608, 611. F

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 8 hrs. Sp.

Nutrition (College of Human Ecology)

MAJORS

DEGREES

Nutrition .................................................. M.S.
Foodservice and Lodging Administration ... M.S.
Human Ecology ........................................ Ph.D.

Michael B. Zemel, Head

Professors:
Beauchene, Roy E. (Emeritus), Ph.D. .............. Kansas State
Carruth, Betty Ruth, Ph.D. ........................ Missouri
Nutrition

ADMISSION REQUIREMENTS

A final file for review includes the Graduate School application form, 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.

Admission into any of the graduate programs in the department is dependent on completion of undergraduate courses that give the necessary background for success in the graduate program. For programs in Nutrition, essential undergraduate courses include: general and organic chemistry, physiological chemistry, nutrition, statistics, and advanced nutrition.

For the Master's program in Foodservice and Lodging Administration, undergraduate courses in foodservice and lodging administration, quantity food production, cost control, marketing, and personnel are essential. Applicants to all programs with related work experience may be given preference.

THE MASTER'S PROGRAM

Students may choose a thesis or non-thesis option in Nutrition of Foodservice and Lodging Administration. Attendance at HRA 537 (Foodservice and Lodging Administration) or NTR 540 (Nutrition) is required every semester.

Nutrition

Thesis Option: The program consists of a minimum of 33 hours with at least 16 hours of coursework in the department. NTR 511, 512, 540, 541 and 3 hours of graduate level statistics are required. Students in public health nutrition must take 511, 512, 513, 514, 515 and the minor in public health. Six hours of Thesis 500, and 5 hours outside the department are required. A minimum of 22 hours at the 500 or 600 level is required.

An oral comprehensive examination is required upon completion of the thesis.

Non-Thesis Option: The program consists of a minimum of 36 hours with at least 20 hours of coursework in the department. NTR 511, 512, 540, 541, 2 hours from 542-544 and 3 hours of graduate level statistics are required. Students in public health nutrition must take 511, 512, 513, 514, 515 and the minor in public health. Six hours in one area outside the department are required. A minimum of 24 hours at the 500 and 600 level is required.

A written comprehensive examination is required for completion of the program.

Foodservice and Lodging Administration

Thesis Option: The program consists of a minimum of 33 hours with at least 16 hours of coursework in the department. HRA 537, 546, NTR 541, and 3 hours of graduate-level statistics are required. Six hours of Thesis 500 are required. Six hours outside the department are recommended. A minimum of 22 hours at the 500 and 600 level is required.

An oral comprehensive examination is required upon completion of the thesis.

Non-Thesis Option: The program consists of a minimum of 36 hours with at least 20 hours of coursework in the department. HRA 537, 546, NTR 541 and 3 hours of graduate-level statistics are required. Six hours in one area outside the 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.

THE PH.D. CONCENTRATIONS

Nutrition Science

The nutrition science concentration enables students to study the science of nutrition from the cellular level to the application of nutritional principles by people in a changing environment.

The doctoral program emphasizes human nutrition, nutritional epidemiology, experimental nutrition, and intermediary metabolism. Cognate areas may include anthropology, biochemistry, chemistry, communications, education, food technology, human development, physiology, public health, sociology, statistics, and/or toxicology.

Minimum requirements include:
1. Sixteen hours in nutrition including 4 hours at the 600 level (exclusive of dissertation);
2. NTR 511, 512, 541, and 2 hours from either 542-544;
3. Four hours of NTR 540, attendance required every semester;
4. Professional seminar, HE 610;
5. Six hours of statistics;
6. Six hours in a cognate area;
7. Nine hours at the 600 level;
8. Students without college teaching experience are required to take the fall semester

teaching seminar for GTAs and NTR 548 comprising a faculty-supervised problem in college teaching.

Consumer Environments

Students enrolled in the Ph.D. program with a concentration in consumer environments are provided with a foundation of coursework relevant to understanding the consumer in the designed environment and management of facilities. From this base, students in foodservice and lodging administration focus on areas of specialization in foodservice systems and in lodging administration to further theory and the application of theory in the field. For further information, see consumer environments concentration under Human Ecology.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. program in Foodservice and Lodging Administration is available to residents of the states of Arkansas, Kentucky, South Carolina, or West Virginia. The M.S. program in Nutrition is available to residents of Arkansas, South Carolina, or Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records. For the Ph.D., see Human Ecology.

Nutrition

GRADUATE COURSES

414 Nutrient-Drug Interactions (2) Nutrient effects on efficacy and toxicity of drugs; drug effects on absorption and metabolism of nutrients. Prereq: Fundamentals of Nutrition or equivalent. Sp, A

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

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

508 Culture, Food, and Nutrition (3) Food-related behavior of individuals and groups in United States. Sociocultural, economic, and technological influences. Nutrition and food surveys, public policy. Prereq: Nutrition for Educators or Advanced Nutrition or consent of instructor. F, A

509 Graduate Seminar in Public Health (1) (Same as Public Health 509, Nursing 606, Physical Education 509 and Social Work 509.)

511 Advanced Physiological Chemistry (4) Bioenergetics, flux control and hormonal interrelationships. Prereq: Advanced Nutrition or equivalent. F


513 Community Nutrition I (3) Orientation to community, assessment of nutrition problems, needs, and resources; functional roles of public health nutritionist. Concurrent field experiences. Prereq: Advanced Nutrition or consent of instructor. F

514 Community Nutrition II (3) Planning, implementation, and evaluation of public health nutrition programs. Concurrent field experiences. Prereq: 513 or consent of instructor. Sp

515 Field Study in Community Nutrition (1-12) Personal participation in and analysis of state or regional community nutrition program. Location of in-depth study
to be selected in consultation with instructor. Prereq: 513, 514 and consent of instructor. S/N only. E

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 adults; nutritional requirements; dietary intake; effects of nutrition on biological aging. Prereq: Advanced Nutrition or consent of instructor. Sp

520 Nutritional Ecology (2) Examination of issues in natural, political, physical, and social environments that impact availability of food and nutrients in U.S. food supply. F, A

521 Physiological Basis for Diet and Disease (2) Altered nutrient needs as result of metabolic changes that occur in selected 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. Sp

527 Nutrition in Mental Retardation and Developmental Disabilities (1-4) Interdisciplinary diagnosis and treatment of developmentally-handicapped child; role of nutritionist; clinical experiences and lectures at Children’s Development Center, UT, Memphis. Prereq: Consent of department head. E

540 Seminar in Nutrition (1) May be repeated, S/N only. E

541 Research Methods (1) Basic principles of planning, conducting, and interpreting nutrition and foodservice systems administration research. Prereq: 6 graduate hrs in nutrition and food system administration and statistics. Sp

542 Advanced Experimental Nutrition (2) Application of research principles to individual project using experimental animals. Prereq or coreq: 541. Sp

543 Human Metabolic Research Methods (2) Application of research principles to conducting and interpreting metabolic study. Prereq or coreq: 541. Sp

544 Food and Nutrition Survey Methods (2) Project for assessment of food consumption, nutrient intake, nutritional status, and socioeconomic factors in populations. Prereq or coreq: 541. Sp

547 Field Experience (3-9) Experience in field-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

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

602 Independent Study (1-3) Critical evaluation of research. Prereq: 508 or consent of instructor. F, A

Hotel and Restaurant Administration

GRADUATE COURSES

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

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester the student uses University facilities and/or takes classes before degree completion. May be repeated toward degree requirement. May be repeated. S/N only. E

530 Computer-Assisted Foodservice and Lodging Management (3) Application of computer technology to foodservice and lodging industry. Inventory, cost accounting, production, nutrition analysis, operations research, and sales planning and analysis. Prereq: Quantity Food Procurement, Production and Service. E

531 Advanced Financial Management (3) Financial planning and operations and evaluation techniques used in foodservice and lodging management; developing budgets, accounting systems and financial reports. Prereq: Food and Lodging Cost Control or consent of instructor. F

532 Advanced Human Resource Management (3) Identifying labor needs; development and maintenance of work force. Prereq: Food and Lodging Personal Development or consent of instructor. F

533 Advanced Food Production and Delivery System Management (3) Analysis of food production and delivery systems; application of quantitative methods and models to organize decisions. Prereq: Quantity Food Procurement, Production and Service or consent of instructor. F

534 Special Topics in Foodservice and Lodging Administration (1-3) Lecturediscussion format. Contemporary developments and trends in industry. Prereq: Consent of instructor. May be repeated. E

535 Directed Study in Foodservice and Lodging Administration (1-3) Problems selected for study by student with guidance of faculty member. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

537 Seminar in Foodservice and Lodging Administration (1) May be repeated, S/N only. F

542 Advanced Hotel Administration (3) Strategic management of hotel organizations. Theoretical and applied literature on formulation and implementation of strategy; environmental and organizational factors affecting the planning process; development of conceptual models. Prereq: Consent of instructor. May be repeated, Maximum 6 hrs. E

544 Experimental Study of Quantity Food Production (3) Design and preparation of food products applicable to foodservice industry. Market research, sensory evaluation, production techniques, and nutritional evaluation of food. Prereq: Quantity Food Procurement, Production and Service with lab, or Observation, Hospitality Sales and Marketing, 542 and Nutrition 413, or equivalents. E

546 Foodservice and Lodging Administration Research Methods (2) Application of research methods to foodservice and lodging. Prereq or coreq: Nutrition 541. Sp

547 Field Experience (3-9) Experience in food- or lodging-related industry or agency under supervision of faculty member. Prereq: Consent of instructor. S/N only. E

555 Foodservice and Lodging Law (3) Management organization and policy as imposed or granted by law. Legai research to determine legal principles at state and federal levels. Prereq: Hospitality Law or equivalent, or consent of instructor. F

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

610 Advanced Topics in Lodging Administration (1-3) Individual study and discussion of topics related to current problems. Prereq: 542 or consent of instructor. F

620 Advanced Topics in Foodservice Administration (1-3) Individual study and discussion of topics related to current problems. Prereq: 533 or consent of instructor.

Ornamental Horticulture and Landscape Design

(College of Agricultural Sciences and Natural Resources)

MAJOR DEGREE

Ornamental Horticulture and Landscape Design.......................... M.S.

G. Douglas Crater, Head

Professors:

Callahan, L. M., Ph.D................................. Rutgers State

Critt, G. Douglas, Ph.D................................ Ohio State

Graham, E. T., Ph.D..................................... Penn State

Graveshoff, Peter M. (Chair of Excellence), Ph.D................................ Australian National

McDaniel, G. L., Ph.D....................................... Iowa State

Williams, Don B., Ph.D......................................... Penn State

Associate Professors:

Augé, Robert M., Ph.D................................ Washington State

Day, J. W., Ph.D. ................................................. Mississippi State

Rogers, S. M., M.A. ........................................... Georgia

Trigiano, R., Ph.D. .............................................. NC State

Witte, Willard T. (Liaison), Ph.D................................ Maryland

Assistant Professor:

Starman, Terri W., Ph.D. ........................................ Texas A&M

The Department of Ornamental Horticulture and Landscape Design offers the Master of Science with concentrations in floricultural science and technology, nursery science and technology, and turfgrass science and technology. Various interests may be emphasized in any of these commodity areas, including micropopagation, breeding, production and maintenance systems, computer-aided management systems, and the molecular biology, genetics, histology and stress physiology of ornamentals.

For admission, the student must have a B.S. in ornamental horticulture, horticulture, plant science, or a related agricultural or basic science discipline. Undergraduate transcripts must be evaluated by the department for prerequisite requirements, if any. Graduate research assistantships are available on a competitive basis. For further information, contact the department head.

THE MASTER’S PROGRAM

Thesis Option

1. A thesis is required. A Master’s committee of no fewer than 3 faculty members will be selected. Prior to research for the thesis, a proposal must be approved by the Master’s committee. Registration for 6 hours of Thesis 500 is required.

2. In addition to the thesis requirement, a minimum of 24 hours of graduate credit is required. Not more than 10 hours of the minimum 30 hours can be below the 500 level. The academic program must be approved by
the Master's committee which may require additional coursework if the student's progress or background indicates such need.
3. All students are required to include 510 Research Methods and 2 hours of 590 Seminar in their program and are expected to attend this course and participate in discussions each semester enrolled.
4. Twelve hours of coursework in the major must be at the graduate level, exclusive of Thesis 500.
5. An oral examination covering the thesis coursework is required.

Non-Thesis Option
1. A Master's committee of no fewer than 3 faculty members will be selected.
2. Thirty-four hours of graduate coursework are required of which 22 hours must be at the 500 level or above.
3. All students are required to include 2 hours of 590 Seminar in their program and are expected to attend this course and participate in discussions each semester enrolled.
4. Twelve hours of coursework in the major must be at the graduate level.
5. Final comprehensive written and oral examinations shall be taken upon completion of no fewer than 32 hours of approved graduate work.

GRADUATE COURSES
410 Nursery Management and Production (3) Modern management methods as applied to retail and wholesale nurseries and landscape contracting firms. Methods of producing liners, container and field-grown woody ornamental plants. Prereq: 220, 330, and Plant and Soil Science 210, or consent of instructor. 2 hrs and 1 lab. Sp
440 Advanced Turfgrass Management (4) Principles and scientific basis of turfgrass culture; adaptation, ecology, physiology, soil fertility, and grazing of turf; soil and grass influences on grass culture; physiology of clipping and water management; design, construction, and management of golf courses; and physiological influences of pest infestation and control measures. Prereq: 340 or consent of instructor. 3 hrs and 1 lab. Sp
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 contractual management in landscape services industry. Interaction with industry representatives through special presentations. Prereq: 350 or consent of instructor. F
480 Advanced Landscape Design (4) Comprehensive application of landscape design skills. Design applications involving site layout, landscape grading, applied landscape construction, planting design, analysis, programming, design, detailing, estimating, and specifying applicable to a variety of landscape projects. Prereq: 350, 360, and 380, or consent of instructor. 1 hr and 2 3-hr labs. Sp
485 Computer Aided Landscape Design (3) Overview of drafting and design (CAD): Site planning and construction of related landscape plan view and 3-D drawings; introduction to operating systems; techniques on the use of AutoCAD and LANDACAD software. Prereq: Fundamentals of Landscape Design, Microcomputer Applications to Problem Solving or consent of instructor. 2 3-hr labs. F, Sp
500 Thesis (1-15) P/NP only. E
501 Special Topics in Ornamental Horticulture and Landscape Design (1-3) Topics to be assigned. May be repeated. Maximum 6 hrs. Prereq: Consent of instructor. E
502 Registration for Use of Facilities (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

Pathobiology
(College of Veterinary Medicine)

<table>
<thead>
<tr>
<th>MAJOR</th>
<th>DEGREE</th>
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</thead>
<tbody>
<tr>
<td>Veterinary Medicine</td>
<td>D.V.M.</td>
</tr>
<tr>
<td>David O. Slauson, Head</td>
<td></td>
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<tr>
<td>Professors:</td>
<td></td>
</tr>
<tr>
<td>Edwards, D. F., D.V.M.</td>
<td>Georgia</td>
</tr>
<tr>
<td>McGavin, M. D., Ph.D.</td>
<td>Michigan State</td>
</tr>
<tr>
<td>Michel, R. L. (Emeritus), V. M. D.</td>
<td>Michigan State</td>
</tr>
<tr>
<td>Patton, S., D.V.M.</td>
<td>Ohio State</td>
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<tr>
<td>Powell, H. S. (Adjunct), D.V.M.</td>
<td>Georgia</td>
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<tr>
<td>Schuller, H. M., D.V.M., Ph.D.</td>
<td>Hannover</td>
</tr>
<tr>
<td>Shull, R. M., D.V.M.</td>
<td>Cornell</td>
</tr>
<tr>
<td>Slauson, D. O., D.V.M.</td>
<td>California (Davis)</td>
</tr>
<tr>
<td>Woycik, R. (Adjunct), Ph.D.</td>
<td>Case Western</td>
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<tr>
<td>Associate Professors:</td>
<td></td>
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<tr>
<td>McCracken, M. D., D.V.M., Ph.D.</td>
<td>Purdue</td>
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<tr>
<td>Wilkinson, J. E., D.V.M., Ph.D.</td>
<td>Cornell</td>
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<tr>
<td>Assistant Professors:</td>
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<tr>
<td>Bochsler, P. N., D.V.M., Ph.D.</td>
<td>Cornell</td>
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<tr>
<td>Godfrey, V. (Adjunct), D.V.M., Ph.D.</td>
<td>Tennessee</td>
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<tr>
<td>Kornegay, W., D.V.M., Ph.D.</td>
<td>Louisiana State</td>
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<tr>
<td>McEntee, M. F., D.V.M.</td>
<td>Cornell</td>
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<tr>
<td>Merriman, J. I., D.V.M., Ph.D.</td>
<td>Ohio State</td>
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<tr>
<td>Miller, M. S., Ph.D.</td>
<td>Columbia</td>
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<tr>
<td>Munson, L., D.V.M., Ph.D.</td>
<td>Cornell</td>
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<tr>
<td>Schultze, A. E., D.V.M., Ph.D.</td>
<td>Michigan State</td>
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<tr>
<td>Post-Doctoral Research Associates:</td>
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<tr>
<td>Jian, X., D.V.M.</td>
<td>China</td>
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<tr>
<td>Richards, W., Ph.D.</td>
<td>SUNY (Stony Brook)</td>
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<tr>
<td>Yang, Z., M.D.</td>
<td>China</td>
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<tr>
<td>Residents:</td>
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<tr>
<td>Brenneman, K., D.V.M.</td>
<td>Virginia</td>
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<tr>
<td>Dean, D. F., D.V.M.</td>
<td>Tennessee</td>
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<tr>
<td>Donnell, R., D.V.M.</td>
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<tr>
<td>Mason, G. L., D.V.M.</td>
<td>Texas A&amp;M</td>
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<tr>
<td>Richman, L., D.V.M.</td>
<td>Wisconsin</td>
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</tbody>
</table>

See Veterinary Medicine for program description.

GRADUATE COURSES
500 Thesis (1-15) P/NP only. E
501 Special Topics in Pathobiology (1-3) May be repeated. Maximum 6 hrs. E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/N only. E
600 Doctoral Research and Dissertation (3-15) P/NP only. E
601 Advanced Topics in Pathobiology (1-3) Necropsy, histopathology, clinical pathology, clinical parasitology, clinical immunology, clinical bacteriology and mycology, and clinical virology. May be repeated. Maximum 12 hrs. E
602 Veterinary Biopsy (1-2) Examination of biopsy specimens and interpretation of results. Preparation of specimens for sectioning. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. E
603 Correlative Post-Mortem Pathology (1-3) Gross and microscopic post-mortem examination of animals. Correlative interpretation of clinical diseases and lesions. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E
604 Veterinary Pathology Seminar (1) Microscopic slides and transparencies of lesions from cases examined by pathologists, residents, and graduate students. Interpretation of observations. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. E
605 Pathobiology Seminar (1) Subjects of current interest in biomedical science. Students present one seminar per term enrolled. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. Class meets once monthly. E
609 Mechanisms of Disease (4) Advanced topics in pathobiology and mechanisms of disease: pathophysiology, cellular degeneration, inflammation, immunopathology, hemostasis, principal biochemical and morphologic responses of various cells, tissues, and organs to injury and other metabolic derangements. Selection of contemporary topics from current literature and textbooks. Prereq: Consent of instructor. F,A

Philosophy
(College of Liberal Arts)

<table>
<thead>
<tr>
<th>MAJOR</th>
<th>DEGREES</th>
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<tbody>
<tr>
<td>Philosophy</td>
<td>M.A., Ph.D.</td>
</tr>
<tr>
<td>George G. Brenkert, Head</td>
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<tr>
<td>Professors:</td>
<td></td>
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<tr>
<td>Aquila, Richard E., Ph.D.</td>
<td>Northwestern</td>
</tr>
<tr>
<td>Brenkert, George G., Ph.D.</td>
<td>Michigan</td>
</tr>
<tr>
<td>Cebik, L. B., Ph.D.</td>
<td>Nebraska</td>
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<tr>
<td>Davis, John W. (Emeritus), Ph.D.</td>
<td>Emory</td>
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<tr>
<td>Edwards, Rem B., Ph.D.</td>
<td>Emory</td>
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<tr>
<td>Graber, Glenn C., Ph.D.</td>
<td>Michigan</td>
</tr>
<tr>
<td>Postow, Betsy G., Ph.D.</td>
<td>Yale</td>
</tr>
<tr>
<td>Van de Vate, Dwight Jr., Ph.D.</td>
<td>Yale</td>
</tr>
<tr>
<td>Associate Professors:</td>
<td></td>
</tr>
<tr>
<td>Bennett, James D., Ph.D.</td>
<td>Tulane</td>
</tr>
<tr>
<td>Bohstedt, Kathleen Emmett (Liaison), Ph.D.</td>
<td>Ohio State</td>
</tr>
</tbody>
</table>
THE DOCTORAL PROGRAM

An additional oral examination may be required. The non-thesis M.A. requires 30 hours of consultation with the student's faculty committee. There are no particular courses that M.A. students are required to take. The nature of the student's coursework should be determined in consultation with the student's faculty committee. The non-thesis M.A. requires 30 hours of coursework of which at least two-thirds must be in courses at or above the 500 level. Students seeking the non-thesis option must also pass a final written examination on all work offered for the degree. An additional oral examination may be required.

THE MASTER'S PROGRAM

The department offers both a thesis and a non-thesis option. The course requirements for an M.A. with thesis are 30 hours, including 6 hours in Philosophy 500. Of non-thesis hours, at least two-thirds must be in courses at or above the 500 level. No philosophy course numbered under 400 may be taken for graduate credit. There are no particular courses that M.A. students are required to take. The nature of the student's coursework should be determined in consultation with the student's faculty committee. The non-thesis M.A. requires 30 hours of coursework of which at least two-thirds must be in courses at or above the 500 level. Students seeking the non-thesis option must also pass a final written examination on all work offered for the degree. An additional oral examination may be required.

THE DOCTORAL PROGRAM

Specific requirements for doctoral students in Philosophy include a minimum of three academic years of graduate study involving at least 48 semester hours in coursework (normally 16 semester courses or their equivalent, exclusive of credit for thesis and dissertation) of which no fewer than 30 hours shall be in courses numbered over 500 and no fewer than 6 hours shall be in courses numbered over 600. The specific number and distribution of courses will be determined by the student's faculty committee.

Students must demonstrate a reading knowledge of one foreign language, normally a living language in which there exists a significant body of philosophical literature. (In special circumstances relating to the area of dissertation research, the Graduate Committee may approve a language not satisfying these conditions.) This may be done by passing the doctoral language examination given by the appropriate department, if available, or by passing French 302 or German 332 with a B or better. Bi- or multilingual (normally, foreign) students, whose native language (other than English) is one in which there is a significant body of philosophical literature, are exempted from the foreign language requirement. Students receiving the Ph.D. with concentration in medical ethics are also exempted.

CONCENTRATIONS

Medical Ethics

The department has an M.A. and Ph.D. program of graduate study with a concentration in medical ethics. Detailed information concerning the program may be obtained from either the Director of Graduate Studies in Philosophy or the Director of the Medical Ethics Program.

Religious Studies

The department has an M.A. program of graduate study with a concentration in religious studies. Details concerning the program may be obtained from either the Director of Graduate Studies in Philosophy or the Department of Religious Studies.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.A. and Ph.D. programs in Philosophy are available to residents of the states of Alabama, Kentucky (concentration in medical ethics only), Maryland (concentration in medical ethics only), Texas (concentration in medical ethics only), Virginia (concentration in medical ethics only), or West Virginia; the Ph.D. program to residents of Arkansas (concentration in medical ethics only), Louisiana, or Mississippi; and the M.A. program to residents of Oklahoma (concentration in medical ethics only). Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

400 Special Topics (3) May be repeated when topic varies. Maximum 6 hrs.

411 Modern Religious Philosophies (3) (Same as Religious Studies 411.)

412 Classical Indian Systems of Philosophy: The Moksha Tradition (3) (Same as Religious Studies 412.)

420 Topics in History of Philosophy (3) Figures or movements from antiquity through mid-twentieth century. Prereq: 6 hrs of philosophy or consent of instructor. May be repeated when topic varies. Maximum 9 hrs.

425 American Philosophy (3) Colonial to early 20th Century. Prereq: 6 hrs of philosophy or consent of instructor.

430 Topics in Logic (3) Prereq: 6 hrs of logic or consent of instructor. May be repeated when topic varies. Maximum 6 hrs.

440 Contemporary Ethical Theory (3) Topics in meta-ethics or ethics. Prereq: 6 hrs of philosophy or consent of instructor.

446 Theoretical Issues in Medical Ethics (3) Prereq: 240 or 345 or consent of instructor. (Same as Religious Studies 446.)

460 Philosophy of Science (3) Methodological and conceptual issues in natural and social sciences: patterns of theory and model; methodology and replacement; nature of explanation and causation, status of theoretical entities. Prereq: 350 and 1 yr of natural or social science, or consent of instructor.

465 Philosophy of History (3) Speculative and critical aspects of philosophy of history. Prereq: 6 hrs of philosophy or consent of instructor.

473 Philosophy of Mind (3) Problems of mind and body in relation to consciousness and personal identity. Prereq: 6 hrs of philosophy or consent of instructor.

475 Analytic Metaphysics and Epistemology (3) Topics in metaphysics and epistemology in recent Anglo-American tradition. Prereq: 6 hrs of philosophy or consent of instructor.

476 Philosophy of Language (3) Survey of issues such as meaning, reference, and truth. Prereq: 6 hrs of philosophy or consent of instructor.

479 Studies in Recent Continental Philosophy (3) Selected thinkers or topics: existentialism, phenomenology, hermeneutics, structuralism, post-structuralism. Prereq: 6 hrs of philosophy or consent of instructor. May be repeated when topic varies. Maximum 6 hrs.

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

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

520 Topics in the History of Ancient and Medieval Philosophy (3) Intensive critical work on major philosopher or school. May be repeated. Maximum 9 hrs.

522 Topics in the History of Modern Philosophy (3) Intensive critical work on major philosopher or school. May be repeated. Maximum 9 hrs.

524 Topics in the History of Twentieth-Century European Philosophy (3) Intensive critical work on major philosopher or school. May be repeated. Maximum 9 hrs.

530 Topics in Logic and Philosophy of Mathematics (3) May be repeated. Maximum 9 hrs.

540 Topics in Value Theory (3) May be repeated. Maximum 9 hrs.

542 Ethics (3) Dominant movements in history of ethics. May be repeated. Maximum 9 hrs.

544 Applied Ethical Theory (3) Single author, tradition, or topic in ethical theory; application to issues in health, business, technology, ecology, and other practical fields. May be repeated. Maximum 9 hrs.

548 Orientation to Medical Ethics (3) Survey of ethical theories in application to issues in medical ethics. Prereq: Consent of Medical Ethics Committee.

547 Clinical Medical Ethics (3) Medical terminology, history of medical ethics, case study discussion, clinical observation. Open only to students concentrating in medical ethics. May be repeated. Maximum 9 hrs.

553 Philosophical Topics in Literature and the Arts (3) Aesthetics, criticism, art and society. May be repeated. Maximum 9 hrs.

560 Philosophy of Natural Sciences (3) Nature of subject matter and method of science. May be repeated. Maximum 9 hrs.


575 Topics in Metaphysics and Epistemology (3) May be repeated. Maximum 9 hrs.

577 Philosophy of Mind (3) Relation of mental to physical and of role of words in discourse for mental activities, thinking and feeling. May be repeated. Maximum 9 hrs.

590 Social and Political Philosophy (3) Philosophical problems concerning social and political life: family, state, freedom, justice; major theoretical responses: anarchism, socialist, contract, Marxism. May be repeated. Maximum 9 hrs.

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

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

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

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

620 Topics in the History of Ancient and Medieval European Philosophy (3) May be repeated. Maximum 9 hrs.

622 Topics in the History of Modern Philosophy (3) May be repeated. Maximum 9 hrs.

624 Topics in the History of 20th-Century Philosophy (3) May be repeated. Maximum 9 hrs.
Physics and Astronomy

(College of Liberal Arts)

MAJOR DEGREES

Physics ........................................ M.S., Ph.D.

William M. Bugg, Head

Professors:
- Bingham, C. R., Ph.D. ................................ Tennessee
- Biss, W. E., Ph.D. .................................. Michigan State
- Breaza-lea, M. A., Ph.D. ............................ Michigan State
- Breining, M. Ph.D. .................................. Oregon
- Bugg, W. M., Ph.D. .................................. Tennessee
- Burgoefer, J., Ph.D. ................................. Frie Universitat Berlin
- Calcutt, T. A., Ph.D. ................................. Purdue
- Childers, R. W., Ph.D. ............................... Vanderbilt
- Christophorou, L. G., Ph.D. ....................... Manchester
- Colgiazer, E. W., Ph.D. ............................... Cal Tech
- Condo, G. T., Ph.D. .................................. Illinois
- Crater, H. W. (UTSI), Ph.D. ....................... Yale
- Deeds, W. E. (Emeritus) ............................ Ohio State
- Duckett, K. E., Ph.D. ............................... Tennessee
- Eleton, S. B., Ph.D. .................................. Massachusetts
- Fox, K. Ph.D. ........................................ Michigan
- Gallar, N. M. (Emeritus), Ph.D. ..................... Ohio State
- Georghiou, S., Ph.D. ................................. Manchester
- Guldry, M. W., Ph.D. ................................ Tennessee
- Handler, T. H., Ph.D. ................................. Rutgers
- Harris, E. G. (Distinguished Prof.), Ph.D. ....... Tennessee
- Hart, E. L. (Liaison), Ph.D. ......................... Cornell
- Jacobson, H. C., Ph.D. ............................... Yale
- King, D. T. (Emeritus), Ph.D. ....................... Bristol
- Lewis, J. W. L. (UTSI), Ph.D. ....................... Mississippi
- Macek, J. (Distinguished Scientist), Ph.D. ........... Rensselaer
- Mahan, G. D. (Distinguished Scientist), Ph.D. ....... California
- Mason, A. A. (UTSI), Ph.D. ......................... Tennessee
- McGregor, W. K. (UTSI), Ph.D. ..................... Tennessee
- Nielsen, A. H. (Emeritus), Ph.D. .................. Michigan
- Obenshain, F. E., Jr., Ph.D. ......................... Pittsburgh
- Painter, L. R., Ph.D. ................................. Tennessee
- Peg, D. J., Ph.D. ................................. New Hampshire
- Plummer, E. W. (Distinguished Scientist), Ph.D. ....... Pennsylvania State
- Quinn, J. J. (Lincoln Chair), Ph.D. .............. Maryland
- Riedinger, L. L., Ph.D. .............................. Vanderbilt
- Ritchie, R. H., Ph.D. ................................. Tennessee
- Rusk, W. R. (Emeritus), M.S. .......... Tennessee
- Sander, W. Ph.D. ...................................... Freiburg
- Sellin, I. A. (Chancellor's Research Scholar), Ph.D. .... Chicago
- Shih, C. C., Ph.D. ................................. Cornell
- Strayer, R. M., Ph.D. ............................... MIT
- Thompson, J. R., Ph.D. ........................... Duke
- Thomas, J. O. (Emeritus), Ph.D. ................. Illinois
- Ward, F. L., Ph.D. .................................... Princeton
- Wheeler, G. W. (Emeritus), Ph.D. ................. Yale
- White, J. W. (Emeritus), Ph.D. .................. North Carolina

Associate Professors:
- Barnes, F. E., Ph.D. .............................. Caltech
- Aguiluz, Adolfo G., Ph.D. ....................... Brown
- Ferrall, T. Ph.D. ................................... Clemson
- Lide, R. W. (Emeritus), Ph.D. .................... Michigan
- Muñihuausen, J. W. (UTSI), Ph.D. .............. Tennessee
- Shieh, S. Y., Ph.D. ................................. Maryland
- Sorenson, P. S., Ph.D. ............................. Copenhagen

Assistant Professors:
- Carign, G. Ph.D. .................................... Tennessee
- Daunt, S. J., Ph.D. ................................. Queens
- Harmatz, R., Ph.D. ................................. Ohio State
- Levin, J. C., Ph.D. ................................ Oregon
- Menzel, R. (UTSI), Ph.D. ........................... Tennessee
- Read, K. Ph.D. ..................................... Cornell
- Sanders, A. J., Ph.D. .............................. Tufts
- Siopsis, G., Ph.D. ............................... Cal Tech
- Wettling, H. H., Ph.D. ............................ Groningen (Netherlands)

Research Professors:
- Blankenship, J. L., Ph.D. ......................... Tennessee
- Kamyckov, I., Ph.D. ............................... ITEP (Russia)
- Zhang, J., Ph.D. ..................................... Lanzhou

Research Associate Professors:
- Du, Yuan-Cai, Ph.D. ............................... Beijing
- McCorkle, D. L., Ph.D. .............................. Pennsylvania
- Saini, Suresh, Ph.D. ............................... Bombay

Research Assistant Professors:
- Chen, X., Ph.D. .................................... Purdue
- Davis, L. (UTSI), Ph.D. ............................ Auckland
- Ormand, W. E., Ph.D. .............................. Michigan State
- Painkevitch, L., Ph.D. ............................... Pittsburgh
- Yost, S. A., Ph.D. ................................. Princeton

Instructors:
- Fairman, R. C., B.A. ............................... Earlham
- Readinger, T. M. ................................. Vanderbilt

Graduate programs leading to the Master of Science and the Doctor of Philosophy are offered in a number of concentration areas: atomic and low temperature physics; biophysics; chemical physics; elementary particle physics; health physics; heavy ion atomic physics; molecular spectroscopy; nuclear physics; plasma physics; condensed matter physics; theoretical physics, and ultrasonics.

Departmental graduate programs leading to the M.S. and Ph.D. are also available at The University of Tennessee Space Institute, Tullahoma, where opportunities for study and research are available in quantum optics and laser physics, atomic and molecular spectroscopy, fluid physics, and theoretical physics. For additional information, contact the department head.

ADMISSION REQUIREMENTS

A student who intends to enroll in The Graduate School with the intention of attaining an advanced degree in Physics will have completed an undergraduate major in Physics or its equivalent. Physics 311-12, 321, 431-32, 421, 451, 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.

Physics 311-12, 321, 431-32, 421, 451, 461, and 411-12 constitute the minimum coursework prerequisite to graduate study.
Astronomy

GRADUATE COURSES

411 Astrophysics (3) Development of analytical physical models of galactic structure of universe, stellar and interstellar matter, and planetary systems. Topical and interdisciplinary, consideration of quasars, pulsars, black holes and current developments in field. Acceptable for major credit in Physics. Prereq: Physics 222 and consent of instructor.

490 Special Topics in Astronomy (1-3) Topics of current interest in astronomy and astrophysics. Acceptable for graduate credit in physics with consent of department. May be repeated with consent of department. Maximum 9 hrs.

Physics

GRADUATE COURSES


421 Modern Optics (4) Transmission of light in uniform, isotropic media; reflection and transmission at interfaces; mathematics of wave motion and interference effects. Rudiments of Fouier optics and holography. Prereq: 431, or Fundamentals of Physics: Wave Motion, Optics, and Modern Physics, or Honors: Mechanics and Heat, and consent of instructor.


461-62 Modern Physics Laboratory (3,3) 1. Introduction to fundamental and modern techniques in experimental physics, and to theory and practice of measurement and data analysis. Selected experiments in nuclear, atomic, molecular and solid state physics, and modern optics. Prereq: Electronics Laboratory and other Fundamentals of Physics: Modern Physics or 411, 482. Advanced experiments and experimental techniques in modern physics; experimental team work. Thorough quantum mechanical interpretation of results and preparation of scientific reports. Prereq. 461. 6 hrs lab per week.

471-72 Health Physics (3,3) Reactivitv, interaction of electromagnetic radiation with matter, radiation quantities, ionization and radiolysis, radioactive and extended sources, x-rays and gamma rays, neutron activation, interaction of charged particles with matter, stopping power, range, energy relations, counting statistics, shielding, dosimetry, waste disposal, criticality prevention, radiation biology and ecology. Prereq: Consent of instructor.

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 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 that student is an active University faculty member. May not be used toward degree requirements. May be repeated. S/NC only. E

506 Experimental Methods (3) Principles, real operational behavior of detectors of different types, use of vibration detectors, photomultiplier tubes, image intensifiers, image converters, image dissectors, streak cameras, and fast-frame cameras; high-vacuum systems including cryogenic-based vacuum systems or other ionization techniques including synchronous detection, digital electronics methods and micro-computer data acquisition and registration methods.

507 Contemporary Optics (3) Topics in geometrical, physical, Fourier, and nonlinear optics and introduction to laser physics. Extensive use of computer calculations and design of practical and sophisticated optical systems.

508 Laser Physics (3) Mode analysis, stable and unstable resonators; rate equations and population inversion, saturation, relaxation oscillations, fluctuations and noise, laser stability; quantum theory of laser, photon coherence; modes and frequency stabilization; specific laser types: semiconductor and solid-state, excimer, copper vapor and dye lasers.

511-12 Theoretical Physics (3,3) Classical theoretical physics, with limited use of mathematics. Prereq: 312, 432, selected calculus, differential equations, and vector analysis.


532 Advanced Classical Mechanics (3) Variational principles, canonical transformations, Hamilton-Jacobi theory, nonlinear mechanics, elasticity, fluid mechanics. Prereq: 531.


561 The Theory of Relativity (3) Geometry of spacetime, relativistic electrodynamics, particle mechanics and continuum mechanics, Einstein's field equations, Schwarzschild solutions, the classical test of general relativity. Prereq: or coreq: 531 and 542.


574 Group Theory for Physicists (3) Introduction to abstract group theory, discrete and continuous groups, representation theory. Nother'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 Liberal Arts.

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

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

594 Special Problems (3) Especially assigned theoretical or experimental work on problems not covered in other courses. May be repeated. Maximum 9 hrs. E


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


606 Nonlinear Optics (3) Nonlinear optical susceptibilities, wave propagation in nonlinear media, sum-frequency and difference frequency generation, harmonic generation, parametric amplification and oscillation, stimulated Raman processes, two- and multi-photon processes, wave mixing problems, interferometry, coherence, coherence, coherent optical effects and frequency, optical breakdown and nonlinear effects in plasmas. Prereq: 571-72.

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, counting and high-order coherence; atomic scattering phenomena. Prereq: 521.

611 Advanced Quantum Mechanics & Field Theory (3) Second quantization, quantization of electromagnetic field, emission, absorption, and scattering of light, bremsstrahlung, pair creation and annihilation, quantum field theory methods in condensed matter physics, and quantum optics. Topics vary according to instructor. Prereq: 522 and 542 or equivalent. Prereq or coreq: 561 or consent of instructor.

612 Advanced Topics in Quantum Field Theory (3) Renormalization, Lantti shift, anomalous magnetic monopoles, gauge theories, electroweak theory, quantum chromodynamics, grand unified theories, and advanced topics in laser physics and quantum optics. Topics vary according to interest of students, instructor and present state of physics. Prereq: 561 or 611 or consent of instructor.

621-22 Nuclear Structure (3,3) General properties of nucleus; two-body scattering problems; saturation and symmetry properties of nuclear forces. Nuclear structure of light nucleus; nuclear spectroscopy; special nuclear models; theory of nuclear reactions; theory of beta-decay. Prereq: 571-72.

626-27 Elementary Particle Physics (3,3) Survey of elementary particle physics with emphasis on 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 and thermodynamics. Prereq: 522.

642 Advanced Topics in Quantum Theory (3) To meet special needs of students. Angular-momentum theory,
Planning
(Compliance of Architecture and Planning)

MAJOR
DEGREE
Planning..................................M.S.P.

David A. Patterson, Acting Director

Professors:
Johnston, David A., Ph.D. ..........Cornell
Kenney, Kenneth B., Ph.D. ..........North Carolina
Shouse, Walter L. (Emeritus), M.C.P. ....Harvard
Spencer, James A. (Liaison), M.C.P. ....Ohio State

Associate Professors:
Bowen, George E., M.A. ..........George Washington

Assistant Professor:
Anderson, Annette, M.P.A. ..........Missouri (Kansas City)

Research Associate Professor:
Putnam, Sandra, Ph.D. ..........Brown

Research Assistant Professor:
Newson, Theodore, Ph.D. ..........Penn State

The Graduate School of Planning offers a program of studies leading to the professional degree of Master of Science in Planning. The degree is the normal route for entry into professional positions in urban and regional planning or related positions. Graduates are candidates for positions in regional, city, county, and metropolitan planning agencies; in local, state, and federal agencies concerned with physical, economic, and administrative planning; in private business and organization; and in private consulting.

The Master of Science in Planning program is accredited by the Planning Accreditation Board, a joint undertaking of the American Institute of Certified Planners and the Association of Collegiate Schools of Planning.

THE MASTER'S PROGRAM

Admission Requirements
Applicants are to submit an application for admission to The Graduate School, two letters of reference from faculty familiar with their prior academic work, and a statement describing personal career objectives. If the applicant has prior work experience in planning, a reference letter should also be provided by the work supervisor. Graduate Record Examination scores are requested of all applicants whose undergraduate GPA is below 3.0. Other applicants are encouraged to submit them.

Degree Requirements
The M.S.P. requires completion of at least 48 hours of graduate credit, at least 30 of which must be in planning. The following courses are the core curriculum required of all students: 510, 511, 515, 520, 521, 523, 530, 531, 532, 540, and 545.

Students should plan to enter the program in the fall term to take the core courses in the proper sequence.

Each student is required to develop an area of concentration beyond the core curriculum. After selecting the area of concentration, usually by the end of the second semester, the student takes a minimum number of courses or hours from a prescribed set of courses in the subject area. Further enhancement of the concentration is gained by taking additional elective courses in the subject and by focusing the thesis or major paper on the subject. Concentration courses are drawn from the planning curriculum and from other departments in the University. Concentrations are available in land use planning, information systems in planning, economic development planning, real estate development planning, transportation planning, environmental planning, historic preservation planning, and international planning.

Students have the latitude to propose an alternate specialization consisting of at least 9 hours of coursework, subject to approval of a faculty committee.

Each student is required to demonstrate competence in individual research. This may be done in one of two ways:

The Thesis Option—Complete a thesis for 6 hours credit;

The Non-Thesis Option—Complete a major study with acceptable documentation. To be eligible for the major study option, the student must have completed at least 12 hours of graduate coursework in planning with at least a 3.5 cumulative grade-point average. The student meeting these criteria may present a proposal to his/her committee for a major study that will include at least 6 hours of subsequent coursework. The proposal shall justify the selection of the topic, describe the approach to the study, and describe the nature of the final product. The topic will normally be expected to reinforce or complement the student's concentration.

Student academic progress is monitored by the faculty. A student failing to maintain an acceptable grade-point average may be placed on probation or dismissed from the program.

ACADEMIC COMMON MARKET

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

GRADUATE COURSES

401 The City in the U.S. (3) Development and character of U.S. cities: Contemporary issues and selected case studies. (Same as Urban Studies 401.)

402 Survey of Planning (3) History of city development and planning; U.S. experience in urban areas and other levels of planning. State of the art, process, comprehensive plan, implementation problems. Planning issues in society. Not for M.S.P. degree.

446 Housing (3) Nature and demand for housing in U.S. and abroad, U.S. experiences in private market processes and public influences. Problems of change in housing supply, impact of new technology, and governmental programs to improve supply and quality of housing.

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

501 Thesis and Major Paper Proposal Writing (1) Preparation

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

510 Fundamentals of Planning (2) History of planning, structure and development of urban areas, operations of contemporary planning, trends and issues.

511 Graphic and Oral Communications in Planning (1)

515 Theory of Planning (2) Analysis of nature and objectives of planning process; role of planner and planning function in public decision-making. Prereq: 510 or consent of instructor.

520 Planning Research Methods (3) Research techniques in subject areas associated with city and regional planning. Research tools, data collection and analysis as basis for planning and decision-making.

521 Computers in Planning (3) Basic computer concepts, hardware and software, use of mainframe and microcomputers in planning and government.

523 Statistics for Planners (3) Applications of descriptive and inferential classical and non-parametric techniques in planning research. Data organization and display, measures of location, dispersion and association; data transformations; some basic probability theory; sample and two sample tests; correlation and regression analysis. Prereq: 520 or consent of instructor.


526 Library Research for Planning (1) Survey of publications of interest to planners, research, and research techniques. Use of facilities and collections of library.

530 Planning Analysis and Forecasting (3) Methods of quantitative analysis and modeling in urban and regional studies. Population, employment, and economic
Plant and Soil Science

(College of Agricultural Sciences and Natural Resources)

MAJOR DEGREES

Plant and Soil Science ......................... M.S., Ph.D.

John E. Foss, Head

Professors:
Allen, Fred L., Ph.D. ....................... Minnesota
Bell, Frank F. (Emeritus), Ph.D. .... Iowa State
Boisvel, F. C. (Adjunct), Ph.D. .... Pennsylvania
Coffey, D. L., Ph.D. ......................... Purdue
Conger, B. V. (Distinguished Prof.), Ph.D. Washington State
Duck, B. N., Ph.D. ......................... Auburn
Foss, John E., Ph.D. ....................... Minnesota
Fribourg, Henry A., Ph.D. ............. Iowa State
Hayes, R. M., Ph.D. ....................... Illinois
Howard, D. D., Ph.D. ...................... Auburn
Josephson, L. M. (Emeritus), Ph.D. .... Wisconsin
Luxmore, R. J. (Adjunct) (California) (Riverside)
Mullins, C. A., Ph.D. ..................... Tennessee
Parks, William L. (Emeritus), Ph.D. .... Purdue
Reynolds, John H., Ph.D. .......... Wisconsin
Seatz, Lloyd F. (Emeritus), Ph.D. .... NC State
Skold, L. N. (Emeritus), M.S. ............ Kansas State
Springer, M. E. (Emeritus), Ph.D. ........ California
Swingle, H. D. (Emeritus), Ph.D. ........
Tyler, D. D., Ph.D. ......................... Kentucky

Associate Professors:
Ammons, J. T., Ph.D. ..................... West Virginia
Dayton, D. E. (Liaison), Ph.D. ........... NC State
Krueger, W. A., Ph.D. ................. Illinois
Lee, S. Y. (Adjunct), Ph.D. .......... Wisconsin
Lessman, Gary M., Ph.D. .............. Michigan State
Lewis, R. J., Ph.D. ......................... NC State
Logan, Joanne, Ph.D. ................. Nebraska
Miller, R. D., Ph.D. ....................... Kentucky
Reich, V. H., Ph.D. ....................... Iowa State
Sams, C. E., Ph.D. ......................... Michigan State
West, D. R., Ph.D. ......................... Nebraska
Wyatt, J. E., Ph.D. ......................... Florida

Assistant Professors:
Essington, M. E., Ph.D. .................. California (Riverside)
Mueller, Thomas C., Ph.D. ............ Georgia
Mullen, M. D., Ph.D. ..................... NC State
Newton, D. (Adjunct), M.S. ............. Kentucky
Wilson, G. V., Ph.D. ...................... Arkansas

The Department of Plant and Soil Science offers graduate programs leading to the Master of Science and the Doctor of Philosophy. Concentrations for the graduate programs are offered in soil science, plant breeding and genetics, and crop physiology and ecology. For further information, contact the department head.

THE DOCTORAL PROGRAM

A minimum of 72 hours beyond the Bachelor's degree, exclusive of credit for Thesis 500, is required. Of this number, 24 hours must be Doctoral Research and Dissertation 600. A minimum of 26 hours must be completed in courses numbered above 500 exclusive of doctoral research and dissertation, of which 6 must be in courses numbered above 600. A minimum of 9 hours of graduate course work taken during the doctoral program must be outside the department in one or more cognate areas.

The student and the major professor identify a doctoral committee composed of at least four faculty members holding the rank of assistant professor or above, three of whom, including the chair, must be approved by the Graduate Council to direct doctoral research. At least one member must be from outside the department.
The committee must approve all coursework applied toward the degree, certify the student's mastery of the major field and any cognate fields, direct the research, and recommend the dissertation for approval and acceptance by The Graduate School.

GRADUATE COURSES

411 Soil Microbiology (3) Soil microbial populations and role in soil ecosystem, microbial transformation of inorganic and organic compounds, decomposition of residues, dynamics of soil organic matter. Prereq: Intro-duction to Soil Science and Introduction to Organic and Biochemistry or Organic Chemistry or consent of instructor. 2 hrs and 1 lab. F.A

412 Soil Genesis, Classification, and Mapping (3) Soil genesis and formation; observing and describing morphology of agricultural and forest soils; chemical and physical properties, classification, mapping. Two Saturday field trips. Prereq: 210 or consent of instructor. 2 hrs and 1 lab. Sp.

413 Soil Chemistry (3) Principles concerning structure and chemical properties of soil materials; colloidal fraction as related to soil chemical change, chemical equilibria, soil acidity, oxidation-reduction, weathering, nutrient availability and waste disposal. Prereq: 311 or consent of instructor. F.

414 Soil, Land Use, and the Environment (3) Soil as environmental component and soil-plant interactions affecting land use. Soil as resource in development planning; consideration of nonengineering aspects of site selection for land use, soil survey and resource data in land use, recognition and prevention of soil pollution. Prereq: 210 or consent of instructor. Sp., A.

415 Soil Hydrology (3) Physical relationships among solid, liquid, and gaseous phases of soil system. Relationships of soil properties to processes governing transport of water and solutes in soil. Prereq: Introduction to Soil Science. 2 hrs and 1 lab. F.A

431 Crop Physiology and Ecology (3) Principles of plant physiology and ecology as applied to crop production. Effects of environmental factors on physiological processes. Prereq: 320, Botany 321. 2 hrs and 1 lab. F.A

432 Bioclimatology (3) Solar energy budget: interactions between global, regional and local climates and biological systems; quantification of macro- and microclimatic effects; and their modification; automated weather station data collection and analyses; biological responses to climatic stress; climate variation and change and their effects on biological systems. Prereq: 1 yr physical or biological sciences, junior standing. 2 hrs and 1 lab. F.A.

433 Agricultural Pesticides (3) Regulation of pesticide development, manufacture, transportation, marketing and use. Structure, use, mode of action, degradation and environmental impact of pesticides used in agriculture, forestry and related areas. Prereq: 1 yr. 1 yr biological sciences and 1 semester chemistry. 2 hrs and 1 lab. Sp.

434 Postharvest Biology and Technology (3) Principles, methods and techniques related to maintenance of quality of horticultural commodities. Preharvest handling, harvesting, storage facilities and techniques, quality evaluation and biological and physiological mechanisms related to storage and shelf life. Prereq: Graduate credit requires a short lab project in addition to regular class assignments. Two Saturday field trips. Prereq: 1 y. 2 hrs and 1 lab. Sp.

435 Principles of Plant Breeding (3) Genetic principles and techniques related to maintenance of quality of horticultural commodities. Preharvest handling, harvesting, storage facilities and techniques, quality evaluation and biological and physiological mechanisms related to storage and shelf life. Prereq: 220 or equivalent. 2 hrs and 1 lab. Sp.

471 Statistics for Biological Research (3) Application of statistics to interpretation of biological research. Nota-tion, descriptive statistics, probability, distributions, confidence intervals, hypothesis testing, analysis of variance, mean separation procedures, linear regression and correlation. Prereq: Mathematics 121 or equivalent. F

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

501 Seminar Preparation (1) Application of speaking, writing, and organizational 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, 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 complete. May not be used toward degree requirements. May be repeated. S/N only. E


511 Advanced Soil Fertility (3) Concepts of soil chemistry as related to nutrient movement and adsorption by plant roots. Fertilizer use efficiency as measured by plant response factors. Prereq: 413. Sp., A

512 Pedology (3) Principles and chemical weathering processes, factors of soil formation, soil forming processes. Prereq: 412 or consent of instructor. 2 hrs and 1 lab. F.

514 Advanced Soil Physics (3) Theory and mathematical modeling of flow and solute transport in saturated and unsaturated soils: (a) soil physical properties; (b) soil thermal properties; (c) soil hydraulic properties. Prereq: Calculus III, 415, or consent of instructor. F.

530 Integrated Pest Management (3) (Same as Entomology 343.)

532 Advanced Crop Ecology (3) General and specific relationships among environmental factors, crop organisms, and agricultural systems; quantification of macro- and microclimatic effects on crop growth; world climates, crop distribution and productivity, human cultures, and their interaction. Prereq: 471 or equivalent, 431 or equivalent, or Agricultural Climatology or equivalent. 2 hrs and 1 lab. F.

551 Advanced Plant Genetics (3) Discovery of genetic mechanisms, induced mutations, genome organization, polyplody, tetrasomic inheritance, extrasomatic inheritance, apomixis, incompatibility systems, and genetic engineering of higher plants. Prereq: Biology 220. F.


571 Design and Analysis of Biological Research (3) (Same as Animal Science 571.)

593 Special Problems in Plant and Soil Science (1-3) May be repeated. Maximum 6 hrs. E.

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

601 Special Topics in Soil Science (1-3) Thermodynamics of soil solutions, clay structure and surface chemistry, soil mineralogy, plant mineral nutrition, soil microbiology, water movement and use by plants, soil structure, soil thermal properties, interaction in the soil-plant environment. May be repeated. Maximum 6 hrs. E.

603 Special Topics in Crop Physiology and Ecology (1-3) Microclimatology of agroecosystems, crop dormancy and responses to stress, physiology of crop growth and reproduction. Interactions of physiology and gametophyton in crop production, theory and application of quantitative methods in crop physiology and ecology research. May be repeated. Maximum 6 hrs. E.

605 Special Topics in Plant Breeding and Genetics (1-3) Genotype by environment interactions, estimation of quantitative parameters, mutations, chromosome dynamics, polyploidy, genetic engineering, interspecific hybridization, inbreeding, heterosis, molecular genetics, genome organization. May be repeated. Maximum 6 hrs. E.

613 Advanced Soil Chemistry (3) Surface and colloidal chemistry of soil minerals; recent developments in ion speciation, ion movement, surface charge, surface complexation theory and chemical stability. Prereq: 413 or consent of instructor. Sp., A.


633 Plant Growth Control and Herbicide Action (3) Principles of uptake, translocation, mode of action and uses of herbicides and plant growth regulators and their effects on plant morphology, metabolic systems and enzymatic activities. Practical aspects and commercial uses of plant growth regulators. Prereq: Botany 521 and 522 or equivalent. F, A.

653 Advanced Plant Breeding (4) Development and utilization of concepts of population, genetic, environmental and hereditary factors, and their interaction. Prereq: 413, 471 or equivalent. Maximum 6 hrs. E.

671 Advanced Research Planning (3) Development of research proposals utilizing prescribed sources and emphasizing experimental design and statistical techniques. Prereq: 571, Animal Science 572, Statistics 461, or equivalent. F, A.

Political Science

(College of Liberal Arts)

MAJORS

DEGREES

Political Science ................................ M.A., Ph.D.

Public Administration ............................. M.P.A., J.D., M.P.A.

Michael Gant, Head

Professors:

Carlisle, D. H. (Emeritus), Ph.D. .................. North Carolina

Filzgerald, Michael M., Ph.D. .................... Oklahoma

Gant, Michael M., Ph.D. ........................... Michigan State

Gorman, Robert A., Ph.D. ........................ New York

Iredell, Vernon R., Ph.D. .......................... Chicago

Lyons, William, Ph.D. .............................. Indiana

Plass, Hyram, Ph.D. ............................... Utah

Robinson, Nelson M. (Emeritus), Ph.D. ....... Syracuse

Smith, T. Alexander, Ph.D. ........................ Ohio State

Stephens, Otis H. (Distinguished Prof.), Ph.D. .......... Johns Hopkins

Ungs, Thomas D., Ph.D. ........................... Iowa

Welborn, David M., Ph.D. ........................ Texas

Associate Professors:

Cunningham, Robert B., Ph.D. .................... Indiana

Evans, Gill C., Ph.D. ................................. Columbia

Folz, David H. (Liaison), Ph.D. ................... Tennessee

Freeland, Patricia K., Ph.D. ...................... Wisconsin (Milwaukee)

Peterson, Robert L., Ph.D. .......................... Yale

Scheb, John M., II (Liaison), Ph.D. ......... Florida

Assistant Professors:

Houston, David J., Ph.D. ........................ SUNY (Binghamton)

Nowness, Anthony J., Ph.D. ........................ Kansas

Richardson, Lillard, Ph.D. ........................ Texas

Salinger-McBride, Jan, Ph.D. ................... California (Santa Barbara)

Zhong, Yang, Ph.D. ................................. Kentucky

The Department of Political Science offers the M.A., M.P.A., and Ph.D. The department also offers a dual program with the College of Law. Inquiries concerning all programs should be directed to the departmental office.

ADMISSION REQUIREMENTS

Three departmental recommendation forms must be submitted to The Graduate School, 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 also required together with an average of 3.2 in the last two years of political science or social science. In addition, a composite score of at least 1100 on the verbal and quantitative parts of the GRE is normally required.

Students pursuing the Master of Arts degree may follow one of two options:

1. Non-Thesis Option: (36 hours) Coursework, preparation of a thesis, and an oral examination on coursework and the thesis, is required. At least 12 of these hours must be in political science, with 6 in the field of methodology (Political Science 510 and 512). Six hours may be earned through thesis credit.

2. Thesis Option: (30 hours) Coursework, preparation of a thesis, and an oral examination on coursework and the thesis, is required. At least 12 of these hours must be in political science, with 6 in the field of methodology (Political Science 510 and 512), and 3 hours in the 600-level research seminar in the student's first field of interest.

THE MASTER OF PUBLIC ADMINISTRATION PROGRAM

The M.P.A. program is intended to prepare students for public service careers by acquainting them with management principles, analytical tools, and the ethical dilemmas they face as public administrators. It consists of a total of 39 semester hours, including a core program, an elective specialization and a recommended internship.

Applicants for admission to the program must have a Bachelor's degree or its equivalent. Normally, an overall average of 3.0 and an average of 3.2 in the last two years of political science or social science courses is required. In addition, a composite score of at least 1100 on the verbal and quantitative parts of the GRE is normally required.

Students must demonstrate proficiency in the use of personal computers prior to the completion of 3 credit hours in the M.P.A. program. Students may fulfill this requirement by successful completion of a short course(s) offered by the UT Computing Center. The Coordinator of the M.P.A. program will provide a list of acceptable courses. Exceptions to this requirement will be considered on an individual basis.

The M.P.A. is a non-thesis program. Specific requirements include the following:

1. Core - 21 hours.
   b. Analytical skills (6 hours): 521 Quantitative Political Analysis; 524 Research and Methodology in Public Administration.
   c. Management skills (6 hours): 560 Public Budgeting; and either 562 Public Management or 564 Human Resources Management in Public Administration.
2. Specialization - 9 hours.

A specialization is designed by the student in consultation with the coordinator of the M.P.A. program. Possible specializations include general government, public health, budgeting and finance, planning, natural resources, program evaluation, criminal justice, public relations, personnel, and others.

3. Recommended internship with a public agency - 6 hours.

Internships are arranged in consultation with the coordinator of the M.P.A. program.

4. A written final examination, which may be followed by an oral examination, is required.

DUAL J.D.-M.P.A. PROGRAM

The College of Law and the Department of Political Science in the College of Liberal Arts 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. Applicants must also be accepted by the Dual Degree Committee. All applicants must submit a Law School Admission Test (LSAT) score. An applicant's LSAT score may be substituted for the Graduate Record Examination (GRE) score, which is normally required for admission to the M.P.A. program. Application may be made prior to or after matriculation in either the J.D. or the M.P.A. program, but application to the dual program must be made prior to entry into the last 29 semester hours required for the J.D. degree and prior to entry into the last 15 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 credit is awarded must be approved by the J.D.-M.P.A. coordinators in the College of Law and the Department of Political Science. All candidates for the dual degree must successfully complete Administrative Law (Law 821) and are encouraged to take Local Government (Law 824). An internship is strongly recommended for students in the dual degree program, as it is for all M.P.A. candidates, but an internship is not required.

During the first two years in the dual program, students will spend one academic year completing the required first year of the College of Law curriculum and one academic year taking courses solely in the M.P.A. program. During those first two years, students may not take courses in the opposite area, without the approval of the J.D.-M.P.A. coordinators in both academic units. In the third and fourth years, students are strongly encouraged to take both law and political science courses each semester.

Dual degree students who withdraw from the program before completion of the requirements for both degrees will not receive credit toward either the J.D. or the M.P.A. degree for courses taken in the other program except as such courses qualify for credit without regard to the dual program.

Awards 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 into the 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 3.0 GPA (3.5 for international students) and have earned a composite score of at least 1100 on the verbal and quantitative parts of the Graduate Record Examination.

Students admitted to the program must complete 78 hours of course work beyond the Bachelor's degree, 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. This requirement may be satisfied either by demonstrating competency in one foreign language, or by completing 12 hours of coursework, numbered 500 or above, in empirical methodology.

In addition to the total hours required for the degree, the following requirements must also be met:

1. At least 63 hours must be in political science courses.
2. At least 48 hours in political science courses must be in courses numbered 500 or above.
3. Completion of Political Science 510 and 512.
4. At least 6 hours must be earned in political science courses numbered above 600, exclusive of dissertation hours.
5. A total of 24 hours must be earned by writing the dissertation.

MINOR IN ENVIRONMENTAL POLICY

The department participates in a program designed to give Master's level graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. See Economics for program description.
GRADUATE COURSES

430 United States Constitutional Law: Sources of Power and Restraint (3) Analysis of judicial review, constitutional powers of President and Congress, federalism, sources of regulatory authority, and constitutional protection of political and economic rights.

431 U.S. Constitutional Law: Civil Rights and Liberties (3) Analysis of current issues in civil rights and liberties including: first amendment freedoms, equal protection, privacy and rights of accused.

442 Administrative Law (3) Legal dimensions of administrative power and procedures, and constitutional controls over administrators.

452 Black African Politics (3) Recent evolution and current political environment of Black African nations. (Same as Afro-American Studies 452.)

454 Government and Politics of China and Japan (3) Examination of the political setting, structure and political processes in China and Japan.

455 Latin American Government and Politics II (3) Selected topics on Latin American political dynamics, consideration of leading theoretical explanations. (Same as Latin American Studies 455.)

458 Government and Politics of the Soviet Union (3) Origins and development of Soviet political system, and study of selected policy areas.

461 Policy Making in Democracies (3) Comparative approach to theory and process of making public policies.

463 Contemporary Middle East Politics (3) Governments and movements in Middle East, their characteristics, bases, and interrelationships.

470 International Law (3) Nature and development of international law and compliance. Function of international law in context of international conflict.

475 Ancient and Medieval Political Thought (3) Survey of major western political thinkers from Socrates to Machiavelli to Marx.

476 Modern Political Thought (3) Survey of major western political thinkers from Machiavelli to Marx.

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

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

510 Scope and Methods in Political Science (3) Procedures of analysis in political science.

512 Quantitative Political Analysis (3) Methods and techniques in quantitative political analysis: univariate and bivariate statistics.

513 Quantitative Political Analysis (3) Methods and techniques in quantitative political analysis: multivariate model building.

514 Research and Methodology in Public Administration (3) Basic assumptions and techniques of research in public administration; measurement, analysis, and reporting of data.

520 Political Theory (3) Survey of major ideas, thinkers and works of Western political theory.

522 American Political Thought (3) Systematic examination of the normative and empirical theories of leading American political thinkers from the colonial period to the present.

530 American Government and Politics (3) Survey of literature, approaches to research and analysis, critical examination of major works, and overviews of research in various subfields. May be repeated with consent of department. Maximum 9 hrs.

532 Presidency (3) Systematic examination of the structure, functions and powers of the American presidency as they have evolved from the founding to the present.

533 Congress (3) Formal, empirical and theoretical approaches to and models of the institutional workings of Congress and the behavior of legislators.

535 Mass Political Behavior (3) Theoretical and empirical 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 analyses of government, politics, policymaking and public administration at the state and local levels.

540 Public Law (3) Selective examination of published research and current approaches in subfields of constitutional, administrative, judicial processes, and judicial behavior. May be repeated with consent of department. Maximum 9 hrs.

546 Law and the Administrative Process (3) Constitutional position, decisional processes, regulation and management. Limitations on governmental action; questions of structure, role, and administrative choice. May be repeated with consent of department. Maximum 9 hrs.

549 Public Policy Process (3) Theoretical, formal and empirical analysis of the roles, functions and decision making processes of public policymakers, including legislative, executive and judicial actors.

550 Public Administration (3) Overview of public administration theory and function.

552 Organization Theory (3) Appraisal of major theories of organization and their applicability to public sector.

553 Management of Information Systems (3) Theory, design, development, implementation and evaluation of information systems in public organizations. Database systems, computer applications, and training for management information technology.

556 Policy Analysis (3) Strategies and techniques for identification and analysis of public problems and policy solutions. May be repeated with consent of department. Maximum 9 hrs.

558 The Politics of Administration (3) Examination of public administration in context of American political system, policy making and political roles of public administrators and agencies. May be repeated with consent of department. Maximum 9 hrs.

560 Public Budgeting and Finance (3) Technical and political aspects of planning, preparing and adopting government budgets. Management implications of revenue raising, debt management, treasury function, accounting, internal auditing, purchasing, risk management, post-auditing.

562 Public Management (3) Interpersonal and leadership skills, techniques and methods for planning, decision making, and implementation of management strategies in public sector. May be repeated with consent of department. Maximum 9 hrs.


566 Ethics, Values, and Morality in Public Administration (3) Moral-ethical-value dilemmas confronting administrators in American political system.

569 Internship in Public Administration (3-9) Open to students participating in approved internship programs. May be repeated with consent of department. Maximum 9 hrs.

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 Liberal Arts.

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

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

595 Readings and Special Problems in Political Science (1-3) Prereq: Consent of instructor. May be repeated. Maximum 15 hrs.

600 Doctoral Research and Dissertation (3-15) P/NP only. May be repeated. Maximum 9 hrs.

610 Special Topics in Empirical Methodology and Methodology (3) Advanced methods and procedures of analysis in political science. May be repeated with consent of department. Maximum 9 hrs.

615 Formal Political Analysis (3) Assumptions, methods and applications of formal political models, including game theory, rational choice theory, and public choice theory, and mathematical modeling. May be repeated with consent of instructor. Maximum 9 hrs.

628 Topics in Political Theory (3) Selected issues and problems in normative political theory. Specific content determined by instructor. May be repeated with consent of instructor. Maximum 9 hrs.

639 Special Topics in American Government and Politics (3) Advanced study of selected topics. May be repeated with consent of instructor. Maximum 9 hrs.

640 Special Topics in U.S. Constitutional Law (3) 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 research and public policy formulation: criminal process; law enforcement administration; criminal court administration; and prison administration. May be repeated with consent of department. Maximum 9 hrs.

654 Contemporary Public Policies (3) Problems in one or more public policy areas 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.

667 Comparative Public Administration (3) Comparison of policy-making structures and public policies in selected countries. May be repeated with consent of department. Maximum 9 hrs.

668 Special Topics in Public Administration (3) Analysis of selected issues and problems in public administration. May be repeated. Maximum 9 hrs.

670 Special Topics in Comparative Government and Politics (3) Research into selected topics. May be repeated with consent of department. Maximum 9 hrs.

682 Theory and Analysis of U.S. Foreign Policy Processes (3) Theoretical approaches to decision making in foreign policy area and analysis of 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.

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Polymer Engineering

See Materials Science and Engineering

Psychology

(College of Liberal Arts)

MAJOR

DEGREES

Psychology ........................................... M.A., Ph.D.

Warren H. Jones, Head
Professors:
Burghardt, Gordon M., Ph.D. ....................... Chicago
Burstein, Alvin G., Ph.D. .......................... Chicago
Caihoun, William H., Ph.D. ....................... California
Cohen, Charles P., Ph.D. .......................... Kansas
Fine, Harold J. (Emeritus), Ph.D. ............... Syracuse
Handel, Stephen J., Ph.D. ........................ Johns Hopkins
Handler, Leonard, Ph.D. ........................... Michigan State
Johnson, Michael G., Ph.D. ........................ Johns Hopkins
Jones, Warren H., Ph.D. ........................... Oklahoma State
Lawler, James E., Ph.D. ............................ North Carolina
Lawler, Kathleen A. (Liaison), Ph.D. ......... North Carolina
Loensburg, John W., Ph.D. ........................ Michigan State
Lubar, Joel F., Ph.D. ............................... Chicago
Malone, John C., Ph.D. ............................ Duke
Newton, Kenneth R. (Emeritus), Ph.D. ....... Tennessee
Pollie, Howard R. (Distinguished Prof.), Ph.D. ....................... Michigan
Samejima, Fumiko, Ph.D. ........................... Keio
Saudargas, Richard S., Ph.D. ........................... Florida State
Shadrer, Raymond R. (Emeritus), Ph.D. ............ Tennessee
Sundstorm, Eric D., Ph.D. .......................... Utah
Travis, Cheryl B., Ph.D. ............................ California (Davis)
Verplanck, William S. (Emeritus), Ph.D. ....... Brown
Wahler, Robert G. (Liaison), Ph.D. .............. Washington
Wibberley, J. Albert (Emeritus), Ph.D. .......... Syracuse

Associate Professors:
Mcintyre, Anne, Ph.D. .............................. Yale
Morgan, Wesley G., Ph.D. .......................... Tennessee
Nash, Michael R., Ph.D. ............................ Ohio

Assistant Professors:
Baldwin, Debora R., Ph.D. ........................ Kent State
Hopson, Ronald E., Ph.D. ........................ Michigan State
Welsh, Deborah, Ph.D. .............................. Massachusetts

THE MASTER'S PROGRAM
Graduate study leading to the M.A. degree in psychology is available with a concentration in experimental psychology. This program is appropriate for students who desire a Master's degree as part of their progress toward a doctorate or for those who wish to complement a degree in a different field.

Admission
Any student with a B.A. or B.S. may apply to the Department of Psychology for admission to the Master's program. All students must also submit scores from the Graduate Record Examination (general and subject).

Major Advisor and Committee
Initially, the Director of Experimental Psychology will advise the student. As soon as possible, the student must select an advisor and obtain his or her approval for registration. Subsequently, the advisor and student will select two additional faculty members to comprise the student's Major 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 504-505, or Statistics 537-538 or an equivalent sequence, 420; six semester hours of Thesis 500; and twelve hours of 500- or 600-level foundation courses. Students must earn a grade of B or better in all courses that are to count toward the 30-hour total.

THE DOCTORAL PROGRAM
A student with a B.A. or B.S. may apply to the Department of Psychology for admission to the doctoral program with a concentration in general psychology or clinical psychology. The doctoral program with a concentration in psychology is offered through the Life Sciences Program. Doctoral study in psychology is available with a concentration in experimental psychology. This program is offered through the Intercollegiate Program in Industrial and Organizational Psychology, to which application is made through the Department of Management.

Departmental Requirements
All students in the doctoral program in psychology must obtain a score of at least 630 on the GRE in psychology by the end of the first year, and all students must pass the departmental general psychology examination (a comprehensive, two-day essay exam offered twice each year) by the end of the second year. In addition, each student must pass the doctoral comprehensive examination, complete an acceptable dissertation, and conduct a satisfactory oral defense of the dissertation. All doctoral students must complete a minimum of 78 hours of graduate-level courses, including courses required by their program; at least 6 hours in courses outside of psychology; and at least 24 hours of dissertation research (Psychology 600).

General Psychology
This program allows students to select from a variety of specializations oriented toward careers in research and teaching in psychology in academic, institutional, or industrial settings. The program is designed to lay the groundwork for a career as a clinical psychologist capable of working in both academic and applied settings. The program emphasizes the theoretical foundations of psychology as well as supervised experience oriented toward the development of practical skills. The program is designed to prepare students for a variety of careers in psychology. Requirements are as follows:

1. Statistics 537-38, or equivalent, and two additional courses numbered above 500 in psychology (600 hours).
2. Competence in general psychology, demonstrated by completing Psychology 513 (Foundations of Psychology) or Psychology 565 (History and Systems of Psychology) or equivalent, plus at least one course or sequence or equivalent from each of the following categories in the following list. (This requirement may be met by passing approved written examinations.)
   a. Biological psychology: 461-69 Psychophysical Psychology and Laboratory; 526, Neuroanatomy; 527 Behavioral Neurology.
   d. Developmental psychology: 511 Developmental Psychology; 512 Life-span Development; 574 Child Psychopathology.
   e. Individual differences and personality: 445 Measurement and Testing; 470 Theories of Personality.
   g. Research practicum (509) - research apprenticeship involving participation in the ongoing research of two different members of the faculty during the first two semesters in the program.
   h. Pre-dissertation research project completed during the second year, involving the collection of original data or original analysis of existing data, reported in publishable form and acceptable to the doctoral supervisory committee.
   i. At least 4 graduate seminars in psychology numbered above 600.

Clinical Psychology
This program is designed to lay the groundwork for a career as a clinical psychologist capable of working in both academic and applied settings. The program emphasizes the theoretical foundations of psychology as well as supervised experience oriented toward the development of practical skills. The program is designed to prepare students for a variety of careers in psychology. Requirements are as follows:

1. Apprenticeship with a faculty member during the first year, one day each week.
2. Pre-dissertation research project completed before forming a doctoral supervisory committee, reported in written form acceptable to the student's faculty advisor and the director of clinical training.
3. Supervised clinical placement two days (16 hours) each week during the second, third, and fourth years.
4. Satisfactory completion of listed courses (or equivalents) in the following nine categories:
   a. Foundations of Psychology (513);
   b. Measurement and Testing (445);
   c. Personality Theory and Research (570-71);
   d. Lifespan Development (512);
   e. Statistics and research methods (504, 505).
   f. Psychopathology (572, 573, 574);
   g. Psychological Assessment (504-505, 506);
   h. Psychotherapy (670, 671, 673, 675);
   i. Ethical, Legal, and Professional Issues (635).
5. Satisfactory completion of at least 3 additional graduate-level courses in non-clinical topics in psychology.
6. Satisfactory completion of a one-year clinical internship at a site approved by the program.

MINOR IN GERONTOLOGY
Graduate students in the Department of Psychology may pursue a specialized minor in gerontology. This interdisciplinary/interdisciplinary minor gives the student an opportunity for combining the knowledge about aging in American society with his/her major concentration. Please refer to Human Ecology for specific requirements.
GRADUATE COURSES


409 Group Facilitation (3) Study of theory and technique through supervised experience in small groups. Prereq: 359 and consent of instructor. May be repeated. Maximum 6 hrs.


424 Psychology and the Law (3) Psychological aspects of legal systems. Prereq: 110 or equivalent, upper-division standing and consent of instructor.

430 Health Psychology (3) Survey of psychological factors related to health and illness: stress, personality, and environment. Applications of psychological treatments to physical illness. Prereq: 110 or equivalent, 210.

434 Psychology of Gender (3) Biological, psychological, and social factors in gender. Importance of gender roles and stereotypes for behavior and experience. Prereq: 110 or equivalent, 210, 220. (Same as Women's Studies 434.)

440 Organizational Psychology (3) Social-psychological analysis of organizations, role-theory and systems theory. Prereq: 210, 220.


450 Comparative Animal Behavior (3) (Same as Zoology 450.)

459 Comparative Animal Behavior Laboratory (3) Coreq: 450. (Same as Zoology 459.)

461 Physiological Psychology (3) Nervous system and physiological correlates of behavior. Biological basis of emotion, learning, memory and stress. Prereq: 110 or equivalent, 210, and 1 yr. of biology or zoology introductory courses.

469 Laboratory in Physiological Psychology (3) Laboratory studies of nervous system and physiological correlates of behavior. Coreq: 461.

470 Theories of Personality (3) Survey of major theories of human personality and their development. Prereq: 220 and 300 or 330.

480 Theories of Learning (3) Classical and current approaches to learning and cognition. Prereq: 310.

482 Topics in Psychology (3) Intensive analysis of special topics: Afro-American psychology or evaluation of programs in community. Prereq: Biological Basis of Behavior or Experience: Humanistic Psychology and at least 9 hrs. in 300-level courses. Recommended prereq: Statistics in Psychology. Methods of Research in Psychology. May be repeated. Maximum 6 hrs.

489 Supervised Research (1-9) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs. in 389, 489, 491, 492, and 493 combined may apply toward undergraduate major.

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

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any 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-evaluations. Development of questions and hypotheses, and use of studies to maximize validity. Prereq: Consent of instructor. Sp

508 Readings and Special Issues in Psychology (1-3) Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E

509 Research Practicum (1-3) Required of first-year graduate students in psychology. May be repeated. Maximum 6 hrs. S/WNC only. Coreq: Consent of instructor.

510 Topics in Psychology (3) Intensive examination of selected issues in psychology. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

511 Developmental Psychology (3) Normal processes of human socialization: physical, cognitive, and emotional development and its problems from infancy, childhood, and adolescence. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. F

512 Life-Span Development (3) Theories and research concerning normal human development throughout life, adulthood and old age. Prereq. Consent of instructor.

513 Foundations of Psychology: Biological Factors, Perception, Learning, Thinking, Motivation (4) Intensive survey. Prereq: Consent of instructor.

516 Colloquium in Ethology (1) Current research and theory. May be repeated. Maximum 9 hrs. (Same as Zoology 516.) S/N only. E

517-19 Proseminar in Industrial and Organizational Psychology (3,3) (Same as Management 517-519.)

520 Interventions for Behavioral Change (3) Principles and techniques for planning, implementing, and evaluating interventions derived from social learning theory. Interventions by people in community: teachers or supervisors. Token economics and strategies for self-control. Prereq: Consent of instructor.

525 Laboratory Techniques and Instrumentation (3) Procedures for laboratory research involving humans and non-human animals; techniques for collecting, transforming, storing, and retrieving data using microcomputers. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

526 General Vertebrate Neuroanatomy (3) Lecture and laboratory. Structure and functioning of central and peripheral nervous system. Prereq: 469, 461, or equivalent and consent of instructor. (Same as Zoology 526.)

527 Behavioral Neurology (3) Disorders of nervous system, organic brain dysfunctions. Diagnosis and treatment. Prereq: Consent of instructor.

528 College Teaching in Psychology (3) Concepts, techniques, and materials for teaching psychology at college and/or university levels. Supervised practice. Prereq: Consent of instructor. S/N only.


545 Advanced Animal Behavior (3) (Same as Zoology 545.)

546 Ethological Psychology (3) Basic ethology and comparative psychology. Implications for human behavior. Prereq: Consent of instructor.

547 Conceptual Foundations of Evolution and Behavior (3) Critical evaluation of seminal writings on theory and methods in comparative analysis of behavior. (Same as Zoology 547.)

550 Social Psychology (3) Survey of theory and research concerning interpersonal interaction and individual behavior in social context. Prereq: Consent of instructor.

555 Psychometrics (3) Basic concepts: factor analysis, scaling, test theories, and their applications, computerized adaptive testing and other topics. Prereq: Statistics 537,538 or equivalent. May be repeated. Maximum 6 hrs.

557 Applied Psychological Measurement (3) Issues and techniques in applying psychological measurement in organizational, clinical, and community research. Prereq: Statistics 537,538 or equivalent consent of instructor. May be repeated. Maximum 6 hrs.

558 Interviewing and Observation (3) Sensitizing students to own feelings and beliefs and to feelings of interviewee, and analysis of language content, style, and body language. Exploration of various important aspects of interviewee's life. Prereq: Admission to doctoral program in psychological or consent of instructor. Coreq: 556.

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: 492 or consent of instructor. May be repeated. Maximum 6 hrs.

565 History and Systems of Psychology (3) History of philosophy concerning psychology. Major systems of psychology which emerged during 20th century. Prereq: Graduate standing. Sp

570 Personality: Theory and Research I (3) Advanced survey of psychodynamic and neo-Freudian approaches to personality; related research. Prereq: Admission to clinical program or consent of instructor.

571 Personality: Theory and Research II (3) Advanced survey of behavioral and humanistic approaches to personality; related research. Prereq: Admission to clinical program or consent of instructor.

572 Descriptive Psychopharmacology (3) Diagnostic criteria of the DSM-III. Examples from written case-histories and recorded interviews. Prereq: Admission to doctoral program in clinical psychology or consent of instructor.

573 Dynamics of Psychopathology (3) Psychodynamic view of the causes and symptoms of major psychoses, personality disorders and adjustment disorders. Prereq: Admission to doctoral program in clinical psychology or consent of instructor.

574 Atypical Development in Childhood (3) Research on etiologies of atypical patterns of development in infancy and childhood. Prereq: 511 and consent of instructor. May be repeated. Maximum 6 hrs.

575 Psychopharmacology (3) Connections between pharmacology and psychology. Prereq: Consent of instructor.

576 Object Relations (3) European and American conceptions of normal and psychopathological development of object relations. Significance for psychotherapy, psychoanalysis, and psychodynamic theory. Prereq: Admission to doctoral program in clinical psychology or consent of instructor.

578 Clinical Aspects of Human Sexuality (3) Variation in human sexual behavior. Theories of etiology, treatment. Prereq: Consent of instructor.

580 Research Questions and Designs (3) Question-asking process in research and strategies or designs through which answers might be derived. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. S/N only.

585 Assessment (3) Basic concepts and techniques of adult assessment. Intelligence tests and personality tests. Prereq: Admission to doctoral program in clinical psychology or consent of instructor.


593 Independent, Off-campus, or Foreign Study (1-15) Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. S/N only.

594 Psychological Assessment I (3) Basic concepts and techniques of adult assessment. Intelligence tests and personality tests. Prereq: Admission to doctoral program in clinical psychology or consent of instructor.

599 Psychological Assessment II (3) Basic concepts and techniques of adult assessment. Intelligence tests and personality tests. Prereq: Admission to doctoral program in clinical psychology or consent of instructor.

599 Laboratory in Psychological Assessment (1) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. Coreqs: 594 or 595. May be repeated. Maximum 4 hrs. S/N only. Sp

597 Evaluation of Development in Childhood (3) Structured and projective tests and interview techniques for evaluation of intellectual, personality, and social development in childhood. Prereq: 511 and admission to
Religious Studies

(College of Liberal Arts)

Charles H. Reynolds, Head

Professors:
Dungan, David L., Th.D. ................. Harvard
Heffernan, Thomas (Adjunct), Ph.D. Cambridge
Humphreys, W. Lee, Ph.D. ............... Union
Linge, David E., Ph.D. ................... Vanderbilt
Lusby, F. Stanley (Emeritus).
M.Div. .................................... Colgate Rochester
Norman, Ralph V., Jr., Ph.D. ............ Yale
Reynolds, Charles H., Ph.D. ............ Harvard

Associate Professors:
Fitzgerald, James L., Ph.D. ............. Chicago
Gwynne, Rosalind W., Ph.D. .......... Washington
Hackett, Rosalind I. J., Ph.D. ............ Aberdeen
Hodges, John O., Ph.D. ............... Chicago
Levinger, Miriam L., Ph.D. ............. Harvard

Assistant Professors:
Hulsether, Mark, Ph.D. .................... Minnesota
Schmidt, G. Gerda, Ph.D. ............. Pittsburgh
Tober, Linda (Adjunct), Ph.D. ............ Vanderbilt

A Master’s degree in Philosophy with a concentration in religious studies is available. (Details of this program are described under Philosophy.) Graduate courses in religious studies provide opportunity for students in a variety of disciplines to pursue work in religious studies as a graduate concentration.

GRADUATE COURSES

411 Modern Religious Philosophies (3) Religious implications of major Western thinkers and movements from Nicolas of Cusa to nineteenth-century German Idealists. (Same as Philosophy 411.)
420 Seminar in American Religion (3) Selected figures, themes, movements, and problems. Content varies. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.
421 Seminar in Western Religions (3) Selected figures, themes, movements, and problems. Content varies. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.
425 Seminar in Western Religions (3) Selected figures, themes, movements, and problems. Content varies. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.
430 Seminar in American Religion (3) Selected figures, themes, movements, and problems. Content varies. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.
435 Seminar in Asian Religion (3) Selected figures, themes, movements, and problems. Content varies. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.
440 Seminar in Comparative Religion (3) Selected figures, themes, movements, and problems. Content varies. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.
445 Theological Issues in Medical Ethics (3) (Same as Philosophy 445)
450 Readings and Research in Religious Studies (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.
451 Topics in Religious Thought (3) Prereq: Consent of instructor.
490 Prospective Seminars in Religious Studies (3) For advanced students in religious studies; required for majors. Selected specific topics; nature and function of myth in religion, problem of evil, transcendence, theories of

The Department of Religion and Philosophy offers two advanced degrees: the Master of Arts in Religious Studies and the Doctor of Philosophy in Religious Studies. Minor concentrations are also available in Religious Studies and Philosophy. Faculty members are active in research and publication in a variety of areas, including the history of religion, religious anthropology, religious history, philosophy of religion, and the philosophy of science. The department also offers a wide range of courses in religious studies, including courses in Asian religions, American religions, Western religions, and comparative religion. Students interested in pursuing advanced study in religious studies should consult with the department chair or the graduate chair to plan their course of study.
THE DOCTORAL PROGRAM

Requirements for the Ph.D.

Candidates must complete a minimum of 63 semester hours of coursework beyond the Bachelor's degree, distributed as follows:

1. First Concentration: French, German, or Spanish. It consists of a minimum of 39 semester hours beyond the Bachelor's degree, distributed as follows:
   - A maximum of 45 hours of 400-level classes taken for the M.A. may be applied.
   - A minimum of 27 hours at the 500 level (exclusive of thesis hours) including French 584 (3), German 550 (3), or Spanish 550 (3); German 512 (3), French 512 (3), or Spanish 512 (3); French 515-16 (2,2) or German 520 (3).
   - At least 12 hours at the 600 level (exclusive of dissertation hours).

2. Second Concentration: French, German, Italian, Russian, or Spanish (different from the first concentration). It consists of at least 18 hours of courses beyond the Bachelor's degree, at least 12 of which must be at the 500 or 600 level.

3. Cognate Field: Six hours must be in graduate courses numbered 400 and above in a field outside the department of the first concentration but related to the student's principal area of research. If the cognate field is yet a third foreign language, a reading proficiency exam will be administered upon completion of the 6 cognate hours by the language section concerned.

   The coursework for Track II must be distributed as follows:
   - A minimum of 45 hours in the first concentration;
   - A minimum of 12 hours in the second concentration;
   - A minimum of 12 hours in the cognate field.

   1. First Concentration: French or Spanish. It consists of a minimum of 45 semester hours beyond the Bachelor's degree, distributed as follows:
      - A maximum of 45 hours of 400-level classes taken for the M.A. may be applied.
      - A minimum of 27 hours at the 500 level (exclusive of thesis hours) including French 584 (3), German 550 (3), or Spanish 550 (3); French 512 (3) or Spanish 512 (3); and French 516 (2) or the appropriate Spanish course.
      - At least 12 hours at the 600 level (exclusive of dissertation hours).

   2. Second Concentration: French, German, Italian, Portuguese, Russian, or Spanish (different from the first concentration). It consists of at least 12 hours, with a minimum of 3 hours at the 500 level. Students are strongly encouraged to take classes that complement the primary area of expertise in the first concentration, so that this second concentration will be a useful research tool for the dissertation and future professional activities. (Because Track II students will have taken 12 graduate hours instead of 18 hours in the second concentration, they will normally not be eligible to teach that language at institutions which follow SACS guidelines for college foreign language teaching.)

   3. Cognate Field: Six hours must be in courses numbered 400 and above and in a field outside the candidate's first concentration but related to the student's principal area of research. If the cognate field is yet a third foreign language, a reading proficiency exam will be administered upon completion of the 6 cognate hours by the language section concerned.

   4. Additional requirements for both tracks: A student must demonstrate competence in the languages of both the first and second concentrations by taking a test in each language. The test will include reading, writing, listening, and speaking, and should be completed by the time the student reaches 40 hours of study beyond the bachelor's degree. Standardized examinations that may be used for this purpose include applicable portions of either the National Teachers Examination, the MLA Examination for Teachers and Advanced Students, or the proficiency standards of the United States Foreign Service Institute (FSI).

   If the student has not chosen a third language as his or her cognate area, basic competence (determined by a reading examination with translation into English administered by the department concerned) in a third language is required. If the student's first and second languages are Romance languages, the third language should be chosen from another language family.

   A comprehensive examination on the language and literature of the first and second concentrations must be passed before the student may be admitted to candidacy. The candidate is required to defend his/her dissertation in an oral examination. Central emphasis is put on the doctoral dissertation as a final test of the candidate's scholarly qualifications.

   Graduate Teaching Assistants in the program should have the opportunity and will be strongly encouraged to instruct at least two foreign languages, subject to staffing needs.

   Doctoral students are strongly encouraged to reside and study abroad and will be assisted in identifying potential sources of financial support (e.g., Fulbright, McClure, Rotary fellowships).

   For additional courses, see Germanic and Slavic Languages.

ACADEMIC COMMON MARKET

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

Asian Languages

GRADUATE COURSES

431 Readings in Chinese Literature (3) Prereq: Mastery of intermediate-level Chinese or consent of instructor. May be repeated. Maximum 9 hrs.

451 Readings in Japanese Literature (3) Prereq: Mastery of intermediate-level Japanese or consent of instructor. May be repeated. Maximum 9 hrs.

471 Selected Topics in Asian Studies (3) Content varies. May be repeated. Maximum 9 hrs.

French

GRADUATE COURSES


411 French Literature of the 16th Century (3) Highlights of 16th-century French literature. Excerpts from Rabelais and Montaigne; readings of poems from writers from Lyon and members of Pléiade. Prereq: 212, 218 or equivalent.

413 French Literature of the 18th Century (3) Major works of Enlightenment. Prereq: 212, 218 or equivalent.


416 Survey of Francophone Literature (3) Examination of French literature outside metropolitan France, particularly Africa and Caribbean. Prereq: 212, 218 or equivalent.

420 French Cinema (3) French cinema from earliest days through New Wave directors. Prereq: 212, 218 or equivalent. May apply toward major.


422 Advanced Grammar (3) Improving one's written French by studying basic and more refined structures of French language. Writing creative free-style compositions. Prereq: 342 or 345.

423-24 Advanced Conversation (1,1) Informal conversation with native speaker on contemporary topics. Stresses in-class contact rather than outside preparation. Prereq: 342 or 345, 2 hrs. weekly.

425 Introduction to Descriptive Linguistics (3) Phonetics and phonemics, morphology and syntax. Types of languages, groups, dialects, and dialect geography. Application of descriptive linguistics—field linguistics, dialect study; its practical use in learning languages and in language teaching. Introduction to transformational grammar. Prereq: 6 hrs. of upper-division English or 6 hrs. of upper-division courses in a modern or ancient language (exclusive of German and French 301-02). Courses in literature in translation, and general courses in Latin and Greek requiring no knowledge of these languages, or consent of department. (Same as German 425, Russian 425, and Linguistics 425.)

426 Methods of Historical Linguistics (3) (Same as German 426, Russian 426, Spanish 426 and Linguistics 426.)

428 Romance Linguistics (3) Development of Classical Latin through Vulgar Latin into major Romance languages. (Same as Spanish 429 and Linguistics 429.)

430 Theatrical French (2-3) Performance in one or more French plays. Prereq: 212, 218 or equivalent and consent of instructor. May apply toward major.

431 Highlights of French Civilization (3) Survey of French civilization from the Gauls to World War II. Historical events, daily life, all forms of arts. Prereq: 212, 216 or equivalent.

432 Contemporary French Culture (3) French contemporary civilization and culture since World War II. Problems, trends, and organization of French society today. Prereq: 212, 218 or equivalent.

434 Literature of Quebec (3) Survey of literature of Quebec as well as French literature connected with North America. Readings include explorer and missionary works, such as Voyages of Champlain and Journals of Juchereau and contemporary Quebec. Prereq: Intermediate French or equivalent.

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

501 Techniques in Literary Analysis (2) Required for M.A. program. Intensive course in explication de texte, a close stylistic analysis of texts representative of different eras and different literature. 

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: SNG only, E

512 Teaching a Foreign Language (3) Practical application of methods for teaching and evaluating basic language skills and foreign language skills; and cultural aspects through seminars, demonstrations, peer teaching, and observation of foreign language classes. Required of all M.A. and Ph.D students holding Graduate Assistantships, except those whose previous training or experience warrants their being excused by department.


531 French Literature of the 16th Century I (3) Literature of first half of 16th century. Rabelais and other prose writers, humanists, and poetry of Marot, Lyonnais group, and young Péladié poets.

532 French Literature of the 16th Century II (3) Literature of second half of 16th century, mature works of Péladié writers and such poets, as d'Aubigné and Sponde; Montaigne; writings of scientific works and memoirs; drama.

541 French Literature of the 17th Century I (3) French poems and prose works of 17th century.

542 French Literature of the 17th Century II (3) Classical French theatre of 17th century.

551-52 French Literature of the 18th Century: the Philosophes (3,3) Textual analysis of works of Voltaire, Diderot, Rousseau, and other major French 18th-century writers.


571-72 Trends in Modern French Literature (3,3) In-depth study of some of most revolutionary, challenging positions, and non-conformists of 20th century.

581-82 The French Novel (3,3) French Novel from 17th through 20th centuries.

583 Problems in Stylistics (3) Survey of comparative English-French stylistics. Development and improvement of one's written French.

584 Literary Criticism: the Foundations of Romance Criticism (3) Survey of critical ideas utilized over centuries and applied to various types of literature.

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

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

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

Portuguese

GRADUATE COURSES

431-32 Topics in the Language & Literature of Portuguese-speaking World (3,3) Outstanding works of literature and culture from Portuguese countries. Topics may vary. Prereq: At least one course at the 300 level or the equivalent. May be repeated. Maximum 12 hrs.

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

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

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

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 of all majors. Native speakers must receive consent of instructor. Prereq: Intermediate Conversation and Composition or consent of instructor.

423-24 Advanced Conversation and Composition (3,3) Advanced conversational and written skills in Spanish for pre-professionals. Native speakers must receive consent from instructor to take course. Prereq for 423: Intermediate Conversation and Composition or consent of instructor. Prereq for 424: 423 or consent of instructor.

425 Introduction to Descriptive Linguistics (3) (Same as French 425, German 425, Russian 425, and Linguistics 425.)

426 Methods of Historical Linguistics (3) (Same as German 426, French 426, Russian 426, and Linguistics 426.)

428 Romance Linguistics (3) (Same as French 429 and Linguistics 429.)

431 Spanish Civilization (3) Major social, political, and cultural achievements of Spanish people from origins of their civilization until today. Prereq: 311, 312 or equivalent.


450 Hispanic Drama (3) Close reading and analysis of representative works by selected dramatists of Spain and Spanish America. Topics vary. Prereq: Aspects of Spanish and Spanish-American literature or consent of instructor. May be repeated with consent of department. Maximum 6 hrs.

451 Hispanic Prose (3) Close reading of selected works of prose fiction and essays by major writers from Spain and Spanish America. Topics vary. Prereq: Aspects of
Spanish and Spanish-American Literature or consent of instructor. 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 consent of instructor. May be repeated with consent of department. Maximum 6 hrs.

459 Capstone Colloquium in Spanish (3) Integrative experience. Broad range of issues and topics that affect much of Spanish-speaking world and also involve those who specialize in Hispanic studies. Prereq: 311, 312 or equivalent.

461 Special Topics (3) Aspect of Hispanic literature, culture, linguistics, or foreign language pedagogy. Topics vary. May be repeated with consent of department. Maximum 6 hrs.

471 Latin American Civilization (3) Latin America's diverse heritage and major social and political institutions. Prereq: 311, 312 or equivalent.

473-74 Survey of Spanish American Literature (3,3) Historical survey from Conquest to late 19th century: 473-Major literary movements, writers and works of 18th century; 474-Major literary movements, writers and works of 19th century. Prereq: 311, 312 or equivalent.

479 Social Protest Literature of Latin America (3) Analysis of literature as means of unmasking social ills that have traditionally beset Latin America, Indigenismo, Black literature, and the political role of writer in Latin American society. Prereq: 311, 312 or equivalent.

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

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

512 Teaching a Foreign Language (3) Practical application of methods for teaching and evaluating basic language skills and cultural aspects through seminars, demonstrations, peer teaching, and observation of foreign language classes. Required of all M.A. and Ph.D. students holding Graduate Teaching Assistantships, except those whose previous training or experience warrants their being excused by department.

522 Advanced Communication Skills for Teachers and Other Professionals (3) Advancement of oral and written proficiency in Spanish through extensive use of authentic contemporary materials; class lectures and discussions; oral and written presentations and reports. Especially recommended for graduate students, teachers, and other professionals seeking to maintain or enhance high level communicative competency.

531 Old Spanish (3) Old Spanish language and medieval Spanish literature through 13th century.

532 Medieval Spanish Literature (3) Spanish literature of 14th and 15th centuries.

533 Golden Age Prose (3) Wide range of prose fiction in Spain during 16th and 17th centuries: Moorish, picturesque, sentimental, pastoral and exemplary novels, and dialogues.

534 Don Quixote (3)

535 Golden Age Poetry (3) Garcilaso, Fray Luis de León, San Juan de la Cruz, Lope de Vega, Quevedo, and Góngora.

537 Golden Age Drama (3) Major dramatists of period: Lope de Vega, Tirso de Molina, Ruiz de Alarcón, Guillén de Castro, Calderón de la Barca, Moreto, and Rojas Zorrilla.


543 The 20th-Century Spanish Novel (3) Baroja, Azorín, Valle-Inclán, Pérez de Ayala, Cela, Delibes, Goytisolo, Malute, and at least one present-day novelist.

545 Modern Spanish Poetry (3) From Bécquer, Unamuno, A. Machado, Jiménez, Lorca, Guillén, Alexandre, and a contemporary, Celya.

547 Modern Spanish Drama (3) Major playwrights of 20th-century Spain.

550 Techniques of Literary Analysis and Research Methods (3) Theoretical and critical essays on various techniques of literary analysis. Exploration of bibliographical and research materials.

551 Special Topics in Spanish or Spanish American Literature (3) May be repeated. Maximum 6 hrs.

552 Directed Readings (3)

561 Spanish American Colonial Literature (3) From pre-Columbian era through 18th century. Reading and re-analysis of works from Colonial Spanish America period and their Continental sources. Individual texts and authors.

562 Nineteenth-Century Spanish American Literature (3) From early nineteenth century to 1880. Content varies with regard to genre, theme, literary movements, or other aspects contributing to definition of Spanish American literature.


567 Spanish American Drama (3) Major playwrights of 20th-century Spanish America.


570 The Spanish American Short Story (3) Short story by major writers in Spanish America from Romanticism to present day, theory and criticism of genre.

571 Independent Study (1-15) See College of Liberal Arts. Letter grade or S/NC.

572 Spanish American Poetry (3) Major poets in Spanish America from post-modernismo to present day.

573 Spanish American Drama (3) Major playwrights of 20th-century Spanish America.


576 Contemporary Spanish American Poetry (3) Major poets in Spanish America from post-modernismo to present day.

577 Spanish American Drama (3) Major playwrights of 20th-century Spanish America.


579 Independent Study (1-15) See College of Liberal Arts. Letter grade or S/NC.

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

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

582 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

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

586 Social Practice

587 Social Practice

588 Social Practice

589 Social Practice

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

593 Independent Study (1-15) See College of Liberal Arts. Letter grade or S/NC.

595 Special Topics in Large Animal Medicine and Surgery (1-4) May be repeated. Maximum 6 hrs. E

596 Social Practice

597 Social Practice

598 Social Practice

599 Social Practice

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

Russian

See Germanic and Slavic Languages

Social Work

(College of Social Work)

DEGREES

MAJOR

DEGREE

Social Work...........................................M.S.S.W., Ph.D.

Eunice Shatz, Dean

Professors:

Bloch, M. H. (Emeritus), M.S. ........... Ohio State

Browne, Robert C. (Emeritus), D.S.W. ........ Washington (St. Louis)

Celtong, M., Ph.D. ........... Washington (St. Louis)

Faver, C., Ph.D. ........... Michigan

Fryer, Gideon W. (Emeritus), Ed.D. ......... Columbia

Gibson, C. A., Ph.D. .......... Washington (St. Louis)

Granger, Ben P. (Emeritus), Ph.D. ......... Brandeis

Hirayama, H., D.S.W. ............ Pennsylvania
Mclarnan, G. (Emeritus), M.S.W. .................................. Tennessee
Mullins, M. Kate (Emeritus), Ph.D. ............................ Chicago
Nooe, Roger M., D.S.W ........................................... Tulane
Orten, J. D., D.S.W ....................................................... Alabama
Rubenstein, H., Ph.D ................................................. Chicago
Shatz, Eunice, Ph.D. ..................................................... Brandeis

Associate Professors:
Bell, W. J., D.S.W .......................................................... Tulane
Charping, J. W., Ph.D. ............................................... Peabody
Cruthirds, C. Thomas, D.S.W ..................................... Tulane
Fieno, Judith, Ph.D. .................................................. Tennessee
Jennings, J., Ph.D. ...................................................... Michigan
Moses, A. E., D.S.W .................................................. California
Nugent, W., Ph.D. ...................................................... Florida State
Orme, J., Ph.D. .......................................................... Washington (St. Louis)
Spicuzza, Frank, M.S.W. .......................................... Tennessee
Vaughn, H. E., Ed.D ..................................................... Memphis State

Assistant Professors:
Campbell, P. M., D.S.W .............................................. Alabama
Collar, J. C., M.S.W. ................................................... Tulane
Crawford, S., M.S.W. ............................................... Texas
Jones, J., Ph.D. .......................................................... Bryn Mawr
Patterson, D., Ph.D. ..................................................... Utah
Resnick, C., D.S.W. ................................................... Yeshiva
Spaulding, E., Ph.D. ...................................................... Smith
Thompson, J., Ph.D. ..................................................... Rutgers

Field Practice Coordinators:
Beitz, Phyllis (Knoxville), M.S.W. ......................... Tennessee
Harris, Joyce (Nashville), M.S.S.W. ....................... Tennessee
Pomerantz, Edward (Memphis), M.S.W. .......... Barry

THE MASTER'S PROGRAM

The Master of Science in Social Work program prepares social workers to provide professional leadership in: 1) the direct provision of social work services and 2) social welfare administration and planning. These objectives are met through a curriculum requiring of all students a professional foundation and a concentration in either social work treatment or social welfare administration and planning.

Admission Requirements

Admission to the Master's program is based on the following requirements:

A. A Bachelor's degree from an accredited college or university with appropriate preparation in the social sciences. At least three-fourths of the applicant's undergraduate work should be in the social sciences, humanities, physical sciences, and other liberal arts subjects. Those with other academic backgrounds should request consultation regarding ways in which they might be admitted.

2. A grade-point average of 2.7 on a 4.0 scale, with preference given to applicants with 3.0 and above.

3. Personal qualifications acceptable for entrance into the professional practice of social work.

Preference is given to applicants with a 3.0 average in undergraduate work and substantial preparation in the social sciences. Applications should be filed no later than March 1 for the year in which admission is desired.

Advanced Standing

The University of Tennessee College of Social Work has an advanced standing program. Admission to advanced standing requires: (1) a B.S.W. from an accredited program, (2) an overall undergraduate GPA of 3.0 or greater, 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 - social work treatment or social welfare administration and planning. These students will follow the curriculum plan and meet all requirements of the concentration during three semesters of study in the program.

Specific information about the advanced standing program is available from the college. Application for admission to the advanced standing program is through the regular admission process.

Extended Study

Planned part-time programs are available in all three branches of the college. Admission requirements are the same as for full-time study. Coursework can be completed over a three- or four-year period. One year of the student's period of study must be on a full-time basis.

Financial Aid

Students may apply directly to the University's Financial Aid Office for assistance such as the National Direct Student Loan or the Work-Study Program. Other stipends are administered by the college and awarded on the basis of financial need. Applications for these funds must be made to the Branch of the College the student will attend. A student must first apply for University assistance, since College funds are considered supplementary to those of the University. Additional information about College stipends may be obtained from the College of Social Work.

General Requirements

1. A minimum of 57 semester credit hours including a) completion of foundation courses and field practice (15 hours), b) the course Social Work with Oppressed Populations (3 hours), and c) at least six courses (18 hours) and three semesters of field practice (15 hours) in the social work concentration or at least four courses (12 hours) and three semesters of field practice (16 hours) in the social welfare administration and planning concentration.

2. Students may select a thesis or non-thesis option. Those students pursuing the thesis option receive 6 credit hours for successful completion of a thesis.

3. Successful completion of a comprehensive exam or thesis defense.

4. An overall GPA of 3.0 or better on all graded courses and satisfactory performance in field.

The Professional Foundation Curriculum

The foundation curriculum is a 15-semester hour sequence of five basic areas required of all students before entering either of the concentrations programs. As the initial phase of the educational program, the foundation curriculum contributes to the process of professional identification while presenting a comprehensive and broad knowledge base from which to operate in the future as practitioners, supervisors, administrators, and planners.

Upon completion of the foundation curriculum (at the beginning of the second semester), students select a concentration in either social work treatment or social welfare administration and planning.

Social Work Treatment: The social work treatment concentration provides the educational basis for practice with individuals, families, and groups in order to enhance their social functioning, ameliorate problems, and prevent social dysfunction. The concentration provides knowledge of theory and methodology basic to individual, family, and group methods applicable in the treatment of diverse client problems.

Social Welfare Administration and Planning: The social welfare administration and planning concentration provides the educational basis for leadership in the design, implementation, and continued operation of effective human service programs at local, regional, and state levels. This concentration emphasizes theory and skills related to administration and planning, and permits considerable flexibility in tailoring a program to fit the student's individual interests, capabilities, and career goals.

Field Practice

Field instruction is a critical component of the student's first- and second-year programs. Through cooperation with a wide range of social agencies and human service programs throughout Tennessee, the college is able to provide field placements in a variety of social work practice areas. The faculty works closely with the placement agencies and the field instructors to ensure that students have quality field practice experiences, meeting the objectives of the core curriculum and the concentration.

The college uses a concurrent class and field plan. Students are in field two days per week during the first year and three days per week in the second year.

First-year agency placements are selected to provide practice experiences related to the foundation curriculum content and beginning concentration. Within the placement, each student's experiences are planned and designed according to educational objectives.

Second-year placements are selected according to the student's area of concentration, individual career interests, and educational needs. The student actively participates with the field practice coordinator and the educational committee in selection of the second-year placement. The second-year field placement experience focuses on the integration of social work knowledge and values, and emphasizes the acquisition and development of practice skills.

Students are responsible for meeting the requirements of their placement agencies in terms of office hours and workload coverage. This responsibility takes precedence over scheduled University breaks and may result in variations in holidays and office hours for the student.

Transfer Credits

Coursework equivalent to the first year of the college's program, completed in another accredited graduate social work program, is usually accepted toward degree requirements. Applicants must meet the admission requirements of The Graduate School and the College of Social Work. Transfer courses must be approved as equivalent to required and/or elective courses taken for graduate credit and passed with a grade of B or better. An S (earned on an S/N/C system) for the field practicum is also accepted. In addition, transfer courses
must be part of an otherwise satisfactory graduate program (B average) and be approved by the dean. This coursework must be completed within the six-year period prior to the receipt of the degree.

A maximum of 6 semester credits from work earned in disciplines other than social work may be transferred as elective credits. The student's academic committee must approve the request and the transfer credit must meet Graduate School requirements.

**Proficiency Examination**

Students in the Master's program may earn a maximum of nine hours by proficiency examination, with the exception of field practice courses. Students interested in proficiency examinations are referred to The Graduate School statement describing the procedure for applying for examination.

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**THE DOCTORAL PROGRAM**

The College of Social Work offers the Doctor of Philosophy with a major in Social Work. The focus of social work education at the doctoral level is to foster the development of an attitude of scientific inquiry, knowledge of the scientific method, ability to extend the knowledge base of social work practice, and effective participation in leadership roles in social work education, research, and practice.

The emphasis of the doctoral program is upon:

--The analysis of direct intervention and social administration and of the interrelationships among each of them and their social policy, organizational, and community contexts.

--Research-based knowledge to inform and guide social work practice, social policy, and social welfare program development.

The program consists of foundation courses, elective courses, and dissertation research. The courses are available only in Knoxville. Students and their committees can develop a plan for completing their research in Nashville and Memphis based on the availability of dissertation resources.

**Admission Requirements**

The Ph.D. program is designed for students who have completed a Master's degree in an accredited school of social work and have post-Master's social work/social welfare experience. Applicants who do not meet these requirements, but believe they have equivalent credentials, should consult the Chair of Ph.D. program for further information regarding admissions criteria.

**General Requirements**

1. A minimum of 60 semester hours beyond the Master's degree including a) completion of 21 credits of required coursework, b) completion of 15 credits of advanced electives, at least 12 of which are taken outside the department, and c) completion of at least 24 credits of dissertation research.

2. Successful completion of qualifying and comprehensive examinations.

3. Completion and defense of the dissertation.

**Curriculum**

The curriculum of the Ph.D. program consists of foundation coursework, electives, and dissertation research. The foundation curriculum consists of 21 hours of coursework in the history and philosophy of social work, issues in direct service and administration and planning, social work 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 part-time basis.

Specific courses required are 601, 602, 612, 613, 940, and Statistics 531 and 532 or any two graduate level statistics courses approved by the Doctoral Program Chair.

**Examinations**

All doctoral students are required to pass a qualifying examination and a comprehensive examination. The qualifying examination covers the foundation curriculum. The comprehensive examination is administered by members of the doctoral committee and is designed for the student to demonstrate comprehensive knowledge of the major and cognate areas and the dissertation topic. In case of failure of either examination, the student may request a retake. The result of the second examination is final.

**Financial Aid**

Financial aid is available to qualified students in the form of fellowships, scholarships, and teaching and research assistantships. Graduate assistantships and other forms of assistance are awarded on the basis of merit and interest to applicants who are accepted into the Ph.D. program.

**MINOR IN GERONTOLOGY**

Graduate students in the College of Social Work may pursue a specialized minor in gerontology. This interdepartmental/interdisciplinary minor gives the student an opportunity to combine the knowledge about aging in American society with his/her major concentration. Please refer to Human Ecology for specific requirements.

**ACADEMIC COMMON MARKET**

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S.S.W. and Ph.D. programs in Social Work are available to residents of the state of Arkansas; the Ph.D. to residents of Kentucky or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

**GRADUATE COURSES**

**500 Registration for Use of Facilities (1-15)** Required for the student not otherwise registered during any semester when instruc-tion and/or facility time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only.

**506 Practicum in Social Work Research (3)** Supervised practice in application of research methods to social work. Prereq: 510 and consent of faculty conducting investigation. May be repeated. Maximum 6 hrs. S/NC only.

**509 Graduate Seminar in Public Health (1)** (Same as Public Health 509, Nutrition 509, Physical Education 509 and Nursing 509.)

**510 Social Work Research (3)** Research methodology applied to problems in social welfare. Problem formulation, research design; ethics; instrument construction; data collection; analysis, and reporting; statistical procedures; research reporting; and evaluation and utilization of research. Prereq: Admission to college or consent of instructor.

**512 Social Work Practice (3)** Basic theory, values, and methodology generic to social work practice at various system levels presented from ecological perspective. Assessment, planning, communication, and evaluation skills. Theories of depression and anxiety. Prereq: 510 and consent of instructor.

**514 Human Behavior and Social Environment (3)** Theories pertaining to individual, family, small group, and community in context of functions, structure, roles, and processes. Theories of depression and anxiety. Prereq: 510 and consent of instructor.

**516 Social Welfare Policy and Services (3)** Development, contemporary social policy and social services. Theories of depression and anxiety. Prereq: 510 and consent of instructor. If approved by instructor.

**517 Social Work with Oppressed Populations (3)** Social work's professional role in working with individuals and groups in American society whose oppression is based upon distinguishing characteristics: age, race, sex, economic class, religion, sexual preference, handicapping conditions, ethnicity and race. Prereq: Admission to college or consent of instructor.

**520 Social Work with Individuals and Families (3)** Nature and process of practice with individuals and families in helping them resolve or cope with problems of living. Working with disadvantaged clients and enhancing client competence. Prereq: Foundation or consent of instructor.

**522 Social Work Treatment with Groups (3)** Theories and practice of social work with small groups. Treatment groups, task groups. Prereq: Foundation or consent of instructor.

**524 Psychopathology and Social Deviance (3)** Theories of depression and anxiety from a psychiatric perspective. Prereq: 510 and consent of instructor.

**526 Research for Assessment of Social Work Treatment (3)** Application of research methods for assessment of social work treatment. Prereq: Foundation, 520 or 522, or consent of instructor.

**530 Seminar in Social Work Treatment (2-3)** Topics in theory and practice of social work treatment with individuals, couples, families, and groups. Prereq: Foundation and 520, or consent of instructor. Required for group treatment 522. May be repeated. Maximum 6 hrs.

**531 Family Therapy in Social Work Practice (3)** Major family therapy models, perspectives on family dynamics and interaction, and techniques of treatment and their application to families from diverse social and cultural backgrounds. Prereq: 510 and 520, or consent of instructor.
and other financial management and resource development in human service organizations.
533 Social Work Treatment with Couples (3) Theories regarding couple life styles, problems in relationship, and skills for problem resolution. Prereq: Foundation and 520, or consent of instructor.
534 Social Work Treatment with Children and Adolescents (3) Examination of various treatment modalities for assessing and treating children and adolescents. Prereq: 520 and 522, or consent of instructor.
540 Administration of Social Welfare Programs and Services (3) Analysis of organizations and provision of services to clients. Models of social welfare administration, their historical and philosophical perspectives, concepts for designing organizational structure and processes, planning, developing and implementing agency policies and programs, and management of service delivery systems. Prereq: Foundation or consent of instructor.
542 Financial Management and Resource Development in Social Welfare Administration (3) Administrative decision-making related to financial planning and resource allocation in human service organizations. Knowledge and skills in accounting, budgeting and auditing, techniques in fundraising, grant writing, marketing, and other financial management and resource development techniques. Prereq: Foundation or consent of instructor.
544 Management Information Systems and Evaluative Research (3) Management information systems design and implementation; evaluative research design and methodology; and utilization for organizational decision-making and policy setting. Prereq: Foundation or consent of instructor.
546 Human Resources Development in Social Welfare Administration (3) Administrative and leadership skills required for management and development of human resources within the context of organization and its environment. Prereq: Foundation or consent of instructor.
550 Seminar in Social Welfare Administration and Planning (2-3) Areas and issues relating to methods and techniques of social welfare administration and planning. Prereq: Foundation or consent of instructor. May be repeated. Maximum 6 hrs.
551 Seminar in Social Welfare (2-3) Social welfare problem area or field of practice. Prereq: Foundation or consent of instructor. May be repeated. Maximum 6 hrs.
552 Community Organization (3) Locally developed, social planning for social action as practice modes for development of resources to meet human needs. Prereq: Foundation or consent of instructor.
554 Social Policy Analysis (3) Techniques for assessing social, political, and economic implications of social policy proposals. Prereq: Foundation or consent of instructor.
556 Supervision and Consultation in Social Work (3) Roles, techniques, and practices of social work supervision and consultation. Prereq: Foundation or consent of instructor.
562 Social Work and Black Families (3) Historical and contemporary issues about black families. Development of frameworks to assess and plan for black families within service delivery systems. Prereq: Foundation or consent of instructor.
563 Social Aspects of Illness (3) Social, economic, and emotional aspects of illness and their relationship to social work. Prereq: Foundation or consent of instructor.
564 Substance Abuse (3) Survey and analysis of sociocultural, medical and psychological factors underlying alcoholism and drug abuse and addiction: recent research and treatment innovations. Prereq: Foundation or consent of instructor.
566 Social Gerontology (3) Physical, psychological, and social aspects of aging. Major social policies and programs. Prereq: Foundation or consent of instructor.
580 Field Practice (3) Instruction and supervision in social work practice. Prereq: or coreq: 512, SNC only. E
581 Field Practice (3) Instruction and supervision in social work practice. Prereq: Student's selected concentration in social work treatment or social welfare administration and planning. Prereq: Foundation. SNC only. F
582 Field Practice (6) Instruction and supervision in social work treatment or social welfare administration and planning. Prereq: Foundation. 581 or coreq: Treatment: 520, 524. SNC only. F
583 Field Practice (6) Instruction and supervision in social work treatment or social welfare administration and planning. Prereq: 582. SNC only. F
584 Field Practice (2-5) Instruction and supervision in social work practice. Prereq or coreq: 512. May be repeated. SNC only. F
593 Independent Study (1-6) Individualized study, student selects, designs, and completes examination of special issue or problem. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. F,Sp
600 Doctoral Research and Dissertation (3-15) P/NP only. E
601 Research for Social Work Practice I (3) Epistemological and methodological considerations for both quantitative and qualitative research for social work practice. F
602 Research for Social Work Practice II (3) Epistemological and methodological considerations for both quantitative and qualitative research for social work practice. Sp
604 Research in Social Service Settings (3) Advanced research, under faculty supervision, of practice issues in community agency. Prereq: First year required. Ph.D. courses or consent of instructor. May be repeated. Maximum 9 hrs. F,Sp
608 Evaluative Research for Social Work Practice, Programs and Policy (3) Techniques and strategies for quantitative and qualitative analysis for social policy's impact on individuals and groups and for evaluating processes and outcomes of social work practice. F
613 Social Work Practice and Its Social Context II (3) Critical analysis of knowledge bases of major practice in administration and planning. Sp
640 History of American Social Work (3) Social, cultural, economic and political contexts for development of social work profession, development of education for profession, and modern welfare system. F
693 Directed Study in Social Work Research (3) Advanced individual study, under faculty guidance, of social work practice issues. Prereq: First year required. Ph.D. courses or consent of instructor. May be repeated. Maximum 9 hrs. F,Sp

Sociology

(College of Liberal Arts)

MAJOR

Sociology .... M.A., Ph.D.

Michael L. Benson, Head

Professors:
Betz, D. Michael, Ph.D. Michigan State
Black, James A., Ph.D. Iowa
Cleland, Donald C., Ph.D. Michigan State
Hastings, Donald W., Ph.D. Massachusetts
Hood, Thomas C., Ph.D. Duke
Ploch, Donald R., Ph.D. North Carolina
Shover, Neal, Ph.D. Illinois
Wallace, Samuel E., Ph.D. Minnesota

ASSOCIATE PROFESSORS:
Benson, Michael L., Ph.D. Illinois
Cable, Sherry, Ph.D. Penn State
Gaventa, John P., Ph.D. Oxford
Kurth, Suzanne B., Ph.D. Illinois (Chicago)
Perrin, Robert G. (Liaison), Ph.D. British Columbia

Assistant Professor:
Jalata, Asafa Ph.D. SUNY (Binghamton)

The Sociology Department offers graduate study leading to the Master of Arts and the Doctor of Philosophy. The M.A. program includes a thesis and non-thesis option. The graduate program has concentrations in criminology, energy, environment, and resource policy; and political economy. The criminology concentration includes 560, 565, and 665. The energy, environment and resource policy concentration includes 560, 563, 661, 662, and 665. The political economy concentration includes 504, 540, 641, 643, 644, and 645. Both the Master's and the doctoral program allow for the construction of individualized programs of study. Detailed information may be obtained from the Director of Graduate Studies in Sociology. All incoming students will be advised by the Director of Graduate Studies. New students are admitted in fall semester only and applications must be received by the Graduate Admissions and Records Office by February 1.

ADMISSION REQUIREMENTS

1. Acceptable scores on the general Graduate Record Examination (GRE scores in 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 or master's) in one of the social sciences, for the M.A. program; Master's degree in one of the social sciences for the doctoral program.

THE MASTER'S PROGRAM

Thesis Option
A minimum of 30 hours beyond the baccalaureate degree, including 24 hours of coursework and 6 hours of Thesis 500, is required. Students must complete Sociology 521, 531, Statistics 531, and one foundation course (504, 505, or 560). At or near the end of all coursework, the student must take an oral examination on course material and thesis. The examination will be administered by the student's committee.

Non-Thesis Option
A minimum of 30 hours beyond the baccalaureate degree is required, including Sociology 521, 531, Sociology 531, and one of the following: 504, 505, or 560. Sociology 634, 632, 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 approval of the student's committee. Twelve hours in a special area of study approved by the student's committee and the department's Graduate Program Committee. Students are encouraged to prepare a paper synthesizing their knowledge of the concentration(s). Students who incorporate supervised field experience in their programs are encouraged to prepare a report based on those experiences that demonstrates their understanding of research, theory, and report writing. All students must take final written and oral examinations that include questions on their general coursework in theory and methods and on their special areas of study.

Subject to approval by the student's committee, up to 12 hours may be taken in courses outside the department for either program.

THE DOCTORAL PROGRAM

Coursework
Twenty-four hours of coursework beyond the Master's degree are required (exclusive of S/NC credits). Twelve hours of course credit in Sociology at the 600 level are required. Students who enter the program without the courses required for the M.A. degree (521, 531, Statistics 531) or their equivalents must take them as remedial work which does not apply to their residence. Students must complete Sociology 622/594, 633, 635, 636, 637, 639, 641, and Statistics 532 or another advanced course in statistics. Completion of 9 hours in each of two concentrations is encouraged. A student who cannot achieve his/her educational goals within the department's concentrations may construct an individualized course of study subject to the approval of the student's doctoral committee and the Graduate Program Committee. Sociology courses at the 400 level may not be taken without the consent of the student's advisor and the Graduate Program Committee. Six hours may be taken in related fields without petitioning the Graduate Program Committee for approval. The student's program may include a minor or cognate field.

Comprehensive Examinations
Written examination in four areas are required (sociological theory, research methodology, and two substantive areas). Doctoral students are eligible to take the theory and methodology examinations whenever offered. Substantive examinations may be taken upon completion of theory and methodology examinations. Detailed information on examinations and examination options (generalist, specialist, and collateralist) may be obtained from the department.

Dissertation and Final Examination
A dissertation based on original research must be completed (24 hours). The candidate must pass an oral defense of the dissertation, including the theory and methodology related to the research, in accordance with the deadlines specified by The Graduate School.

MINOR IN ENVIRONMENTAL POLICY
The department participates in a program designed to give Master's level graduate students an opportunity to develop interdisciplinary specialization in environmental policy. See Economics, for program description.

MINOR IN GERONTOLOGY
Graduate students in the Department of Sociology may pursue a specialized minor in gerontology. This interdepartmental/interdisciplinary minor gives the student an opportunity for combining the knowledge about aging in American society with his/her major concentration. Please refer to Human Ecology for specific requirements.

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 Sociology is available to residents of the state of South Carolina. 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. Prerequisite: 291 or consent of instructor. (Same as Physical Education 405.)

414 Sociology of Health Care (3) Organization of health care facilities, staff-patient relationships, demographic characteristics, and prevalence of disease.

415 Sociology of Aging (3) How roles and statuses change with age in relation to major social institutions; impact that rapidly increasing number of older people has on society; effect of society on older people.

446 The Modern World System (3) Critical examination of capitalist world-system as social system. Its coherence, boundaries, regions, member groups, civilizations, and patterns of conflict. Analysis of who gets what, why, and how in global political economy.


455 Society and Law (3) How laws and legal processes are affected by social change, social impact of legal sanctions, relations between law and social justice.

450 Organizational and Corporate Crime (3) Analysis of crime and deviance committed by organizations. Case studies of corporal regulatory agencies, organizational dynamics of crime, theories of corporate crime, and organizational responses to this type of crime by governmental regulatory agencies.

462 Populations (3) Demographic factors and social structure: trends in fertility, mortality, population growth, migration, distribution, and composition; population policies.

463 Demographic Techniques (3) Standard rates and measures of demographic variables, life table analysis, probability models, and survey techniques of population analysis.

464 Urban Ecology (3) Relation of humans to their urban environment; conservation and use of appropriate technology. (Same as Urban Studies 464.)

471 Sociolinguistics (3) (Same as English 471 and Linguistics 471.)

480 Diffusion of Agricultural Technology (3) (Same as Rural Sociology 480.)

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

504 Sociological Foundations of Political Economy (3) Survey of contemporary sociological theories of economic power and conflict. Prerequisite: 350 or equivalent.

505 Foundations of Criminology (3) Critical overview of contemporary developments in criminology, theories of crime causation and theories of responses to crime. Prerequisite: 350 or equivalent.

507 Foundations of Social Psychology (3) Current and classical theoretical perspectives in social psychology.

510 Teaching Sociology (3) Art and craft of teaching sociology from curricular considerations through teaching techniques. May be repeated. Maximum 6 hrs.

521 Sociological Theory I (3) Assessment of what sociological theory is; its major figures and their approaches to understanding society.

531 Research Methods in Sociology (3) Research design, measurement, sampling, qualitative and quantitative data collection techniques, data reduction, and analysis.

534 Advanced Sociological Analysis (3) Underlying assumptions and logical procedures used by sociologists in relating events, operations of sociological research strategies and techniques.

540 Occupations (3) Occupations in relation to individuals and society, technology, economic stratification, and social organizations.

541 Collective Behavior, Social Movements, Social Change (3) Basic theory and research on conditions of social unrest in human collectivities and efforts of collectives to change existing society.

542 Sociological Aspects of Sports and Physical Education (3) (Same as Physical Education 542.)

543 Sociology of Development (3) Sociological theories and studies of development: modernization, colonialism, dependency, comparative impact of various development paths upon selected aspects of social structure and change.

551 Delinquency and the Social Structure (3) How study of delinquency and juvenile justice is affected by changing structures of childhood and adolescence, changing demographic and institutional influences, and changing views about responsibility and punishment.

560 Environmental Sociology (3) Systematic treatment of current research in environmental sociology, social impact analysis and conflicts over environmental issues.

563 Demographic Techniques (3) Standard rates and measures of demographic variables, life table analysis, probability models, and survey techniques of population analysis.

580 Advanced Rural Sociology (3) (Same as Rural Sociology 580.)

585 Seminar in Gerontology (1) (Same as Human Ecology 585, Educational and Counseling Psychology 585, Nursing 585, Psychology 585, Public Health 585, Human Performance and Sport Studies 585, and Social Work 585.)

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

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

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

594 Social Theories of Sport (3) (Same as Physical Education 515.)

595 Special Topics in Rural Sociology (1-3) (Same as Rural Sociology 593.)

599 Readings (3) Selected topics. May be repeated. Maximum 6 hrs.

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

622 Sociological Theory II (3) Distinct schools of sociological theory and contributions of their principal exponents. Prerequisite: 521 or consent of instructor.

629 Supplementary Readings in Sociological Theory (3) Individual guidance. Preparation for comprehensive examination. Prerequisite: Consent of instructor. S/NP only.

633 Survey Design and Analysis (3) Linear regression and analysis of variance techniques for survey research. Prerequisite: 531 or consent of instructor. (Same as Childhood and Family Studies 533.)

636 Field Research (3) Research experience in selected field using techniques of interviewing, partici-
pant observation, and other methods of field research. Prereq: 531 or consent of instructor.

639 Supplementary Readings in Methodology (3) Individual guidance. Preparation for comprehensive examination. Prereq: Consent of department. S/N/C only.

643 Class Analysis (3) Critical analysis of theories and research on class structure and conflict.

644 Political Sociology (3) Critical examination of theories of state and political processes.

645 Advanced Studies in Political Economy (3) Topical seminar. Prereq: 504 or consent of instructor. May be repeated. Maximum 6 hrs.

653 Sociology of Law (3) Intensive examination of selected topics in sociology of law. Prereq: 505 or consent of instructor.

655 Advanced Studies in Criminology (3) Intensive examination of selected topics in criminology. Recommended prereq: 505. May be repeated. Maximum 6 hrs.

661 Theory and Methods of Human Ecology (3) Historical and contemporary studies of interaction between humans and their environment. Prereq: Consent of instructor.

662 Urban and Regional Sociology (3) Historical and contemporary studies of South and Appalachian region with comparisons to other regions.

665 Advanced Studies in Energy, Environment and Natural Resources Policy (3) Topical seminar covering particular lines of research and theory within area. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

675 Advanced Studies in Social Psychology (3) Selected contemporary research issues related to social psychological theories. Prereq: 541 or consent of instructor. May be repeated. Maximum 6 hrs.

695 Advanced Special Topics (3) Topic of special interest or student-initiated courses that will not be regularly offered. Prereq: Consent of department. May be repeated. Maximum 6 hrs.


Enrollment in the following courses is restricted to participants in the James R. Stokely Institute Fellows Program in the College of Liberal Arts and requires the Program Director's approval. Tennessee elementary and secondary school teachers who are certified and have a minimum of five years teaching experience may apply to participate in the Institute. Selection of participants is based on academic ability, references, an application essay and an interview of final candidates.

GRADUATE COURSES

510 Humanities Perspectives in the Liberal Arts (2) Seminar on nature of inquiry in humanities. Emphasis on nature and special forms of human experience and its interpretation through study of formative texts and critical figures.

520 Natural Science Perspectives in the Liberal Arts (2) Seminar on nature of inquiry in physical and biological sciences drawing on history of science, critical figures in shaping of scientific thought, and methodology for observation and experimentation in natural sciences.

530 Social Science Perspectives in the Liberal Arts (2) Seminar on nature of inquiry in social sciences. Emphasis on methodology for observation and research in study of human beings, their social environments and their behavior.

Special Services Education

(College of Education)

MAJORS

DEGREES

Special Education ............................ M.S.
Rehabilitation Counseling ...................... M.S.
Education ....................................... Ph.D.

Laurence J. Coleman, Head

Professors:

Benner, Susan M., Ed.D. ...................... Columbia
Coleman, Laurence J., Ph.D. .............. Kent State
Doll, E. E. (Emeritus), Ph.D. ............. Pennsylvania
Frey, Roger M. (Emeritus), Ed.D. ......... Illinois
George, Thomas, Ed.D. ..................... Tennessee
Hargis, Charles H., Ed.D. .................. Colorado State
Kronick, Robert F., Ph.D. ................. Tennessee
McClam, T., Ph.D. ............................ South Carolina
Miller, James H., Ed.D. ..................... Auburn
Schindler, W. Jean, Ph.D. ................. Kent State
Welch, Ola, Ed.D. ............................ Tennessee
Woodrick, William E., Ed.S. .............. Mississippi
Woodside, M. R., Ed.D. ..................... VPI

Associate Professors:

Cassell, Jack L., Ph.D. ..................... Kansas
Colvin, Craig R., Ed.D. ..................... Virginia
Hannum, Michael C., Ed.D. ................ Northern Colorado
Greenberg, Katherine H., Ph.D. ............. George Peabody
Mukay, S. Wayne, Ph.D. .................... Florida State

Assistant Professors:

McLean, J. D., Ph.D. ....................... Chicago
Warden, K., Ph.D. ............................ Tennessee

Instructors:

Ashmore, Don L., M.S. ..................... Tennessee
Barnes, Wendell W., Jr., M.Ed. ............. Georgia

Butterworth, J., Ph.D. ....................... Vanderbilt
Griffin, M., M.S. ............................ Tennessee
LaCava, C., M.S. ............................. Tennessee
Saneture, R., M.S. ............................ South Carolina

Lecturer:

Byrd, H. L., Jr., M.S. ....................... Tennessee

The Department of Special Services Education offers graduate programs leading to the Master of Science with a major in Special Education or in Rehabilitation Counseling. The department also participates in the Doctor of Philosophy program in Education as described under Education.

THE MASTER'S PROGRAMS

Special Education

The department offers two tracks for the Master's degree in Special Education for all areas of concentration. Track 1 is for students who are already licensed to teach in special education or a related field or those who are seeking a Master's degree without teacher licensure. Track 2 is for students seeking initial licensure. Thesis and non-thesis options are available for both tracks.

An area of concentration may be selected from the following: early childhood special education, general special education, or education of the hearing impaired.

Track 1 students select coursework based on their area of concentration as described below. Some coursework may apply toward State of Tennessee endorsements (add-on certification in specific licensure areas). The non-thesis option requires 24 hours, including a minimum of 18 in special education, and a final written and oral comprehensive examination. The thesis option requires 30 hours including 6 hours of Thesis 500.

Track 2 students select coursework based on a specified course of study required for teacher licensure and options for areas of specialization and/or cognates as described below. The non-thesis option requires 24 hours of internship year coursework and an additional 12 hours prescribed by the student's committee, for a total of 36 hours. The thesis option requires an additional total of 6 hours of Thesis 500 for a total of 42 hours.

Students completing a program of study in the early childhood special education concentration area are qualified to be preschool teachers, home-based interventionists, educational consultants, and family service coordinators. The curriculum is interdisciplinary in nature, with most of the coursework offered by the Departments of Special Services Education and the Department of Child and Family Studies. Additional department offerings may be included through elective hours.

Students completing a program of study in the general special education concentration area are qualified to be teachers and/or consultants in a variety of special education programs providing services to people certified as mentally retarded, learning disabled, emotionally disturbed, gifted, physical-health disabled, multiply disabled, and socially or emotionally disturbed.

General special education majors, in conjunction with their committees, select one or more specializations for their program of study.
Six to nine hours of coursework in the designated area should be taken. Approved specializations include affective/motivational approaches, assessment/evaluation, diagnosis, cognitive education, early childhood, gifted education, rehabilitation, and/or technology. Students also may select a cognate of three to six hours of coursework taken outside the department.

Students completing a program of study in the education of the hearing impaired concentration area are qualified to teach in public or residential schools for the hearing impaired. Graduates are eligible for both Council on Education of the Deaf (CED) certification and Tennessee state certification. Internships (student teaching) may be completed at the Tennessee School for the Deaf, in other program institutions in the state or in programs for the hearing impaired in North Carolina, Kentucky, Georgia, Virginia and the District of Columbia.

**Rehabilitation Counseling**

The Rehabilitation Counseling program enables counselors to acquire competencies which facilitate the movement of a person with disabilities toward optimal functioning in the three broad areas of living, learning, and working. The rehabilitation counselor works primarily with adults who are being served in various public and private settings. Students should expect to spend four semesters, including summer, in classwork and in internship. The program requires 54 semester hours. Thesis and non-thesis options are available.

**ADDITIONAL PROGRAMS**

Under the sponsorship of the Office of Special Education and Rehabilitative Services (F.S.A.), special training opportunities for the preparation of professionals to adapt their skills toward services to hearing impaired and deaf people are provided. A federally supported Educational Consortium provides staff development and technical assistance for postsecondary programs serving hearing impaired students in a 13-state southeastern region.

Details concerning each program can be obtained by writing to the department head.

**ACADEMIC COMMON MARKET**

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. program in Special Education is available to residents of the states of Kentucky (concentrations in hearing impaired and early childhood only), South Carolina (concentration in hearing impaired only), Virginia (concentration in hearing impaired only), or West Virginia; the M.S. in Rehabilitation Counseling is available to residents of Alabama. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

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### Special Education

#### GRADUATE COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Description</th>
<th>Prereq/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>410</td>
<td>Pre-Internship Seminar 1 (Orientation, objectives and policies of internship program)</td>
<td>Must be completed term immediately preceding internship. Preference to admission to teacher education program. S/NC only.</td>
<td></td>
</tr>
<tr>
<td>415</td>
<td>Language Development of Hearing Impaired (3)</td>
<td>Language problems of hearing impaired contrasted with scope and sequence of normal language development. Formal linguistic systems used to describe language development problems.</td>
<td></td>
</tr>
<tr>
<td>416</td>
<td>Language Development of Hearing Impaired II (3)</td>
<td>Developmental and remedial systems of teaching language to hearing impaired children. Compares and contrasts normal and hearing impaired.</td>
<td></td>
</tr>
<tr>
<td>419</td>
<td>Speech Development of Hearing Impaired (4)</td>
<td>Theories of speech development, approaches in training perception and production of speech, and aural habilitation. Practice experiences.</td>
<td></td>
</tr>
<tr>
<td>420</td>
<td>Psychology and Education of Students with Mild Disabilities (6)</td>
<td>Nature and characteristics of mildly handicapped students with mental retardation, learning disabilities, physical and health impairments, emotionally disturbed, educational strategies found effective in modified classrooms. Assessment, diagnosis, legal, and educational implications.</td>
<td></td>
</tr>
<tr>
<td>421</td>
<td>Field Experience in Modified Programs (3)</td>
<td>Practicum in teaching in modified programs: planning, developing, implementing, and evaluating instruction.</td>
<td></td>
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<tr>
<td>423</td>
<td>Communication Processes for the Hearing Impaired (3)</td>
<td>Expressive and receptive vocabulary development in sign communication.</td>
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<tr>
<td>424</td>
<td>Nature of Hearing Impairments (3)</td>
<td>Basic principles of psychology: anatomy and physiology of hearing; nature and causes of hearing loss; methods and instruments for assessment of hearing level; interpretation of audiologic services to medical and other rehabilitative disciplines.</td>
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<tr>
<td>425</td>
<td>Introduction to the Psychology and Education of the Hearing Impaired (3)</td>
<td>Primarily for those planning to teach hearing impaired. Overview of research related to psychology, social adjustment, communication methods, language development and education of hearing impaired. Survey of literature. Visits to programs.</td>
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<tr>
<td>430</td>
<td>Psychology and Education of Students with Moderate-Severe Disabilities (6)</td>
<td>Nature and characteristics of persons with moderate-severe disabilities and educational strategies appropriate for these persons. Prereq: Special Education Principles and Special Education Strategies, Admission to Teacher Education and Curriculum and Instruction 422. Coreq: 420. S/NC only.</td>
<td></td>
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<tr>
<td>431</td>
<td>Field Experience in Comprehensive Programs (3)</td>
<td>Practicum in teaching children with hearing impairments.</td>
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<tr>
<td>432</td>
<td>Field Experience in Comprehensive Procedures (3)</td>
<td>Special Education Principles and Special Education Strategies, Admission to Teacher Education and Curriculum and Instruction 422. Coreq: 430. S/NC only.</td>
<td></td>
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<tr>
<td>434</td>
<td>Observation of Clinical Practice (1) (Same as Audiology and Speech Pathology 433.)</td>
<td>Observation of clinical practice in reference to curriculum and program implementation.</td>
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<tr>
<td>436</td>
<td>Clinical Practice in Speech-Language Pathology II (1-4)</td>
<td>(Same as Audiology and Speech Pathology 434.)</td>
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<tr>
<td>440</td>
<td>Voice Disorders (3) (Same as Audiology and Speech Pathology 440.)</td>
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<tr>
<td>470</td>
<td>Psychology of the Exceptional Child (3)</td>
<td>Varieties of exceptional children, general characteristics and educational needs. Implications of developmental variations for functioning as adults. Opportunities to extrapolate upon particular exceptionality. Enrollment limited to non-special education majors.</td>
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<tr>
<td>471</td>
<td>Internship I: Special Education (3-5)</td>
<td>Intensive experience designed to allow student to practice art and science of teaching exceptional children under supervision of experienced teachers. Prereq: 460.</td>
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<tr>
<td>472</td>
<td>Audiology II (3) (Same as Audiology and Speech Pathology 472.)</td>
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<tr>
<td>482</td>
<td>Speech and Language Services in the Schools (2)</td>
<td>Organization and implementation of speech and language programs in schools.</td>
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<tr>
<td>492</td>
<td>Special Education in the Schools (3)</td>
<td>Organization and implementation of speech and language programs in schools.</td>
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<tr>
<td>493</td>
<td>Clinical Practice in Communication Disorders in Schools (3)</td>
<td>Supervised practice with children with communication disorders. Prereq: 453, 454 (90-100 clinical contact hrs).</td>
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<tr>
<td>494</td>
<td>Internship with Hearing Impaired Children (6)</td>
<td>Supervised practicum with preschool, day school and residential students.</td>
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<tr>
<td>500</td>
<td>Thesis (1-15) P/NP only.</td>
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<tr>
<td>502</td>
<td>Registration for Use of Facilities (3-15)</td>
<td>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 requirement. May be repeated. S/NC only.</td>
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<tr>
<td>503</td>
<td>Problems In Lieu of Thesis (1-4)</td>
<td>May be repeated. Max 9 hrs. S/NC or E.</td>
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<tr>
<td>504</td>
<td>Clinical Experience in Teaching and Supervision of Exceptional Children (3-6) Placement in educational settings.</td>
<td>Maximum 9 hrs. S/NC or E.</td>
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<tr>
<td>506</td>
<td>Internships 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/NC only.</td>
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<tr>
<td>509</td>
<td>Vocational Guidance and Career Planning With Hearing Impaired (3)</td>
<td>Utilization of psychological, educational, social and vocational, diagnostic materials and resources appropriate for hearing impaired persons to provide guidance in career decisions and individualized rehabilitation plan.</td>
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<tr>
<td>510</td>
<td>Advanced Educational and Clinical Procedures (3-6)</td>
<td>Integration of advanced educational and clinical procedures; skills and knowledge for implementing instructional programs for consulting with other persons in treatment of exceptional individuals. May be repeated. Maximum 6 hrs.</td>
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<tr>
<td>523</td>
<td>Practicum in Hearing Impairment (3)</td>
<td>Receptive and expressive language capabilities of hearing impaired student. Designing, teaching, and post-testing unit of instruction for remediation of specific language errors. Prereq: 522.</td>
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<tr>
<td>525</td>
<td>Manual Communication (3) American Sign Language (ASL)</td>
<td>Language (ASL) and culture of American deaf community. Acquisition of basic linguistic properties of ASL, cultural differences between hearing and deaf community, and vocabulary development. Prereq: Prior sign language experience or consent of instructor.</td>
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<tr>
<td>526</td>
<td>Advanced Sign Language (3) Intermediate ASL</td>
<td>Recognizing the fluency of expressive and receptive communication with deaf people and structure and history of language. Prereq: 525 or equivalent.</td>
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<tr>
<td>529</td>
<td>Teaching Reading to the Hearing Impaired (3)</td>
<td>Specific procedures necessary to teach the specifically hearing impaired student. Practice in preparation of developmentally appropriate reading materials. Methods which assist in integrating hearing impaired students in regular reading curricula and materials. Prereq: 415.</td>
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<tr>
<td>530</td>
<td>Orientation to Rehabilitation (3) History, philosophy, legal and economic bases, current issues, and practices in public and private rehabilitation programs. Qualifications of service providers. Assessment, plan development, and provision of services to people who have disabilities and vocational handicaps. Identification,</td>
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</table>
509 Clinical Studies (4) Relationship between educational theory and application during internship: research project, development of portfolio, and capstone experience. May be repeated. Maximum 15 hrs. S/NC or letter grade.

510 Application of Microcomputer Technology in Special Education and Vocational Rehabilitation (3) Application of microcomputer technology with all categories of exceptionalities and across all chronological and functioning age ranges. Microcomputer adaptive software, special switch access, authoring systems, telecommunications, and strategies for cognitive development.

511 Clinical Studies (4) Relationship between educational theory and application during internship: research project, development of portfolio, and capstone experience. May be repeated. Maximum 15 hrs. S/NC or letter grade.

520 Assistive Technology in Special Education and Vocational Rehabilitation (3) Technology as applied to needs of school-age and post-secondary age students. Delivery of assistive technology services; software programs and assistive devices; delivery systems, interdisciplinary evaluation/planning, and funding issues.


522 Clinical Experience in Assessment and Instruction (3) Clinical practice in applied field setting: tasks related to teaching, assessment, preparation of lessons, and delivery of instruction. Coreq: 553 or S/NC or letter grade. P

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

601 Seminar in Educational Theories in Special Education and Rehabilitation (3) Education theories: education and rehabilitation of exceptional persons. Theory applications in educational settings. Prereq: Admission to doctoral program or consent of instructor.

602 Seminar in Social Processes in Special Education and Rehabilitation (3) Social phenomena which influence development of discipline and moral issues. Prereq: 561 or consent of instructor.

620 Internship in Research in Special Education and Rehabilitation (3) Placement with professional entity. Experiential-based research: public school, institutions, agencies or university settings. Prereq: 9 hrs in statistical and research methods. May be repeated. Maximum 9 hrs. S/NC only.

620 Internship in Research in Special Education and Rehabilitation (3) Placement with professional entity. Experiential-based research: public school, institutions, agencies or university settings. Prereq: 9 hrs in statistical and research methods. May be repeated. Maximum 9 hrs. S/NC only.

630 Seminar in Research in Special Education and Rehabilitation (3) Development and implementation of research. Independent research studies. Research proposals. Prereq: 9 hrs of research core and consent of instructor.

640 Seminar in Clinical Study and Rehabilitation (3) Relationship between educational theory and application during internship: research project, development of portfolio, and capstone experience. May be repeated. Maximum 15 hrs. S/NC or letter grade.
Statistics

(College of Business Administration and Intercollegiate Program)

MAJORS

Statistics .......................................................... M.S.
Business Administration ........................................ MBA

William C. Parr, Head

Professors:

Downing, Darryl J. (Adjunct), Ph.D. .... Florida State
McLean, Robert A. (Emeritus), Ph.D. .... Purdue
Parlett, William C., Ph.D. .... Southern Methodist
Philip, John W., Ph.D. .... VPI
Sanders, Richard D., Ph.D. .... Texas
Sanders, Willard L. (Adjunct), Ph.D. ..... Tennessee
Sylwester, David L., Ph.D. .... Stanford
Thigpen, Charles C. (Emeritus), Ph.D. .... VPI

Associate Professors:

Bozdogan, Hampursum, Ph.D. .... Illinois
Guess, Frank M., Ph.D. .... Florida State
Leitnaker, Mary G. (Liaison), Ph.D. .... Kentucky
León, Ramón V., Ph.D. .... Florida
Lin, Dennis K. J., Ph.D. .... Wisconsin
Mee, Robert W., Ph.D. .... Iowa State
McGuire, Stephen S. (Adjunct), Ph.D. .... Kansas State
Raney, Gipsie B. (Adjunct), Ph.D. .... NC State
Walker, Esteban, Ph.D. .... VPI
Wright, Tommy (Adjunct), Ph.D. .... Ohio State
Younger, M. S., Ph.D. .... VPI

Lecturer:

Schmidhammer, James L., Ph.D. .... Pittsburgh

Instructors:

Donnelly, Sharon, M.S. .... Tennessee
Neidert, Sharon, M.S. .... Miami (Ohio)
Cwik, Charles, M.S. .... Tennessee
Wright, S. Paul, M.S. .... Tennessee

Additional Intercollegiate Program Committee Members:

Bunting, Dewey, Liberal Arts
Dessart, Don, Education
Fribourg, Henry, Plant and Soil Science
Gisson, Charles, Social Work
Huck, Schuyler W., Educational Counseling Psychology

Ladd, R. T., Management
McLaren, J. B., Animal Science
Miller, Mark, Communications

THE MASTER'S PROGRAM

The M.S. program in Statistics provides students with the foundations in theory and practice required for careers in applied statistics. In addition to the education traditionally offered in such a program, the department offers a concentration in industrial statistics, which provides unique opportunities for experiences in practical applications of statistics. Through involvement in The University of Tennessee Institute for Productivity Through Quality and related programs, department faculty participate in a variety of consulting and research projects in industry. Students may supplement their classroom study with an industrial internship and participation in research projects dealing with industrial problems. Department faculty also collaborate with researchers from many academic disciplines and hold joint appointments with the College of Agriculture, the Computing Center and the Medical Center. Statistics graduate students may gain consulting experience by working with faculty involved in these consulting activities. All students are encouraged to participate in supervised internship or consulting activities as part of their graduate program.

Individuals with undergraduate or graduate degrees in other disciplines are encouraged to enter the program. The candidate's mathematics background should include differential and integral calculus of several variables. Individuals with limited mathematics background should seek departmental guidance regarding specific ways in which they may prepare themselves for the program by taking coursework as non-degree students. Requests for application forms and further information may be sent to the Director of Graduate Studies, Department of Statistics, Stokely Management Center, University of Tennessee, Knoxville, TN 37996-0532.

Admission Requirements

General admission requirements for The Graduate School are stated beginning on page 12. Applicants for Statistics must submit results of the Graduate Record Examination (GRE) general portion, although GMAT exam scores may be substituted. Applicants for the statistics program must have completed at least two years of college-level mathematics, including the calculus of several variables and matrix algebra, and be proficient in a computer language. Applicants whose native language is other than English must submit results of the Test of English as a Foreign Language (TOEFL).

Curriculum

A minimum of 33 credit hours must be completed for the Master's degree. Required of all students are 6 hours in statistical methods, 6 hours in statistical theory, 1 hour in statistical computing, and 3 hours in either supervised consulting or internship. Students must complete a minimum of 21 hours in approved statistics courses, exclusive of consulting, internship, independent study, or thesis.

Thesis or Independent Study

The thesis option for the Master's degree requires the student to complete 6 hours for the thesis. Alternatively, the non-thesis option requires a minimum of 3 hours for an independent study project.

Comprehensive Examination

Students must pass a two-part written comprehensive examination covering 1) theory and 2) methods. Upon failing either part of the examination, the student may retake it. The result of the second examination is final. For students writing a thesis, this examination must be passed before the thesis is defended.

INTERCOLLEGIATE GRADUATE STATISTICS PROGRAM

The Intercollegiate Graduate Statistics Program is a formal University of Tennessee academic program established to recognize graduate students for completing the requirements of a major or minor in Statistics as part of their degree. The program enables a student to obtain the M.S. in Statistics simultaneously with the Ph.D. or Ed.D. in another department. The program also enables a student to obtain a Statistics minor along with the M.S., Ph.D., or Ed.D. in another department. The program is administered by an executive committee with advisory input from the program faculty. The program is open to well-qualified graduate students in all departments which have an approved Statistics minor and/or joint major curriculum offered through the program.

Curriculum requirements for the statistics component of each joint degree are specified in terms of completion of alternative sequences of course options. Course options consist of courses in statistics, offered either by the Department of Statistics or by other departments, that have been reviewed and approved by the Executive Committee. Interested students should contact their department head for information on specific course requirements.

General Admission Requirements

1. The student's sponsoring department must have established with the executive committee an approved degree program along with specified sequences of statistics courses taught by the Statistics Department and/or other departments.

2. The student's Admission to Candidacy form must contain all courses required for the Statistics minor maj or set off in a group and labeled "Statistics courses required for the minor/major."

3. In many cases, a student may not decide to apply for participation in the program until he/she has completed two or three statistics courses. In that case the student's major professor should file a program change with the cooperating departments and assist the student in obtaining a Statistics Department faculty member to serve on the student's committee.

Degree Requirements

The program offers the M.S. in Statistics with a minor in another department, a joint major program in which the student earns a Master's or doctoral degree in the student's sponsoring department along with the M.S. in Statistics, and a joint major and minor program in which the student earns a Master's or doctoral degree in the student's sponsoring department along with a minor in Statistics. The table below presents the minimum number of semester hours in statistics for each of these alternatives.
hours do not represent the minimum required for the degree program. The student selects courses to satisfy the requirements established by the student's sponsoring department and approved by the Program Executive Committee. The student's committee must include a faculty member from the Statistics Department at the rank of Assistant Professor or above. The student's formal examination procedure as established by the sponsoring department must include an appropriate section on statistics. Successful completion of the Statistics minor/major is recognized by appropriate documentation on the student's transcript. Students who do not complete all requirements for the Statistics major/minor will still receive academic credit for statistics courses they have successfully completed.

Degree Program: Hours*
M.S. in Statistics, minor outside of Statistics 21
M.S. outside of Statistics, minor in Statistics 9
M.S. outside of Statistics, Usual separate requirements for Statistics 15
M.S. in Statistics both degrees 24
Doctorate outside of Statistics,** 33
Doctorate outside of Statistics,*** 18

**Approved Statistics courses from the Department of Statistics and/or other departments.

### BUSINESS ADMINISTRATION

**BA Concentration:**
Complete for listing of MBA program requirements, see Business Administration.

**MBA Concentration:** Statistics.
Minimum course requirements are 571, 556, 572 with prereq or coreq of 561.

### ACADEMIC STANDARDS

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

### GRADUATE COURSES

411 Introduction to Statistical Computing (3) Use of computer operating system commands and packaged programs for statistical analysis and file management.

412 Analysis of Variance and Experimental Design (3) Analysis of variance techniques for single and multivariable models, post hoc procedures. Design considerations for completely randomized, hierarchical and split plot experiments; balanced incomplete block and other designs; response surface methodology. May be repeated Maximum 6 hrs.

413 Applied Regression Analysis (3) Linear regression, including use of dummy variables; single and multiple factor models, post hoc procedures. Design considerations for completely randomized, hierarchical and split plot experiments; balanced incomplete block and other designs; response surface methodology. May be repeated Maximum 6 hrs.

414 Statistical Models in Industrial Processes (3) Applications of control charts and other statistical techniques in industrial settings. Attributes and variables control charts, process capability analysis, acceptance sampling, statistical tolerancing. Estimation of variance components, problems of measurement, special industrial applications. Prereq: 571 or 572 or equivalent.

451 Theory of Statistical Inference (3) Introduction to theory underlying regression variable selection techniques, multiple regression, maximum likelihood estimation, testing and estimation. May be repeated Maximum 6 hrs.

461 Applied Regression Analysis (3) Linear regression and correlation, multiple regression, polynomial regression, selection of variables, use of dummy variables, analysis of residuals, logistic regression and its applications. Use of standard computer packages. Major writing requirement. Prereq: Probability and Statistics for Scientists and Engineers II and Introduction to Statistical Software or graduate standing and consent of instructor.

462 Analysis of Variance and Experimental Design (3) Analysis of variance techniques for single and multivariable models, post hoc procedures. Design considerations for completely randomized, hierarchical and split plot experiments; balanced incomplete block and other designs; response surface methodology. May be repeated Maximum 6 hrs.

471 Random Processes and Probability Models (3) Functions of random variables, multivariate distributions, conditional expectations, waiting time distributions; random processes, Markov chains, queuing theory. Prereq: 251 or 252.

472 Probability for Facilities (1-15) Pr/NP only. E

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


531 Survey of Statistical Methods I (3) Univariate and bivariate data collection and organization, statistical estimation and hypothesis testing; analysis of relationships for categorical analysis. Chi-square tests and simple and linear and quadratic regression. Use of computing facilities required. Credit not given for both 531 and 537. Prereq: 1 yr. college mathematics. E

532 Survey of Statistical Methods II (3) Multiple linear regression, including use of dummy variables; single and multiple factor analysis of variance and covariance; issues in experimental design and analysis. Use of computing facilities required. Prereq: 531. E

537 Statistics for Research I (3) Principles and application of statistical methodology, integrated with computer use. May be used for major and/or minor statistical computing system. Probability and probability distributions, sampling and testing hypotheses using parametric and nonparametric inference methods. Matrix-based simple linear regression and correlation. Credit not given for both 531 and 537. Prereq: 1 yr undergraduate mathematics and 1 undergraduate statistics course.

538 Statistics for Research II (3) General linear model as applied to multiple regression and analysis of variance. Diagnostic and influence techniques. One-way, factorial, blocking, and nested designs; preplanned versus post-hoc contrasts. Random factors and repeated measures. Prereq: 537 or 532. F

551 Introduction to Computing for Data Management and Analysis (1) UTK computing environment for beginners, statistics and computer science students. Use of operating system commands, system editor, utility programs and SAS statistical package for data entry and editing, file management and statistical analysis. Use of UTCC computing facilities required. Coreq: 531, 537 and 571, or consent of instructor.


562 Theory of Statistical Inference (3) Introduction to theory underlying regression variable selection techniques, multiple regression, maximum likelihood estimation, testing and estimation. Prereq: 561 or equivalent.

563 Theory of Multivariate Statistical Analysis (3) Analysis of variance techniques for single and multivariable models, post hoc procedures. Design considerations for completely randomized, hierarchical and split plot experiments; balanced incomplete block and other designs; response surface methodology. May be repeated. S/NC only.

564 Statistical Techniques in Industrial Processes (3) Applications of control charts and other statistical techniques in industrial settings. Attributes and variables control charts, process capability analysis, acceptance sampling, statistical tolerancing. Estimation of variance components, problems of measurement, special industrial applications. Prereq: 571 or 572 or equivalent.


572 Applied Linear Models (3) Simple and multiple linear regression using matrix algebra and general linear model; polynomial regression, weighted least squares regression, variance component estimation, response surface methodology, regression diagnostics; general linear model approach to analysis of data from designed experiments. Use of standard computer packages. Prereq: 571 and matrix algebra.

573 Design of Experiments (3) One-way ANOVA, multiple range tests, equal and unequal variances, transformations, factorial experiments, completely randomized designs, analysis of covariance, split plot and nested designs, fractional factorials, sequential designs. Prereq: 571.


585 Principles of Statistical Process Management (3) Control charts and other statistical techniques applied to management of business processes. Prereq: Consent of department head.

587 Graduate Seminar (1) Directed readings and active participation in colloquium in department of Statistics and of student's minor program. Prereq: Consent of statistics department director of graduate studies. May be repeated. Maximum 2 hrs. S/NC only.

592 Internship (1-6) Supervised off-campus experience in application of statistical principles and methods in business, industry, or government. Written and oral report. Prereq: 4 courses in graduate level statistics and consent of statistics department director of graduate studies. May be repeated. Maximum 6 hrs. S/NC only.

593 Independent Study (2-6) Faculty directed readings and investigation of specified topic in probability or statistics. Written report and oral presentation. Prereq: 2 courses in statistics and consent of the statistics department director of graduate studies. May be repeated. Maximum 6 hrs. S/NC or letter grade.

595 Statistical Consulting Practicum (1-6) Supervised experience helping on-campus researchers plan, manage data, and develop and perform analyses specific to designs and hypotheses. Discussion of activities in regular seminar meetings. Final written reports and/or detailed diaries. Prereq: 572 or 538. May be repeated. Maximum 6 hrs.

673 Advanced Topics in Design of Experiments and Linear Models (3) Experimentation for product and process improvement: response surface methodology and robust design methods; mixture experiments; optimal design topics; distribution theory and inference for linear models. Prereq: 573 or consent of instructor.

675 Categorical Data Analysis (3) Log-linear analysis of multidimensional contingency tables. Logistic regression, generalized linear models, and generalized linear models. Prereq: 1 yr graduate-level statistics, regression analysis and analysis of variance and familiarity with CMS or VAX; or consent of instructor.

679 Multivariate Statistical Modeling (3) Modern information based techniques and model selection in multivariate analysis, informational tests of significance with multivariate data, multivariate analysis of variance, multivariate regression and variable selection, multivariate cluster analysis, common principal component model, factor analysis model, covariance structural models with latent variables, mixture-model cluster analysis. Prereq: Matrix algebra and 564, or matrix based linear models with experience in interactive computing, or consent of instructor.

681 Special Topics in Probability (1-3) Presentation of specialized topics in probability and stochastic processes. May be repeated. Maximum 6 hrs.

683 Special Topics in Statistics (1-3) Presentation of specialized topics in statistics. May be repeated. Maximum 6 hrs.
The Ed.S. program is a cooperative undertaking involving all vocational service areas. Concentrations are available in agricultural, business, marketing and distributive, home economics, industrial, and technical education, and in general vocational education.

The degree requires a minimum of 60 hours of graduate study. Credits earned for the Master's degree may meet program requirements in the courses which contribute to the program objectives of the candidate. A major core of studies offers advanced concepts in technological and adult education.

THE DOCTORAL PROGRAM

The comprehensive Ed.D. program in the department is designed to provide opportunities for graduate students to achieve professional objectives, develop needed competencies, and gain desirable experiences and understanding of technological and adult education.

The minimum requirements in the doctoral program consist of the following: departmental specialization, 12 hours; departmental core and electives, 21 hours; cognate field, 9 hours; professional education core, 9 hours; research techniques, 12 hours; and dissertation, 24 hours. A minimum of 90 hours above the baccalaureate is required.

The Doctor of Philosophy with a major in Education includes concentrations and specializations as listed under Education.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. and Ed.D. programs in Technological and Adult Education are available to residents of the state of South Carolina; the Ed.D. program is available to residents of Kentucky and West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

401 Utilization of Community Resources (3) Strategies of developing linkages between vocational education and private sector through advisory committees, councils, and working partnerships. Development and management of public relations programs. Prereq: 3 yrs teaching experience.

415 Coordination Techniques (3) Necessary procedures, duties and responsibilities to implement, maintain, and evaluate successful cooperative education program. Prereq: Senior standing and consent of instructor. Sp


436 Supervised Occupational Experience (3-9) Practical experience in business and marketing settings supervised by profession, and departmental representatives. Prereq: Consent of instructor. F,Su

504 Research in Technological and Adult Education (3) Research in technological and adult education. Prereq: Consent of instructor. F,Su

550 Internship in Technological and Adult Education (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs. F,Su

513 Special Topics in Technological and Adult Education (1-3) Special topics, activities, and evaluation. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

514 Individual Study in Technological and Adult Education (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

515 Microcomputer Operations and Programming in Education (3) Operating and programming microcomputers and microcomputer programs using sequential data files. Prereq: Consent of instructor. E

516 Microcomputer Software Development (3) Advance microcomputer design in BASIC: random access and binary files, search and sort algorithms, and bitmapped graphics for educational software. Prereq: Consent of instructor. F,Su

521 Program Development and Operation in Technological and Adult Education (3) Program development and operation in technological and adult education. Prereq: Consent of instructor. F,Su

522 Adult Development (3) Change in characteristics of adults over life span and implications for adult education. Prereq: Consent of instructor. F,Su
523 Post-Secondary Education for Adults (3) History, evolution, philosophy, structure and functions of post-secondary sub-institutions, their programs and clientele. Prereq: Consent of instructor. Sp, Su

524 Continuing Professional Education (3) Theories and concepts supporting design and management of educational programs for adults in professions. Prereq: 510 or equivalent. Sp, Su

530 Methods and Materials for VOE Programs (3) Development of instructional aids, recent developments and research, individualized instructional, and occupational clusters. Prereq: 510 or equivalent. Sp, Su

531 Organization and Supervision of VOE and Marketing Programs (3) Developing office and marketing occupations, guiding, directing and controlling, model office programs. Trends in office and marketing education, physical facilities, state plans, instructor qualifications and advisory committees. Prereq: Consent of instructor. F, Su

532 Improvement of Instruction in Basic Business and Marketing Education (3) Issues, research findings, methods, and materials for improved instruction of both secondary and post-secondary levels. Prereq: 12 hrs of graduate credit. Sp, Su

533 Improvement of Instruction in Office Technology (3) Research, principles of learning issues, and materials in typewriting, wordprocessing, business communications, and office procedures. Prereq: Consent of instructor. F, Su

534 Improvement of Instruction in Accounting and Data Processing (3) Principles of learning issues, research findings and materials in basic accounting, automated accounting and data processing at secondary and post-secondary levels. Prereq: Consent of instructor. F, Su

535 Curriculum in Business and Marketing Education (3) Curriculum design in career, secondary, post-secondary, adult education, legislation, technology, social, economic and research results that affect business and marketing education. Prereq: Consent of instructor. Sp, Su

536 Organizing and Teaching Adult Business and Marketing Education (3) Planning, organizing, coordinating, teaching and evaluating continuing education programs in business and marketing education; utilizing trade associations, employment agencies, business groups, and advisory committees in program implementation. Prereq: 3 yrs teaching experience and consent of instructor. F, Su

537 Measurement in Business and Marketing Education (3) Testing and evaluation of learner performance in business and marketing education; teacher-made tests. Prereq: Consent of instructor. Sp, Su

540 Special Topics in Business and Marketing Education (1-3) Specific objectives, activities, and evaluations vary. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

541 Practicum in Business/Marketing Education (3) Practical updating and upgrading of experiences in non-traditional settings for business and marketing teachers. Prereq: 15 hrs of graduate credit. E

542 Problems in Business and Marketing Education (3) Selective research problems in teaching of business and marketing education and related areas. Prereq: Consent of instructor. E

550 Administration of Industrial Education Programs (3) Developing, staffing, administering and evaluating, trade, industrial and technical education programs in secondary and post-secondary school settingsur. Prereq: Consent of instructor. Sp, Su

551 Supervision of Industrial Education Programs (3) Theory used to improve industrial education programs. Staff development, curriculum improvement, and program updating techniques. Prereq: 455 or equivalent. F, Su

552 History and Philosophy of Industrial Education (3) Social, economic events that influence development of industrial education. Philosophical problems, justification, values, principles and concepts of industrial education. Prereq: Consent of instructor. F, Su

553 Planning Technical Education Facilities (3) Preparation of educational specifications, site selection, and working relationships with other professionals involved in process of planning technical-education facilities. Prereq: Consent of instructor. Sp, Su

554 Technical Program Planning (3) Instructional systems attending to analysis, design, development, implementation, and evaluation of trade, technical supervisor and related training. Prereq: Curriculum development course and consent of instructor. F, Su

555 Curriculum Planning for Industrial Education Programs (3) Developing performance-based, criterion-referenced instructional programs. Prereq: 374 or 554 or consent of instructor. Sp, Su

556 Staff Development Programs (3) Strategies for assessing, planning, and implementing programs for professional development of vocational-technical personnel. Prereq: 552 or consent of instructor. Sp

557 Advanced Methods of Teaching Technical Subjects (3) Proper selection and effective application of innovative methods and teaching specialized skills and technical information. Diversifying and individualizing teaching of technical subjects. Prereq: 373, Sp, Su

558 Seminar in Industrial Education (1-3) Current issues, innovations, problems associated with technical programs. Prereq: 12 hrs of graduate courses. May be repeated. Maximum 6 hrs. F, Su

559 Evaluation of Technical Training Programs (3) Internal and external evaluation of training programs to maintain quality control and/or to justify revisions. Prereq: 455 and consent of instructor. Sp, Su

571 Supervisory Skills for Improving Industrial Productivity (3) Philosophy of improving industrial productivity through quality and introduction to basic tools of statistical process control. Deming philosophy, control charting and interpretation, process capability, techniques for training hourly workers in quality control, and measurement techniques for quality control. Prereq: Statistics course and consent of instructor. F, Su

572 Advanced Training Methods for Industrial Productivity (3) Techniques for improving hourly workers in the use of statistical process control tools. Techniques for involving hourly workers and supervisors in quality assurance, inventory control, and productivity improvement. Prereq: 571, Sp, Su

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

601 Curriculum Planning in Technological and Adult Education (3) Curriculum theory, models, contents, planning evaluation and implementation of specialized program areas. Prereq: 555 or equivalent. Sp, Su

602 Planning and Evaluation of Programs in Technical and Adult Education (3) Techniques utilized in planning, developing, and evaluating instructional programs. Prereq: 500-level planning course and consent of instructor. Sp, Su

604 Seminar in Technological and Adult Education (1) Required 2 consecutive semesters during doctoral residency. May be repeated. Maximum 3 hrs. SNC only. E

605 Administration and Supervision of Technological and Adult Education (3) Leadership, policy, organization, planning, personnel, student development services, and budgeting relating to vocational, technical and adult education at secondary, post-secondary, and higher education levels. Principles, problem solving, and management activities. Prerequisites: Administrative theory course and consent of instructor. F, Su

610 Research Development in Technological and Adult Education (3) Proposal development, theoretical base, research design, sampling, application of statistics, and evaluation of research in technological and adult education. Prereq: 6 hrs of advanced statistics courses and consent of instructor. Sp, Su

611 Internship in Technological and Adult Education (3) Field experience in relevant organizations. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

613 Special Topics in Technological and Adult Education (3) Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E

615 Advanced Microcomputer Software Applications (3) Advanced programming and applications of intelligent or program generating software. Progression of commercial relational data-base management programs and environments. Concepts and applications of communications and networking. Hands-on experience. Prereq: 516 or equivalent. Sp, Su


620 Seminar in Adult Education (3) Issues in adult education, theories and concepts, philosophical positions, research trends and methodologies. Prereq: 510 or equivalent. F, Su

621 Advanced Seminar in Program Planning (3) Concepts, principles, and theories related to program planning in adult education. Prereq: 521 or equivalent. Sp

622 Advanced Seminar in Adult Development (3) Adult development research. Designing research for studies of life cycle. Prereq: 522 or equivalent. Sp, Su

626 Adult Problem Solving and Learning (3) Contemporary research and theories in adult problem solving and learning. Prereq: Consent of instructor. Sp, Su

631 Higher Education in Business and Marketing Education (3) Textiles, Retailing and Interior Design (College of Human Ecology)

MAJORS DEGREES

Textiles, Retailing and Consumer Sciences M.S.

Human Ecology Ph.D.

Nancy B. Fair, Head

Professors:

Blakemore, R. G. (Emeritus), Ph.D. Florida State
DeLong, A. J. (Liaison), Ph.D. Pens State
DeJonge, Jacquelyn C., Ph.D. Iowa State
Drake, Mary Fran, Ph.D. Penn State
Ducett, Kermitt E., Ph.D. Tennessee
Wadsworth, Larry C., Ph.D. NC State

Associate Professors:

Breeze, Randall R. (Liaison), Ph.D. Florida State
Canestro, Nancy, Ph.D. Michigan
Dyer, N. L., Ph.D. North Carolina
Fair, Nancy B., Ph.D. NC State
Fairhurst, Ann, Ph.D. Oklahoma State
Rabun, Jostie, Ph.D. Tennessee

Assistant Professors:

Bhat, Gajanand, Ph.D. Georgia Tech
Dillard, Susan, Ph.D. Florida State
Chu, Milli, Ph.D. Missouri
Houser, T. L., M.S. Tennessee
Lee, Jinkook, Ph.D. Ohio State

Research Assistant Professors:

Dever, Molly, Ph.D. Kansas State
Hansenbocher, Charles, Ph.D. Tennessee
Huang, Xuan Chao, Ph.D. Leeds
Khan, Ahmad, Ph.D. Tennessee
Ko, Wen-Chien, Ph.D. Tennessee
Malan, Sanjiv, Ph.D. Tennessee
The Department of Textiles, Retailing, and Interior Design offers Master’s degrees in Interior Design and in Textiles, Retailing and Consumer Sciences. The program in Textiles, Retailing and Consumer Sciences offers concentrations in textile science and in retail and consumer sciences. An interdisciplinary minor in gerontology gives the graduate student an opportunity for enhancing his/her own major concentration.

The Master’s program in Interior Design will provide a balance between creative and theoretical foundations of the field; emphasis is placed on the dissemination of knowledge. The program is accredited by the Foundation for Interior Design Education Research (FIDER). The goal of the graduate program in interior design is to provide the student with scholarly and professional experiences through seminars, studio work, and research. Interdisciplinary thrusts will increase the depth of understanding of the field of interior design essential to function as educators or as independent professionals.

Areas of emphasis within interior design may include: history of interior design, computer-aided design, and human environment interaction. Supporting courses are available in lighting, furniture design, business practices, etc.

The programs in Textiles, Retailing and Consumer Sciences prepare students for careers in industry, business, public and private agencies, and educational institutions. Master’s level work enables students to conduct research in retail management and merchandising and in the consumer related areas 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 Textiles, Retailing, and Interior Design application, Graduate Record Examination (GRE) scores for the general section, and three Graduate School Rating Forms completed by individuals who can attest to the potential for graduate education. Forms may be obtained from the Dean’s Office, College of Human Ecology.

In addition to specified entrance requirements stipulated by The Graduate School, admission to the particular programs in the department is based on the following requirements:

Interior Design

Admission to the Master’s degree program requires: 1) a background in interior design; 2) a cumulative GPA of 3.0 or above (on a 4.0 scale); and 3) a portfolio of undergraduate studio work (and professional work, if applicable) submitted to the department. The portfolio may include slides or original work. It is recommended that deficiencies in preparation, as identified in the admission process, be removed prior to full admission to the graduate program.

Textiles, Retailing and Consumer Sciences (T.R.C.S.)

Admission to the Master’s degree program requires that the applicant have a background in textiles, retailing, and consumer sciences. The program is designed to provide the student with a foundation in management and retailing or consumer sciences, and an opportunity for career enhancement in industry, business, public and private agencies, or educational institutions.

Requirements for admission include:

1. A B.S. degree in a related field.
2. A cumulative GPA of 3.0 or above.
3. Evidence of professional experience in the field.

The program offers concentrations in the following areas:

- Textile Science
- Retailing and Consumer Sciences
- Environmental Management
- Business Administration

Thesis Option: 12 hours

Non-Thesis Option: 18 hours

Non-Thesis students are required to complete an approved thesis project. Students must demonstrate competence in individual research in one of the following areas:

- Textile Science
- Retailing and Consumer Sciences
- Environmental Management
- Business Administration

The thesis must be completed within two years of full-time enrollment. Students are required to register for 6 hours of dissertation credit during their second semester of full-time enrollment. Students are required to complete a comprehensive examination before the second semester of full-time enrollment.

ACADEMIC STANDARDS

1. Evaluation of student progress will normally occur prior to enrollment for thesis hours (or the non-thesis option) and during the second semester of full-time enrollment in the program. The review of the student will be undertaken by the faculty with consideration...
given to factors such as: GPA (minimum 3.0), portfolio evaluation, and demonstrated research capability.

2. If progress or performance is deemed insufficient, the faculty may recommend probation with specific goals set for a specified time or termination.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.S. program in Interior Design is available to residents of the states of Kentucky, Louisiana, Mississippi, or Virginia. The M.S. program in Textiles, Retailing and Consumer Sciences is available to residents of the state of Mississippi. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records. For the Ph.D., see Human Ecology.

Interior Design

GRADUATE COURSES

400 Proxemics (3) Space and behavior within cultural context. Application of design method and design process. Theoretical foundations and concepts from environment and behavior. Simulation techniques and methods for identifying behavioral design requirements. Prereq: Human Environment Systems and Micro Computer for Interior Design or consent of instructor. F

450 Advanced Interior Design II (5) Comprehensive studio problems of advanced complexity; integration and extension of experiences utilizing systematic design methodologies. Prereq: Advanced Interior Design or consent of instructor, 2 hrs and 3 labs. Sp


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

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

510 Needs Assessment and Design Programming (3) Use of systematic design methodology and design research methods as part of design problem-solving experience. Lecture and studio. May be repeated. Maximum 6 hrs. Prereq: Admission to graduate program. F

520 Integrative Interior Design Studio (3) Identification, integration and synthesis of multidisciplinary data input. Advanced programming techniques and design evaluation. Lecture and studio. Prereq: 510, 564, or consent of instructor. Sp

531 Research Methods in Historic Preservation (3) Methodologies for historic conservation and preservation problems in interior design. Prereq: Architecture 403 or consent of instructor. Sp

552 Seminar in Interior Design (3) Twentieth-century design concepts, persons, motivation, and creative components leading to modern innovation. Prereq: 470 or consent of instructor. F

555 Micro-computer Research Applications in Interior Design (3) Advanced micro-computer concepts and applications for research in interior design. Project design and implementation of design criteria, programming, schematic design, computer-aided design, advanced spreadsheet and database analysis, and desktop presentation. Prereq: Consent of instructor. Sp

564 Environmental Factors in Interior Design (3) Humans and associated research techniques and design methodologies related to interior architectural environments. Design requirements from anatomy, physiology, anthropometry and social and behavioral sciences. Prereq: 510 or approval of faculty. 6 hrs of scientific study and 6 hrs of natural science, or consent of instructor. Sp

570 Facilities Planning (3) Considerations in programming, design, management, and operation of specialized facilities: hospitals, hotels and restaurants, work environments, day care facilities, retailing-consumer interface and environment for elderly.

575 Environment and Aging (3) Seminar on design of physical environment and relationship to aging process. Concepts and theories from design, and social and behavioral sciences, applied to the social/behavioral science or consent of instructor. Sp

580 Directed Study in Interior Design (1-3) Independent advanced research in selected areas from field of interior design. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E

581 Directed Study in Historic Preservation (1-3) Independent advanced research in historic preservation relevant for interior design. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E

582 Directed Study in Historic Design (1-3) Independent advanced research in area of historic stylic movements in interior design. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E

584 Directed Study in Environmental Design (1-3) Independent advanced research in environmental design analysis. Prereq: 574 or consent of instructor. May be repeated. Maximum 9 hrs. E

585 Directed Study in Facilities Planning (1-3) Independent advanced research in facilities management. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E

590 Research Seminar (1-2) S/NC only. E

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

610 Issues in Interior Design (1) Readings, reports, and discussion concerning current research and related issues in history of interior design, historic preservation, environment and behavior. Registration each semester of residence.

620 Advanced Special Topics in Interior Design (3) Selected topics of major interest: history of interior design, advances in historic preservation, environment and behavior. Topics vary. Prereq: 510, 552, 562, 564. May be repeated. Maximum 9 hrs.

625 Integrative Facilities Design in Consumer Environments (3) Methodologies and skills necessary for creation of settings sensitive to needs of users. Techniques for programmatic analysis and development: goals, user requirements, technical, functional, and behavioral analysis of consumer in business and built environment.

630 Advanced Directed Study in Interior Design (3) Individual study in aspect of interior design culminating in scholarly paper. May be repeated. Maximum 9 hrs.

Retail and Consumer Sciences

GRADUATE COURSES

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

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

510 Retail Strategy and Decision Making (3) Strategy, strategic management and strategic process in retail sector. Analytical decision-making skills in retailing. Retail industry structure. International differences in retail systems. Prereq: Retail Management or equivalent. Sp

510 Fiber Science (3) Physical properties, mechanical properties and microstructure of polymeric fibers; relation to end-use properties. Prereq: Organic Chemistry and Thermal Physics or equivalent.


521 Nonwoven Science and Technology I (3) Nonwoven fabric technology; different web forming processes; and relationships among the chemical, morphological and mechanical properties of fibers and orientation in webs to final performance properties of bonded structures. Prereq: Organic chemistry or consent of instructor.

524 Advanced Textile Dyeing and Finishing (4) Chemistry, processing and fastness of chemical finishes and various classes of dyes on different fibers. Prereq: 510 or consent of instructor. 2 hrs and 4 labs.

536 Nonwoven Science and Technology II (3) Interrelations 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.


593 Directed Study (1-3) Individual problems in textile science. Prereq: 9 hrs textiles graduate coursework. May be repeated. Maximum 9 hrs.

595 Advanced Topics in Textile Science (1-3) Lecture, group discussion on specialized topics. Prereq: 9 hrs textiles graduate coursework or consent of instructor. May be repeated. Maximum 9 hrs.

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

625 Physical Chemistry of Fibers (3) Physical chemistry of fibers and fiber forming polymers: surface chemistry and thermal properties. Prereq: 510.

626 Physics of Fiber Structures (3) Morphology of polymeric structures; thermal and processing history on mechanical, electrical and chemical properties of fibers. Prereq: 510.


695 Advanced Topics in Textile Science (3) Lecture, group discussion, individual research on advanced topics and research areas of current significance: future direction, professional issues, theoretical approaches. Prereq: Doctoral student and 9 hrs textiles graduate coursework. May be repeated. Maximum 9 hrs.

Associate Professor:
Black, W., M.F.A. Illinois
Crooked, J., M.F.S. Southern Methodist
Moran, J., M.F.A. Brandeis

Assistant Professors:
DeCuur, L. J. (Laison), M.F.A. Tulane
Gould, B. K., M.F.A. Catholic
Oliva, J. E., Ph.D. Northwestern
Weber, T., M.F.A. Alabama

Adjunct Faculty:
Arnold, P., M.A. Catholic

The Department of Theatre offers the Master of Fine Arts degree in Theatre with area concentrations in acting, directing, playwriting, dramaturgy, scene design, costume design, lighting design and theatre technology. Not all areas of concentration accept applicants every year.

Applicants must have completed undergraduate degrees approximately equivalent in requirements to those specified for degrees conferred by The University of Tennessee, Knoxville.

The Graduate Record Examination, three letters of recommendation and interviews with appropriate faculty are required of all applicants. Applicants for admission to M.F.A. degree in technical theatre and playwriting/dramaturgy programs must submit samples of their work. Auditions are required of M.F.A. degree acting and directing applicants.

For detailed information about the graduate program, contact the Director of Graduate Studies, Department of Theatre.

THE MASTER OF FINE ARTS PROGRAM

At least 60 semester hours, 40 of which must be at the 500 level or above, are required for the degree of Master of Fine Arts with a major in Theatre, which is normally to be completed in three consecutive years of full time residence. Theatre 501 is required the first year of residence. A diagnostic examination in theatre history and literature/criticism and 3 hours of advanced theatre history is required. An additional 3 hours of each may be required as determined by the diagnostic examination.

Students in the M.F.A. degree program are evaluated annually by critical performance of portfolio submission. Continuation in the program is with the approval of the faculty committee for the M.F.A. degree program. Theatre 599 Projects in Lieu of Thesis and an oral defense of the project must be completed satisfactorily before the degree is conferred.

In addition to the core requirements listed above, each area of concentration has specific requirements:

Design/Technical Production
Required courses and at least 12 hours of Theatre 580, Design and Technical Production Seminar, and at least 6 hours in the projects courses. Theatre 401, Principles of Design is required the first year of residence.

Acting
Required courses and at least 12 hours of Theatre 520-21, 22-23, 24-25. Master Class are required, along with one course in directing and two hours each in voice and dance.

Directing
Required courses are 430 Directing, 520-21 Master Class for first year acting candidates and 9 hours of 536 Projects in Play Directing.

Playwriting
Required are 470-71 Playwriting, at least 12 hours of 573 Playwriting Seminar, and at least 3 hours of 585 Production Workshops.

Dramaturgy
An additional two courses in dramatic theory and criticism are required as are Theatre 570, Theory and Practice, at least 6 hours of 585 Production Workshops, 430 Play Directing, 3 hours of 536 Projects in Directing, and 12 hours of 573 Seminar and Projects. In addition, students must select an arts and humanities specialization comprising at least one year of language study plus 6 hours in the selected area.

REQUIREMENTS FOR SECOND MASTER'S DEGREE

Students admitted to the MFA program who have already earned a Master's or a doctoral degree may apply up to 12 credit hours from the previous graduate program to the MFA degree with approval of the student's committee, the Dean of the College of Liberal Arts, and the Dean of The Graduate School.

Any such credits applied from a previous graduate program would be from courses that are directly relevant to the student's M.F.A. curriculum and must have been earned within the time limit (6 years) established for completion of the MFA degree.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. The M.F.A. program in Theatre is available to residents of the state of Virginia (concentration in costume design only).

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

GRADUATE COURSES

401 Principles of Theatrical Design (3) Fundamental principles of design, visual and structural relationships. Projects assigned to develop understanding and perception.

409 Stage Make-up (2) Problems in make-up design and application, character analysis, physiognomy and chiaroscuro. Prereq: 100

420 Special Studies in Acting (3) Content varies. Exercises in selected concentrated areas such as styles, techniques, approaches, e.g., Shakespeare, movement, humor. Prereq: Advanced Acting and consent of instructor. May be repeated. Maximum 6 hrs.

423 Period Movement and Dance (2) Movement styles and dances from Renaissance to 20th century. Prereq: Stage Movement or consent of instructor.

424 Theatre Dance II (2) Advanced dance technique incorporating elements of musical theatre. Prereq: Theatre Dance or consent of instructor. May be repeated. Maximum 6 hrs.

425 Selected Musical Theatre Techniques (2) Study and practice of musical theatre material: dance and vocal work. Prereq: Theatre Dance or consent of instructor. May be repeated. Maximum 4 hrs.

426 Applied Phonetics (3) Development of skills in transcription and reproduction of principal varieties of English Language in North America and Great Britain.
and selected foreign dialects in North America. Prereq: Consent of instructor.
445 Advanced Costume Construction (3) Advanced studies in construction technique, tailoring, vacuum forming, plastic molding, and cobbling. Prereq: 345 or consent of instructor.
446 Costume Pattern Making (3) Draping patterns for period costumes. Cossety and study of historical patterns 1500-1800. Prereq: 345 or consent of instructor.
450 Advanced Scenery Technology I (3) Study and practical application of scenery building and rigging. Pruduction participation required. Prereq: 250. Graduate credit to theatre M.F.A. students only.
451 Advanced Scenery Technology II (3) Study and practical application of metalworking and plastics for theatrical production. Pruduction participation required. Prereq: 250. Graduate credit to theatre M.F.A. students only.
452 Advanced Scenery Technology III (3) Study and practical application of stage rigging for theatrical productions. Production participation required. Prereq: 250. Graduate credit to theatre M.F.A. students only.
453 Scenery Painting (3) Introduction to materials, techniques, and principles of craft. Gaining skill and understanding through studio experience. Prereq: Consent of instructor.
456 Rendering (3) Techniques in monochrome and full color illustration of space and form. Prereq: Acquisition of basic principles and techniques of rendering.
463 Sound Design (3) Sound design for performing arts. Review of equipment and acoustical factors that affect sound and projection. Selected design plotted from selected plays. Final projects mixed, edited, and cued for performance.
464 Computer Assisted Design for Stage Lighting (3) Advanced techniques in computer-assisted design for stage lighting. Work with CAD and other stage lighting software for preparation of lighting plots and associated paperwork. Prereq: Introduction to Lighting Design or consent of instructor.
465 Aesthetics of Lighting Design (3) Theory and practice of stage lighting design. Relationship between designers and non-designers: directors, actors, scenic artists, architects, etc.
470-71 Playwriting (3,3) Advanced instruction in writing of plays. Prereq: Consent of instructor.
491 Foreign Study (1-15) See College of Liberal Arts.
492 Off-Campus Study (1-15) See College of Liberal Arts.
493 Independent Study (1-15) See College of Liberal Arts.
501 Introduction to Graduate Research in Theatre (3) Research tools and methods for thesis artist and scholar.
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/N only.
510 Studies in Theatre History (3) Intensive study of selected topics in theatre history. May be repeated. Maximum 9 hrs.
512 Dramatic Literature Analysis (3) Dramaturgical concepts of major playwrights. Using a variety of analytical approaches from Aristotle to Structuralist.
520-21-22-23-24-25 Master Classes in Acting (4,4,4,4,4,4) Master classes in acting techniques, voice, and movement. Theatre MFA students only.
536 Projects in Play Directing (3) Practical work in play directing involving various lengths and kinds of scripts. May be repeated. Maximum 9 hrs.
542 The Social History of Costume (3) Study and analysis of costume as related to society's manners and mores, architecture and furniture.
544 Millinery for the Stage (2) Pattern making and construction techniques for hats from antiquity to present. Prereq: Consent of instructor.
547 Painting and Dyeing for the Theatre (2) Fibers, dyestuffs and dyes, color matching and distressing.
549 Projects in Costume Technology (1-3) Individualized studies in costume technology in theatre production. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.
553 Projects in Scenic Design (1-3) Conception and realization of major projects, both theoretical and actual, in scene design. May be repeated. Maximum 9 hrs.
554 Studies in Scenic Design (3) Advanced scenic design techniques and approaches to design for complex dramas and varied dramatic forms. May be repeated. Maximum 6 hrs.
556 Advanced Scenery Painting (2) Advanced instruction in materials, techniques, and principles of scenic painting; studio experience in dimensional simulation, faux-finish and carved detail. Prereq: 454 or consent of instructor.
560 Projects in Lighting Design (1-3) Conception and realization of major projects, both theoretical and actual. In lighting design. Prereq: Consent of instructor. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.
562 Special Problems in Lighting Design (3) Advanced problems in lighting design and theory; problems in Broadway production and touring. Prereq: 485 or consent of instructor.
563 Projects in Sound Design (1-6) Production assignment as sound designer for approved play and/or relevant projects in field of sound design/history/methodology. Prereq: 463 or approval of instructor. May be repeated. Maximum 6 hrs.
570 Dramaturgy: Theory and Practice (3) Methods and materials. Prereq: Consent of instructor.
573 Seminar in Playwriting (3) Examinations and projects tailored for advanced students in playwriting. Prereq: Consent of instructor. May be repeated. Maximum 18 hrs.
575-76 Studies in Dramatic Theory and Criticism (3,3) Broad-based study of major ideas about drama.
580 Design and Technical Production Seminar (1-6) Selected aspects of scenic design and technical production. Prereq: Consent of instructor. May be repeated. Maximum 18 hrs.
585 Production Workshops (1-6) Directed experience in production collaborations. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.
589 Project In Lieu of Thesis (1-6) Available to theatre MFA students only. Prereq: Minimum of 30 hrs toward MFA degree and consent of advisor. May be repeated. Maximum 9 hrs.

Transportation
See Marketing, Logistics and Transportation

Urban Practice
(Comprehensive Graduate Program in Theatre Arts)

MAJOR
VETERINARY MEDICINE ........................................... D.V.M.

D.J. Krahwinkel, Head

Professors:

Adams, W.H., D.V.M. ............................................ Florida
Frank, L.A., D.V.M. .............................................. Tufts
Jenkins, C.C., D.V.M. ............................................. Illinois
Millis, D.L., D.V.M. ............................................ Illinois
Paddleford, R.R., D.V.M. ........................................ Missouri
Selcer, R.R., D.V.M. ............................................. Texas A&M
Sims, M.H., Ph.D. .................................................. Auburn

Clinical Professors:

Legendre, A.M., D.V.M. ......................................... Auburn
Ward, D.A., D.V.M. ............................................. Tennessee

Clinical Assistant Professors:

Brace, J., D.V.M. .................................................. California (Davis)
Daniel, L.B., D.V.M. .............................................. Auburn
DeNardo, R.C., Jr., D.V.M. ..................................... Missouri
Ellison, G.W., D.V.M. ........................................... Illinois
Gompf, R.E., D.V.M. ............................................. Ohio State
Harvey, R.C., D.V.M. ............................................. Tennessee
Morgan, R.V., D.V.M. ............................................ Illinois

Assistant Professors:

Krahwinkel, D.J. ............................................... Auburn

Clinical Assistant Professor:

Panjehpour, Masoud, Ph.D. ..................................... Toyota

Assistant Professor:

Sackman, J.E., D.V.M. ........................................... Michigan State

Research Professor:

Overholt, B.F., M.D. ............................................. Tennessee

Research Associate Professor:

Brull, E.A., D.V.M. .................................................. Tennessee

Clinical Research Associate:

Attwood, P.T., D.V.M. ........................................... Michigan State

Clinical Instructors:

Arrington, K.A., D.V.M. ......................................... Tennessee
Campbell, S.L., D.V.M. ......................................... Wisconsin
Mawby, D.I., D.V.M. ............................................. Saskatchewan

DEGREE
Residents:
Bravo, L., D.V.M. .................................. Saskatoon
Burkett, G., D.V.M. .............................. Massey
Davies-Dean, W. L., D.V.M. .................. Michigan
Mears, E., D.V.M. ................................. Tuskegee
Poteet, B. A., D.V.M. ........................... Texas A&M
Vogt, J. D., D.V.M. ............................... Michigan State
Wells, K., D. V.M. ................................. Texas A&M
Wilkens, B. E., D.V.M. ........................... Kansas
Wright, K., D.V.M. ............................... Michigan

Interns:
Bonde, D. J., D.V.M. ............................. Florida
Burkett, G., D.V.M. ................................. Massey
Gantt, K.R., D.V.M. .............................. Cornell
Hilton, J., D.V.M. ................................. Tuskegee
Reeves, C. L., D.V.M. ........................... Missouri

See Veterinary Medicine for program description.

GRADUATE COURSES

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

501 Special Topics in Small Animal Medicine and Surgery (1-4) May be repeated. Maximum 6 hrs. E

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

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

VETERINARY MEDICINE

(Graduate College of Veterinary Medicine)

MAJOR DEGREE
Veterinary Medicine .................. D.V.M.
Comparative and Experimental Medicine .... M.S., Ph.D.

THE PROFESSIONAL PROGRAM

Admission Requirements
To qualify for admission to the professional program of the College of Veterinary Medicine, a candidate must have completed at least the minimum pre-veterinary requirements listed below. These may be completed at any accredited college or university that offers courses equivalent to those at The University of Tennessee, Knoxville. Pre-veterinary course requirements must be completed by the end of the senior year of the student in which he/she enters. Pre-veterinary course requirements must be completed within five years of the time the student wishes to enter the program.

Subject Area Semester Hours
English 8
Humanities and Social Sciences* 18
Physics 8
General Chemistry 8
Organic Chemistry 8
Biochemistry** 4
General Biology 8
Genetics 8
Cellular Biology*** 3

TOTAL 56

* May include, for example, courses in English literature, speech, music, art, and government, history, world or regional history, world or regional languages, philosophy, political science, psychology, sociology, and geography.

** Exclusive of laboratory.

*** It is expected that this requirement will be fulfilled by a course in cellular or molecular biology. An appropriate microbiology course may be approved if cellular or molecular biology is not offered.

Admission Procedures
Application for admission is for the fall semester, with priority given to residents of Tennessee.

Forms and instructions for making application for admission may be obtained, after September 1 each year, from Office of Computer Assisted Registration Services, 201 Student Services Building, The University of Tennessee, Knoxville, TN 37996-0200.

Applications must be complete and mailed in time to reach the UT Knoxville Director of Admissions by January 15 each year. All supporting documents, official transcripts, and Veterinary College Admission Test (VCAT) results from a test taken with 24 months of the January 15 application deadline date, and letter of reference must arrive not later than 30 days after the application deadline date. NON- TENNESSEE APPLICANTS MUST HAVE A MINIMUM CUMULATIVE GRADE-POINT AVERAGE OF 3.2 ON A 4.0 SCALE.

Applications are accepted only from U.S. citizens or permanent residents of the U.S.

D.V.M. CURRICULUM

The curriculum of the College of Veterinary Medicine is a nine-semester, four-year program.

Each class begins in August and graduates four years later in May. The first three years follow the traditional fall and spring semesters with the summer break following years one and two. The first year of the professional curriculum begins immediately following semester six and is a continuous clinical rotation experience extending over one calendar year.

The first year consists of the pre-clinical subjects of anatomy, physiology, genetics and animal management, integrated biology, medical and veterinary technology, pre-clinical medicine, public health, and clinical medicine, which form the basis for the four years of clinical experience in the Veterinary Teaching Hospital. Each student will have a minimum of 12 credit hours in the sixth semester and may register for up to 10 credit hours of graduate courses without enrolling in The Graduate School and these hours will be credited toward the D.V.M. degree. This semester of elective study offers a unique educational alternative for select students in the CVM and is intended to enhance professional growth, concentration in an area of interest and career opportunities.

In addition to education in the science and art of veterinary medicine, students receive instruction in paramedical subjects such as animal behavior, medical communication, professional ethics, jurisprudence, economics, and practice management.

The curriculum requires successful completion of 154 semester credits.

THE GRADUATE PROGRAM

The College also administers a graduate program involving all departments which leads to the Master of Science and the Doctor of Philosophy. Because of the interdisciplinary departmental administration of the College of Veterinary Medicine, the faculty have opportunities in the graduate programs of other instructional units, including Animal Science (nutrition, physiology, genetics and animal management), Microbiology (bacteriology, virology, and immunology), Ecology (environmental toxicology), Public Health, and Comparative and Experimental Medicine. (Refer to other sections of this catalog for a full description of these programs.) The majority of the graduate students and graduate faculty of the College of Veterinary Medicine are involved in the Comparative and Experimental Medicine program. This program provides a wide spectrum of interdisciplinary training that prepares graduates for teaching and/or research careers in the health sciences.

ACADEMIC COMMON MARKET

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

PROFESSIONAL COURSES

811-12 Microbiology III, (5.4) Pathogenesis of bacterial, fungal and viral diseases. Study relating microbial structure, metabolism and genetics to patterns of disease and mode of action of antimicrobials, antigens and antibodies. Immunology, study of mechanisms of immune reaction, diagnostic immunology, and role of immune response.

821-22 Anatomy I and II, (4.4) Gross and applied anatomy of the domestic animals (dog, cat, horse, cow). Dissection of embalmed specimens. Production, slides, and models of all animals. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

827 Special Problems in Animal Science (1-8) Extra and specially designed study for students interested in select topics in anatomy, histology, and physiology.
630 Art of Veterinary Medicine I (1) Paramedical subjects important to veterinary medicine: practice management, interpersonal relations, communications, jurisprudence, ethics, careers, animal behavior and veterinary history. May be repeated. S/NC only.

631 Physical Diagnosis (1) Basic care, feeding, restraint, and handling domestic animals. Introduction to physical examination and diagnostic techniques used by veterinarian.

632 Anesthesiology (2) Principles of anesthesiology: pharmacology of anesthetic agents, and introduction to anesthetic techniques in veterinary medicine.

633 Epidemiology/Public Health (4) Principles of epidemiology and public health. Host-agent relationships, public health aspects of veterinary medicine, and role of veterinarian in ecology and food hygiene.

634 Hematopoietic System (3) Pathophysiology, special pathology, and clinical management of diseases of the hematopoietic and lymphoid organs and tissues. Principles, methods of laboratory evaluation of diseases of other organs.

635 Medical Interaction (2) Multidisciplinary laboratories and lectures of physiologic, pharmacologic and surgical concepts, and their application in the care of animals. Basic principles in facilitating anesthesia, surgery, post-surgical recovery and wound healing. Demonstration of physiologic and pharmacologic principles and introduction to instrument application to measure physiologic processes and drug effects.

636 Toxicology (2) Principles of toxicology, molecular mechanisms, pathologic processes and clinical features of animal diseases caused by common toxic agents.

640 Integumentary System (3) Pathophysiology, special pathology, medicine and surgery of diseases of integumentary system. Laboratory examination, pathology, diagnosis and treatment.

641 Reproductive System (4) Pathophysiology, special pathology, medicine and surgery of diseases of male and female reproductive systems and mammary glands.

642 Allimentary System (5) Pathophysiology, special pathology, medicine and surgery of diseases of alimentary systems.

643 Musculoskeletal System I (3) Pathophysiology, special pathology, medicine and surgery of diseases of musculoskeletal systems. Basic principles, pathologic changes and radiographic interpretation.

644 Musculoskeletal System II (3) Pathophysiology, special pathology, medicine and surgery of diseases of muscular and skeletal systems. Advanced principles, radiographic interpretation and surgical procedures.

645 Principles of Medical Science (2) Physiologic and pathologic principles underlying mechanisms of disease. Selected examples of human and animal diseases; recent scientific advances in biomedical sciences.

646 Multispecies Medicine (4) Anatomy, pathophysiology, medicine, and surgery of avian species, laboratory and zoo animals and reptiles. Species and diseases seen by practicing veterinarian. Current topics on foreign animal diseases.

647 Current Topics in Veterinary Medicine (1-3) Elective subjects in veterinary medicine: basic principles, clinical specialties and issues related to veterinary practice.

648 Art of Veterinary Medicine II (1) Paramedical subjects important to veterinary practice; practice management, interpersonal relations, communication, jurisprudence, ethics, careers, animal behavior and veterinary history. May be repeated. S/NC only.

649 General Elective in Clinics (2) Special rotation with clinical training in urban practice, rural practice, environmental practice and small animal practice. S/NC or letter grade.

650 Introduction to Clinics (1) Clinical veterinary practice with discussions and practical experience. Problem-solving and integration of basic sciences with clinical applications. Problem-oriented veterinary medical record.

851 Urinary System (3) Pathophysiology, special pathology, medicine and surgery of diseases of urinary system. Urinary system in health and disease.

852 Cardiovascular System (2) Pathophysiology, special pathology, medicine and surgery of diseases of cardiovascular system. Anatomic, physiologic and pharmacologic principles which provide basis for treatment.


854 Respiratory System (3) Pathophysiology, special pathology, medicine and surgery of diseases of respiratory system. Upper and lower respiratory system: infections and noninfectious diseases.

855 Radiology (3) Basic, advanced and special techniques in radiology with interpretation and use of radiologic and related techniques in diagnosis and treatment of animal diseases.

856 Special Senses (2) Pathophysiology, special pathology, medicine and surgery of diseases of visual and auditory systems.

857 Nervous System (3) Pathophysiology, special pathology, medicine and surgery of diseases of nervous system; clinical neurology and neuropathology.

858 Clinical Rotation in Specialties (2) Clinical training in specialty services: anesthesiology, ophthalmology or dermatology. Direct responsibility for diagnosis, patient care, and treatment of clinical cases in both urban and rural practice.

859 Clinical Clerkship (2) Advanced clinical training in urban practice, rural practice, environmental practice and pathology. S/NC or letter grade.

861 Pharmacology (4) Principles of pharmacokinetics and pharmacodynamic properties of veterinary drugs: mode of action, clinical efficacy, chemical and physical properties, metabolism, toxicology, important idiosyncrasies and clinical application.

862 Clinical Rotation in Environmental Practice (2) Clinical training in avian medicine, laboratory animal medicine and zoo animal medicine; epidemiology, public health, pharmacology or toxicology.

865 General Pathology (4) Principles of pathology: causes of diseases, disturbances of cell growth, inflammation, and neoplasia.

867 Special Problems in Environmental Practice (1-8) Extramural and specially designed study for students interested in select topics in avian medicine, laboratory animal medicine, zoo animal medicine, epidemiology, public health, pharmacology or toxicology.

871 Parasitology (3) Principles of parasitology: protozoology, helminthology, and entomology and relationship to diseases in animal ruminants.

875 Clinical Rotations in Pathology (2) Clinical training and demonstrations in laboratory diagnosis: post-mortem examination and clinical pathologic and microbiologic techniques.

876 Clinical Rotations in Pathobiology (2) Clinical training and demonstrations in laboratory diagnosis: post-mortem examination and clinical pathologic and microbiologic techniques.

877 Special Problems in Pathobiology (1-8) Extramural and specially designed study for students interested in select topics in veterinary pathology, clinical pathology, clinical microbiology and parasitology.

881 Clinical Rotations in Urban Practice I (4) Clinical training in medicine, surgery and specialty disciplines for companion animals. Direct responsibility for diagnosis, care, and treatment of clinical patients.

882 Clinical Rotations in Urban Practice II (4) Clinical training in medicine, surgery and specialty disciplines for companion animals. Direct responsibility for diagnosis, care, and treatment of clinical patients.

883 Clinical Rotations in Urban Practice III (4) Clinical training in medicine, surgery and specialty disciplines for companion animals. Direct responsibility for diagnosis, care, and treatment of clinical patients.

884 Clinical Rotations in Urban Practice IV (4) Clinical training in medicine, surgery and specialty disciplines for companion animals. Direct responsibility for diagnosis, care, and treatment of clinical patients.

885 Clinical Rotation in Radiology (4) Clinical training in radiographic techniques and interpretation of radiographs as part of diagnostic process.

887 Special Problems in Urban Practice (1-8) Extramural and specially designed study for students interested in select topics in medicine, surgery, anesthesiology, radiology, pathology and medical specialties of small (companion) animals.

981 Clinical Rotations in Rural Practice I (4) Clinical training in medicine, surgery, specialty disciplines and herd health of food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

982 Clinical Rotations in Rural Practice II (4) Clinical training in medicine, surgery, specialty disciplines and herd health of food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

983 Clinical Rotations in Rural Practice III (4) Clinical training in medicine, surgery, specialty disciplines and herd health of food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

984 Clinical Rotations in Rural Practice IV (4) Clinical training in medicine, surgery, specialty disciplines and herd health of food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

985 Clinic Rotation in Radiology II (2) Clinical training in radiographic techniques and interpretation of radiographs as part of diagnostic process.

987 Special Problems in Rural Practice (1-8) Extramural and specially designed study for students interested in select topics in medicine, surgery, herd health, reproduction, radiology and medical specialties of large animals.

GRADUATE COURSES

533 Epidemiology/Public Health (4) Principles of epidemiology and public health. Host-agent relationships, Pathogenesis, diagnosis, control and public health significance of diseases of animals. Prereq: Consent of instructor. S.

536 Toxicology (2) Principles of toxicology: molecular mechanisms, pathologic processes and clinical features of animal diseases caused by common toxic agents. Prereq: Consent of instructor. S.

537 MultiSpecies Medicine (4) Anatomy, pathophysiology, medicine and surgery of birds, reptiles and laboratory and zoo mammals. Common species and diseases. Prereq: Consent of instructor. S.

545 Principles of Medical Science (2) Physiologic and pathologic principles underlying mechanisms of disease. Selected examples of human and animal diseases; recent scientific advances in biomedical sciences. Prereq: Consent of instructor. S.

Zoology

(Major of Liberal Arts)

MAJOR

DEGREES

Zoology............................................. M.S., Ph.D.

Arthur C. Echternacht, Head

Professors:

Bagby, R. M., Ph. D.................................. Illinois
Bunting, Dewey L., Ph. D.......................... Oklahoma State
Carlson, J. G. (Emeritus) (Distinguished Prof.), Ph. D............................... Pennsylvania
Chen, T. T., Ph. D.................................... Florida
Echternacht, Arthur C., Ph. D........................................ Kansas
Etner, D. A., Ph. D...................................... Minnesota
Echternacht, Arthur C., Ph. D.......................... Kansas State
Hochman, B. (Emeritus), Ph. D................. California
Joy, D. C. (Distinguished Scientist), Ph. D.......... London
Liles, J. N. (Emeritus), Ph. D................................ Ohio State
MacCabe, J. A. (Liaison), Ph. D.......................... California (Davis)

887 Special Problems in Urban Practice (1-8) Extramural and specially designed study for students interested in select topics in medicine, surgery, anesthesiology, radiology, pathology and medical specialties of small (companion) animals.
The Department of Zoology offers the Master of Science and Doctor of Philosophy with concentrations in aquatic biology, ecology, cell and molecular biology, physiology, genetics, and reproductive and developmental biology.

**REQUIREMENTS FOR ADMISSION**

Applicants for graduate study are expected to have a background no less extensive than that required of undergraduate majors in this field. This includes a knowledge of the basic principles of cell biology, genetics, and ecology. Other requirements for admission are:

1. one year of general zoology or biology;
2. 18 semester hours of upper division zoology or biology;
3. two years of chemistry including one year of general inorganic chemistry;
4. one year of mathematics including calculus;
5. one year of physics;
6. Graduate Record Examination scores (general and biology); and
7. a grade-point average of 3.0 out of 4.0.

Otherwise superior students, deficient in one or more of the above requirements, may be admitted at the discretion of the department's Graduate Affairs Committee.

**THE MASTER'S PROGRAM**

Special requirements in Zoology are as follows: (1) completion of course requirements as determined by the candidate's faculty committee, including a course in biostatistics; (2) achievement of a 3.0 or better GPA in all courses taken for graduate credit; (3) completion of a thesis.

**THE DOCTORAL PROGRAM**

Special requirements in Zoology are as follows:

1. courses as determined by the candidate's faculty committee, including a course in biostatistics;
2. an oral and comprehensive written examination in zoology and allied fields in which the candidate has had training;
3. a reading knowledge of at least one foreign language in which there exists a sizeable amount of literature relevant to the major field of study. The student has the option of demonstrating a reading knowledge of this foreign language by (a) passing the official reading examination given by the language department or (b) earning a grade of at least a B in the second semester of a special language reading course for graduate students. This foreign language requirement must be fulfilled before a student can take the comprehensive examination.

**GRADUATE COURSES**

403 General Genetics Laboratory (3) Experiments designed to illustrate basic principles of inheritance; primary organism—Drosophila. Prereq: Biology 220. 2 labs.

405-06-11-12 Minicourse in Zoology (2, 2, 2, 2) Select advanced topics in zoology, concentrated in time and subject matter. Consult departmental listing for topics offered. Prereq: As announced. May be repeated. Maximum 4 hrs may apply toward zoology major.

420 Cell and Tissue Structure and Function (4) Study of animal cells and tissues at light and electron microscope levels. Prereq: Biology 210. 2 hrs and 2 labs.

430 Immunology (3) (Same as Microbiology 430.)

439 Immunology Laboratory (2) (Same as Microbiology 439.)


449 Laboratory in Physiology (2) Prereq or coreq: 440 or 445.

450 Comparative Animal Behavior (3) Principles and methods of ethology, ecological, developmental, physiological and evolutionary aspects. (Same as Psychology 450.)

455 Comparative Animal Behavior Laboratory (3) Introduction to observational and experimental research in ethology. Coreq: 450. (Same as Psychology 459.)

460 Evolution (3) Modern concepts of animal evolution. Prereq: Biology 220.

465 Human Genetics (3) Genetic and molecular principles and problems of human inheritance. Prereq: Biology 220.

470 Aquatic Ecology (3) Introduction to physiochemical nature of inland waters with description of biotic communities and their interactions. Prereq: Chemistry 120-20 and Biology 230. 2 1/2 hrs.

472 Arachnology (3) Biology of spiders, mites, scorpions and relatives. Prereq: 360 or 380, 2 hrs and 1 lab.

473 Herpetology (3) Biology of amphibians and reptiles, ecology and adaptive radiation. Prereq: Biology 230. 2 hrs and 1 lab.

474 Ichthyology (4) Evolution, classification, collection and identification, distribution and biology of fishes, freshwater fauna of eastern North America. Prereq: Biology 230 or consent of instructor. 2 hrs and 2 labs.

475 Ornithology (3) Behavior, ecology, populations, evolution and field identification of birds. Prereq: Biology 230. 2 hrs and 1 lab.

476 Mammalogy (3) Evolution, classification, biogeography, ecology, behavior and functional anatomy of mammals. Prereq: Biology 220 or equivalent. 2 hrs and 1 lab.

480 Physiology of Exercise (3) (Same as Physical Education 480.)

490 Comparative Endocrinology (3) Comparative analysis of physiology and morphology of endocrine glands in vertebrates and invertebrates, their role and interaction in maintenance of organism and species. Prereq: 440 or equivalent.

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

501 Graduate Research Participation (3) Advanced research techniques studied under supervision of staff research director. Open to all graduate students in good standing. Prereq: Consent of department and research director. S/N 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/N only. E

503 Zoology Seminar (1) Advanced topics in zoology. Senior zoology majors encouraged. Required of all first- and second-year graduate students. May be repeated. Maximum 4 hrs. S/N only.

504 Special Topics (1-2) Selected directed readings or special course in topics of current interest. Consult departmental listing for offerings. May be repeated with consent of instructor. Maximum 6 hrs. S/N only.

506 Research Methods (1-3) Instruction in methods and techniques of research. Consult departmental listing for offerings. May be repeated with consent of instructor. Maximum 9 hrs.

507 Animal Cell Culture (2) Techniques for culture of animal cells, tissues and organs. 1 hr and 1 lab.

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


513 Advanced Developmental Biology (3) Molecular and histological aspects of differentiation and morphogenesis; current literature. Recommended prereq: Life Sciences 511-12.

516 Colloquium in Ethology (1) (Same as Psychology 516.)

521 Advanced Mammalian Physiology I (4) (Same as Animal Science 521.)

522 Advanced Mammalian Physiology II (4) Respiratory, gastrointestinal and reproductive physiology, acid-base mechanisms, and metabolism. Prereq: 521. (Same as Animal Science 522.)

523 Physiology of Hormones (3) Cellular and organismal actions of hormones in vertebrates and invertebrates. Prereq: 490 or consent of instructor. Recommended prereq: Biochemistry 410. 2 hrs and 1 lab.

524 Physiological Ecology of Animals (3) Adaptive physiological response of animals to natural changes in or extremes of physical and biotic environment. Terrestrial vertebrates. Prereq: Undergraduate courses in animal physiology and ecology, 440 and Biology 230 or equivalent.

525 Physiological Ethology (3) Behavioral endocrinology and neurology from ethological perspective; reciprocal relationships of physiology and behavior in natural context. Term paper, review of assigned topic, creative development of special aspect. Prereq: 450 or undergraduare physiology, or consent of instructor.

526 General Vertebrate Neuroanatomy (3) (Same as Psychology 526.)

540 Insect Taxonomy I: Major Orders (3) Survey of classification of major orders of insects, with practical
experience in identification of insects at family level. Prereq: Consent of instructor. 4 hrs combined lecture and lab.

541 Insect Taxonomy II: Minor Orders (3) Survey of classification of minor orders of insects, with practical experience in identification of insects at family level. Prereq: 540 or consent of instructor. 4 hrs combined lecture and lab.

542 Insect Structure and Function (3) Integrated study of morphology and physiology at tissue and cellular level of insects. Prereq: Consent of instructor.

543 Aquatic Insects (3) Taxonomy and biology of aquatic insects; immature forms. Prereq: Consent of instructor. 2 hrs and 1 lab.

544 Fresh Water Invertebrate Zoology (3) Ecology and taxonomy of fresh water invertebrates exclusive of insects. Prereq: 360. 3 hrs lab and field study.

545 Advanced Animal Behavior (3) Second-level course in ethology, stressing evolution, genetics, physiology, ecology and human behavior. Prereq: 450 or equivalent. (Same as Psychology 545.)

547 Conceptual Foundations of Evolution and Behavior (3) (Same as Psychology 547.)

560 Biometry (3) Statistical methods in analysis of quantitative biological data. Prereq: Statistics course or consent of instructor.

573 Population Biology (3) Genetics and ecology of natural populations of plants and animals and aspects of behavior in determining population structure. Prereq: Introductory courses in ecology and genetics. (Same as Botany 573 and Ecology 573.)

575 Ecological Genetics (3) Genetics of natural populations, using both single-locus and quantitative genetic approaches. Prereq: 573 and statistics course.

583 Zoogeography (3) Processes determining geographic distribution of animals and distribution and composition of animal communities. Prereq: Ecology course or consent of instructor.

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

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

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

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

601 Advanced Topics in Animal Behavior (1-3) Readings and discussion of recent advances. Consult the departmental listing for offerings. May be repeated with consent of department. Maximum 9 hrs.

602 Seminar in Cell and Molecular Biology (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs.

603 Seminar in Genetics (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs.

604 Seminar in Developmental Biology (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs.

605 Seminar in Physiology (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs.

606 Seminar in Aquatic Biology (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs.

607 Seminar in Ecology (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs.

608 Seminar in Ethology (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs.

609 Seminar in Organic Evolution (1) Readings and discussion based on current literature. May be repeated. Maximum 12 hrs.

610 Current Topics in Cell and Developmental Biology (1) Critical analyses of current literature in journal club format. May be repeated. Maximum 10 hrs. S/NC only.
Facilities for Research and Service

Bureau of Educational Research and Service
(College of Education)

Carol E. Kasworm, Director

Four major types of activities--research, development, educational services, and publications--are channeled through the Bureau of Educational Research and Service (BERS), located in 212 CEB. The research activities relate to the development of research proposals, conducting and/or assisting in research, and assisting others in development of research proposals in the College of Education. Educational services include a wide list of activities such as in-service educational programs, consultant services, and technical assistance and administrative training programs. Official publications of the College of Education are developed through the Bureau. A limited number of graduate student assistantships are available.

Center for Information Studies
(Graduate School of Library and Information Science)

The Center for Information Studies (CIS) was established in June 1989 to be a focal point for research related to information systems and services. The Center, located at 304 Temple Court, has performed research for the federal government, state and local governments, companies, etc. Projects have ranged from strategic planning efforts to information system and service evaluations, to modeling of scientific and technical communication. Staff of the Center have been actively involved in proposal development and project performance with faculty and staff in other centers and departments at the University.

Areas of interest to the Center include information systems design, information organization and retrieval in very large databases, directories and locator tools in a networked environment, design of regional library and information system networks, new technology applications, information system support for educational reform, modeling of information processes, development of measures and methods for evaluating information system performance and effectiveness.

Centers 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 colleges and universities a special push toward prominence, well beyond regular annual increases for all programs. In 1984, the General Assembly appropriated and the governor approved $10 million for the first Centers of Excellence throughout the state. The public colleges and universities submitted their proposals for Centers of Excellence to the Tennessee Higher Education Commission, which made the final determinations. Funding has been extended each successive year, and now five of the University's ten Centers of Excellence are sponsored by UT Knoxville. Concurrently, the University has received state funding, which it must match dollar for dollar, for Chairs of Excellence. These Chairs are $1 million endowed professorships in areas of significance to the University and to the individual, foundation, or corporation providing the matching gift money.

The combination of the Centers of Excellence and Chairs of Excellence adds a dimension to The University of Tennessee that is not easily equaled by other institutions. UT's reputation as the premiere university in the state and as a regional and national leader in instruction, research, and public service is enhanced as a result of the infusion of these special funds.

For information concerning the individual centers sponsored by UT, contact:

Center for Laser Applications
Dr. Dennis Keefer, Director
UT Space Institute
Tullahoma, TN 37388-8897
(815) 455-0631 Ext. 475
Center for Livestock Diseases and Human Health
Dr. G. M. H. Shires, Director
College of Veterinary Medicine
UT Knoxville
Knoxville, TN 37996
(615) 974-7262

Center for Materials Processing
Dr. Carl McHargue, Acting Director
UT Knoxville
121 Perkins Hall
Knoxville, TN 37996
(615) 974-7608

Science Alliance
Dr. Thomas A. Callcott, Interim Director
UT Knoxville
101 South College
Knoxville, TN 37996
(615) 974-6755

Waste Management Research and Education Institute
Dr. Jack N. Borkenbus, Director
UT Knoxville
327 South Stadium Hall
Knoxville, TN 37996-0710
(615) 974-4251

Child Development Laboratories
(College of Human Ecology)
Anne Miller Stott, Staff Director
The Child Development Laboratories, operated by the Child and Family Studies department within the College of Human Ecology since 1927, currently offer child care programs for 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 telemetry laboratory that features unique videotaping capabilities in all classrooms, small group research rooms, and observation booths that facilitate teacher training and research. A variety of research projects (such as the development of creativity in young children, parental listening behaviors, children's political socialization, mainstreaming, and peer interactions) involves students and faculty in the college and many departments on campus. Graduate Assistants in the Laboratories participate in teaching, assessment, administration, supervisory and research activities while working with children and families under the guidance of faculty and staff. The Child Development Laboratories are accredited by the National Academy of Early Childhood Programs, a division of the National Association for the Education of Young Children.

Communications Research Center
(College of Communications)
Dr. Thomas A. Callcott, Interim Director
The Communications Research Center, 426 Communications Bldg., is an adjunct to the communications graduate program. Objectives of the Center are: (1) to conduct original research in mass and public communication; (2) to disseminate research-generated information; and (3) to provide research services to faculty and students, professional communicators, and others interested in improving the quality of human communications.

Computing Center
Fred H. Harris, Interim Director
Faculty Associates:
Instructional Technology: Dr. Patricia L. Fisher; Art: Susan E. Moros; Computer Science: Dr. David W. Straight; Engineering: Dr. Osama Soliman; Physics: Dr. William E. Bliss; Statistics: Dr. James L. Schmidhammer; Agriculture: Dr. Boyd Bearden; Human Ecology: Kurt Weiss; Social Work: Dr. David Patterson; Communications: Dr. Mark Miller.

Center (UTC), which is part of the Division of Computing and Telecommunications, provides computing facilities and services for the University’s teaching, research, public service, and administrative activities. UTC offices and principal computing facilities are located on the first two floors of Stokely Management Center (SMC) and on the third floor of Dunford Hall. Assistance with any computer-related question, including information about UTC resources and services, is available by calling the Division of Computing and Telecommunications at the number provided. The Computer Access for Education (CAFE) program provides every UT Knoxville student, faculty, and staff member the opportunity for computing experience through an individual UTC account. Student accounts for use in coursework are requested by the department through which the course is offered. Faculty and staff members can request a UTCC account for research or administration by completing a request for computing services. Forms are available from the receptionist at 200 SMC. Each UTC account is assigned a consultant who is available to answer questions about UTC resources and to assist in accessing the UTCC library of computer programs.

Noncredit short courses covering levels of computing from personal computing to supercomputing are taught throughout the year. Topics include programming languages, job control language, vector processing, the use of graphics, word processing, and the statistical and mathematical programs available at UTCC. Videotapes covering mainframe and microcomputer topics are available for private viewing in the Audiovisual services section of Hodges Library and the UTCC Hodges Library Micro Lab. Instructional tapes on microcomputer software are in the Micro Lab. Short courses are announced in the UTCC Newsletter, the "Campus Capsule" section of the UT Daily Beacon, and Tennessee This Week. During the break following each academic term, UTCC consultants conduct a four-day seminar for faculty, staff, and graduate students on the use of either the IBM or DEC VMS cluster supercomputers.

UTCC maintains online and printed documents describing the availability of software and hardware. The IBM User’s Guide, the Unix User’s Guide, and the VMS cluster User’s Guide are available at the UT Book & Supply Store. The monthly UTCC Newsletter announces changes to systems, equipment, and procedures and contains other items of interest to users.

The UTCC computing network connects mainframe computers, workstations, microcomputers and video terminals in a multivendor, heterogeneous environment. Ethernet and fiber optics connect many buildings on the Knoxville campus to provide rapid access to data in remote locations and supports several protocols including TCP/IP, DECNet, LAT, Novell NetWare, and AppleTalk. A terminal port selection and multiplexing system, which is connected to a similar system at the Oak Ridge National Laboratory, provides access to the network through 141 dialup lines.

The UTCC network is connected to the Internet which provides access to other Internet sites via the Southeastern University Research Association Network (SURAnet). SURAnet connects to the National Science Foundation Network (NSFNET) which joins other state and regional networks as well as directly connecting to the five NSF supercomputer centers: The Cornell National Supercomputer Facility, The National Center for Supercomputing Applications at the University of Illinois, the Pittsburgh Supercomputing Center, the National Center for Atmospheric Research, and the San Diego Supercomputer Center.

UTC is an affiliate of the Pittsburgh Supercomputing Center, the National Center for Supercomputing Applications at the University of Illinois, and the Cornell National Supercomputer Facility. Consulting services are provided by UTCC on those systems.

UTC is also a member of BITNET, a network of several thousand computers located at educational and research institutions throughout North and South America, Europe, and Asia. BITNET provides a gateway into Internet which allows all BITNET members to exchange messages with Internet nodes.

Several major operating systems provide both batch and timesharing computing services. The Time Sharing Option (TOS) runs under MVS/ESA on an IBM 3090-300E with three vector processors. The Conversational Monitor System (CMS) runs under VMS/ESA on an IBM 3081-D. The OpenVMS operating system runs in a Digital Equipment Corporation (DEC) Supercluster that consists of a 4 processor VAX 7000-640, a 2 processor VAX 6000-420 with 2 vector units, a 6 processor VAX 6000-460, and a 2 processor DEC 7000-620 AX. UNIX based operating systems are the Solaris operating system available on two SUN/50 file servers and several workstations from Sun Microsystems and the IBM operating system workstations from Silicon Graphics Incorporated.

UTCC provides technical support for other departmental workstations on the UT Knoxville campus that includes equipment from DEC, HP, Silicon Graphics, IBM, and Sun Microsystems. UTCC maintains more than 100 microcomputers, including several models of both Apple
Macintosh and IBM. In remote user work areas and microcomputer laboratories. A number of software packages are made available for use on the machines at these locations. UTCC also provides users access to some public domain software for microcomputers and is the administrator for a number of site licenses for workstation and microcomputer software.

Software available on the computers at UTCC includes most of the commonly used compilers and interpreters, and a large number of programs for statistical, mathematical, engineering, operations research, and graphics applications. UTCC is the administrator for a number of site licenses for workstation and microcomputer software. UTCC participates in educational programs sponsored by DEC, IBM, SGI and Sun that provide software packages at reduced or no cost to the University of Tennessee.

UTCC maintains 15 user work areas on the Knoxville campus in addition to locations in all residence halls. Several of the areas provide high speed line printing; some also provide laser printing. Computing services are made available to the other UT campuses through remote links. Many of the terminals and microcomputers in the user work areas are capable of being used for graphics.

A CalComp 1051 vector plotter is used to produce graphics output from jobs run on the IBM and the DEC VMscluster computers. An Imagen laser printer is used to produce high quality printed output. The Imagen printer can also produce graphics at 300 dots per inch. A Xerox DocuTech Production Publishing System, located at UT Graphic Arts Services includes a 600 dpi laser printer connected to a scanner and network media server. It permits electronic transmission of documents for processing from computers on the UTCC network.

Continuing Education and Public Service

Laverne B. Lindsey, Associate Vice Chancellor for Academic Affairs and Dean

The Division of Continuing Education, Knoxville, is the administrative unit of UT Knoxville that extends academic courses, educational services, and other programs to the non-traditional student. While most people who participate in the programs are adults, persons of all ages and academic levels enroll in the credit and non-credit offerings of the Division. Programs and courses are based upon student needs and desires, whether for self-motivated learning; for leisure and recreational programs; or for professional promotion, certification, licensure, recredential, or mid-career changes. The Division provides these educational opportunities through program coordination and development of the five departments: the University Evening School, Non-Credit Community Programs, Department of Conferences, Department of Independent Study, and English Language Institute.

UNIVERSITY EVENING SCHOOL

Sam C. Bills, Associate Dean of Continuing Education and Director

The University Evening School, in conjunction with academic colleges and departments, administers credit programs for those students attending classes on and off campus in a variety of non-traditional formats. Support services are provided to assist students in their educational pursuits.

On-Campus Evening Program

Classes are offered during late afternoon and evening hours for those students who work or have other commitments during the day. Some departments within the Colleges of Communications, Education, and Engineering offer all courses required for an advanced degree during the evening. For other majors, consult the appropriate academic department.

Mini-Term

The University Evening School offers a Mini-Term during May. Students may enroll in one concentrated credit course during the Mini-Term period.

Courses and instructors listed for the Mini-Term are carefully selected to reflect a broad academic base of individualized offerings suited to an intensive program of study. Courses cover material and information included in regular semester offerings.

Off Campus Programs

The Evening School makes arrangements for departments to conduct undergraduate and graduate courses in many locations away from the Knoxville campus. The courses are scheduled in response to requests and identifiable needs of adult part-time students who live some distance from the UT Knoxville location. All course offerings and instructors are approved by the appropriate academic departments, and the credit awarded is resident credit.

The College of Education offers the following graduate degree programs: Doctor of Education with a major in Educational Administration and Supervision (Chattanooga); Specialist in Education with a major in Educational Administration and Supervision (Chattanooga); Master of Science with a major in Technological and Adult Education (Statewide).

The Evening School administers an off-campus center at Oak Ridge where courses leading to advanced degrees in science and engineering are offered (see listing under Off-Campus Graduate Centers).

Distance Education

The Evening School in concert with several academic departments at UT Knoxville offers interactive telecourses which allow students at distant locations to see and participate actively with the instructor teaching in Knoxville. Graduate courses in disciplines are transmitted to several sites through use of this advanced technology. Offerings are expected to increase through the 1990s.

Videotaped courses in engineering and other fields are sent to a variety of sites to accommodate UT Knoxville students pursuing advanced degrees at distant locations.

Workshops

Credit workshops are coordinated through various academic departments of the University and give students the opportunity to participate in short periods of intensive study.

Workshops offer flexibility of timing, location, and content. Summer workshops are particularly popular with teachers and school administrators. Although most workshops are held on the UT Knoxville campus, geography is not a limiting factor.

Student Services

A comprehensive program of services including academic advising and financial aid information is provided by the University Evening School for both on- and off-campus students.

Registration

Registration by mail, FAX, or phone is offered as a convenience to former Evening School students. Secondary registration at both on- and off-campus locations is also available.

For information, contact UT Evening School, 451 Communications Bldg, University of Tennessee, Knoxville, TN 37996-0341, or telephone (615) 974-5361 or 1-800-676-VOLS, FAX (615) 974-2027.

NON-CREDIT COMMUNITY PROGRAMS

Cheryl LaBerge, Director

Non-Credit Community Programs provides a comprehensive array of courses and seminars designed to serve the needs of individuals and businesses in Knoxville and surrounding communities. Courses are offered in the evening on the University campus and at selected off-campus locations. Courses are taught by University faculty when possible and citizens of the community who have gained a reputation for certain competencies or technical skills. Courses also are delivered "on-site" for business or industrial clients, with instructional services tailored to the needs of each individual group.

Courses range from computer literacy and management, to gardening, exercise, and music. There are also courses which meet requirements of the state or other agencies for certification in fields such as real estate, aviation, CEBS (Certified Employee Benefit Specialist) and CCA (Certified Credit Administrator). The department co-sponsors the Smoky Mountain Field School with the Great Smoky Mountains National Park.

Continuing Education Units (CEU's) are awarded to students satisfactorily completing selected courses and seminars offered by the department.

For further information or to register, contact Non-Credit Community Programs, 600 Henley Street, Suite 105, Knoxville, TN 37902 or telephone (615) 974-0150.

DEPARTMENT OF CONFERENCES

Norvel L. Burkett, Associate Dean of Continuing Education and Director

UT Conferences, housed in the Conference Center in downtown Knoxville, provides management services to individuals or groups who desire to hold a high quality conference, convention or meeting anywhere in the state of Tennessee or across the United States.

Utilizing the new Conference Center, statewide University system facilities, major hotels and convention centers across Tennessee and the U.S., the department assists University organizations and outside groups in designing programs to meet the needs of clients. The staff provides professional guidance and management for small group meetings as well as for major conventions of diverse size and delegations. Consulting and support services range from planning and budgeting to lodging.
food services, speakers, promotional material, meeting rooms, and all details to assure a successful event. Programs which meet appropriate criteria qualify for Continuing Education Credits, which become a permanent record maintained by the Division. Transcripts are available upon written request.

The Department cooperates with UT CTV to provide teleconferencing services for the University and community. Professional groups and interested individuals may arrange interactive videoconferencing to locations worldwide. Arrangements may also be made to receive (downlink) programming or to transmit (uplink) programming via satellite capabilities.

Additional information may be obtained from UT Conferences, P.O. Box 2648, Knoxville, TN 37996, or by calling (615) 974-0250. FAX (615) 974-0264.

DEPARTMENT OF INDEPENDENT STUDY

David F. Holden, Director

The UT Knoxville Department of Independent Study administers the program of correspondence courses for all campuses of the University. This includes undergraduate credit courses, high school courses (for credit or for college entrance requirements), and non-credit courses. The courses utilize videotapes and audiotapes as well as traditional print materials. For information and enrollment forms for correspondence courses contact: Department of Independent Study, 420 Communications Bldg., The University of Tennessee, Knoxville, TN 37996. Telephone (615) 974-5134.

ENGLISH LANGUAGE INSTITUTE

Dale A. Myers, Director

The English Language Institute (ELI) is a non-credit language-study program of The University of Tennessee, Knoxville. It is designed to assist students in their pursuit of career goals or educational objectives in the U.S.

The ELI offers intensive courses for the improvement of student skills in the English language. International students, visitors, and professionals have successfully learned English through study in the ELI.

The courses emphasize the development of communicative ability in listening, speaking, reading, and writing. Faculty members are trained in teaching English to speakers of other languages with differing national backgrounds and varying proficiency in English.

Courses also assist students in pronunciation, test-taking strategies, U.S. culture orientation, and university study skills.

Additional information may be obtained at 907 Mountcastle St., (615) 974-3404; FAX (615) 974-6383.

Energy, Environment, and Resources Center

(Office of Associate Vice Chancellor)

Jack N. Barkenbus, Acting Director

The Energy, Environment, and Resources Center, 329 South Stadium Hall, was created in 1973 to encourage interdisciplinary research directed at solutions to problems related to energy and the environment. The Center involves faculty and students in research and public service projects, manages research and development projects that involve several disciplines, and assists government and industry in specific problems related to energy, environmental, resource, and technology policy issues. The Center has a close working relationship with researchers at the Oak Ridge National Laboratory and the Tennessee Valley Authority. Sponsors include federal and state agencies, industry, and foundations that believe in the Center's mission.

Current research includes solid, hazardous and radioactive waste management, information systems, environmental assessment, applications of biotechnology, global environmental problems, pollution prevention, and ethical and value issues in technology policy. The Center operates the Waste Management Research and Education Institute, a state-funded Center of Excellence. Current grants and contracts of both centers are approximately eight million dollars per year.

Institute of Agriculture

D. M. (Pete) Gossett, Vice President

The Institute of Agriculture traces its history to 1859 when the University was designated as Tennessee's Federal Land-Grant Institution. Under terms of the Federal Land-Grant Act, the University was enabled to offer instruction in agriculture and the mechanic arts for the first time. Since 1869, agricultural programs at the University have been expanded to include research for the development of new knowledge and extension for dissemination of such knowledge to rural people. Thus the Institute of Agriculture has come to include the work of four main divisions: Agricultural Experiment Station, Agricultural Extension Service, College of Agricultural Sciences and Natural Resources, and College of Veterinary Medicine.

AGRICULTURAL EXPERIMENT STATION

Don O. Richardson, Dean
John I. Sewell, Associate Dean
Thomas H. Klindt, Associate Dean

The Agricultural Experiment Station was established by the University's Board of Trustees on June 8, 1882, five years before the passage of the Hatch Experiment Station Act by the U.S. Congress. The University was one of the first five institutions in the U.S. to establish an Agricultural Experiment Station. Since its beginning, the Station has given first attention to investigations of concern to the agriculture of Tennessee.

The objectives of the Tennessee Agricultural Experiment Station are the creation and utilization of new knowledge through research. Fundamental research is directed toward: (a) Understanding the basic science of processes of plant and animal production through conversion into usable products and services; (b) Understanding the resource and market forces which affect the production, transfer, processing, and utilization of agricultural commodities and the resulting impact on the economic well-being of the agricultural sector, rural areas, and the State of Tennessee; (c) Understanding the interaction of agricultural production and land uses on natural resources and the environment as they relate to long-term productivity and the quality of rural life; (d) Understanding the relationships 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 improve 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 biologic, 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, Lewesburg, Martin, Milan, Oak Ridge (forestry), Springfield and Spring Hill. Professional and technical staff are in residence at these locations.

AGRICULTURAL EXTENSION SERVICE

Billy G. Hicks, Dean
Mildred F. Clarke, Associate Dean
D. Ray Humberd, Assistant Dean

The Agricultural Extension Service was established in 1914. Its purpose is to extend through various educational means agricultural and home economics information to farm families and others in the state who do not have the opportunity to enroll in resident courses of instruction at colleges.

The educational program is carried on through offices in each of the 95 counties of the state. Educational emphasis includes work in four major program areas: agriculture and natural resources, community resource development, home economics, and education of young people through 4-H Clubs. County Extension staff members working directly with local people are supported in the various information fields by a specialist staff, members of which are stationed either in Knoxville, Nashville, or Jackson.

The Agricultural Extension Service operates administratively as one of four units of the Institute of Agriculture. For administration, the state is divided into five districts with supervisors located in their respective districts. District headquarters are maintained in Knoxville, Chattanooga, Cookeville, Nashville, and Jackson.

The Agricultural Extension Service operates as a three-way partnership among county, state, and federal governments. The University of Tennessee represents state and federal government and a County Agricultural Extension Committee represents county government in this partnership.
Learning Research Center
(Office of Associate Vice Chancellor)
W. Lee Humphreys, Director

The Learning Research Center engages in research and facilitates the research of others into all aspects of learning and teaching in higher education. The Center also builds upon this research to support faculty and graduate students in course design and instructional activities.

A significant part of the Center’s research activity is coordinated through a weekly research seminar open to all faculty and graduate students. The results of the Center’s research are disseminated through a number of dissertations, publications and presentations, including the series “Teaching-Learning Issues” which is sent to all faculty at the University and to others in this country. The Center offers a range of support programs for instructors, including individual consultations about teaching, occasional workshops, a GTA Seminar, the GTA Consultation service, the SPEAK testing program for foreign GTAs, a lending library of publications on college teaching and learning, an orientation for new faculty, and a course/teacher evaluation program. Several of the center’s publications are designed to enhance instruction, including the GTA Newsletter and the New Instructor’s Handbook. All of the Center’s development activities are designed to improve instruction at UT, and individual consultations and evaluation services are confidential.

The Center is located in Suite 5, Hoskins Library.

Libraries, The University of Tennessee, Knoxville
Paula T. Kaufman, Dean
Aubrey H. Mitchell, Associate Dean for Access Services
Diane E. Perushak, Associate Dean for Collection Services

Professors:
- Bayne, Pauline S., M.S.L.S. ........ North Carolina
- Crawford, Mary Frances, M.S.L.S. ...... Kentucky
- Felder-Hoehne, Felicia H., M.S.L.S. ...... Atlanta
- Grady, Agnes M., M.Ln. ........ Washington
- Kaufman, Paula T., M.B.A. ........ Columbia
- LeClercq, Anne W., J.D., M.L.S. ........ Emory
- Phillips, Linda L., M.L.S. .......... Rutgers
- Roder, J., M.L.S. ........ Tennessee

Associate Professors:
- Baker, Gayle D., M.L.S. ............ Alabama
- Bridges, Anne E., M.L.S. .......... Rhode Island
- Britton, William A., M.S.L.S. ........ Clarion
- Courtois, Martin, M.A.L.S. .......... Wisconsin
- Crowther, Kimber N.T., M.Ln. ...... Emory
- Dixon, Lane A., M.S.L.S. ......... Tennessee
- Goetsch, Lori, M.S.S. .......... Rosary
- Hanwood, Richard, M.L.S. .......... North Texas
- Kim, Sook-Hyun, M.A.L.S. .......... Indiana
- Leach, Sandra S., M.Ln. ............ Emory
- Lloyd, James B., Ph.D. .......... Mississippi

Miller, Tamara J., M.S.L.S. ............ Kentucky
Mitchell, Aubrey H., M.S.L.S. .......... Tennessee
Perushak, Diane E., M.A.L.S. ........ Michigan
Sammataro, Linda, M.S.L.S. Southern Connecticut State
Smith, Rită H., M.S.L.S. ............. Illinois
Thompson-Wise, Deborah A., M.Ln. ...... South Carolina
Webster, Judith D., M.S.L.S. .......... Tennessee
Young, Lorna, M.L.S. .......... Toronto

Assistant Professors:
- Canelas, Cathryn, M.L.I.S. .......... Michigan
- Carver, Carolyn S., M.L.S. .......... Vanderbilt
- Cobb, Flora, M.L.I.S. .......... Texas
- Figg, Milton, M.L.S. .......... Southern Mississippi
- Garrett, Marie A., M.L.S. .......... Vanderbilt
- Keally, Jillian M., M.S.L.S. .......... Tennessee
- Lahmon, JoAnn, M.S.L.S. .......... Tennessee
- Mack, Thura, M.S.L.S. .......... Tennessee
- Minton, James O., M.S.L.S. .......... Tennessee
- Ponnappa, Biddanda P., M.S.L.S. ...... Tennessee
- Prescod-Janette, M.S.L.S. .......... Western Michigan
- Row, Jane S., M.S.L.S. .......... Tennessee
- Smith, Earl C., M.S.L.S. .......... Tennessee
- Thomas, Steve, M.S.L.S. .......... Tennessee
- Viera, Ann R., M.L.I.S. .......... California
- Watkins, Norman B., M.S.L.S. ...... Tennessee
- Wise, Flossie, M.S.L.S. .......... Tennessee

The University of Tennessee, Knoxville Libraries own approximately 2 million volumes, more than 3.5 million manuscripts, 2 million microforms, 30,000 audio and video recordings, plus United States and United Nations documents. The UT Knoxville Libraries currently subscribe to more than 145,000 periodicals and other serial titles. The Libraries’ membership in the Association of Research Libraries reflects the University’s emphasis on graduate instruction and research and the support of large, comprehensive collections of library materials on a permanent basis. The UT Knoxville Libraries consists of the main library (the John C. Hodges Library), five branches on the Knoxville campus (the Agriculture-Veterinary Medicine Library, the Cartographic Information Center, the Music Library, Special Collections Library, and the University Archives), and the Social Work Library in Nashville.

The John C. Hodges Main Library (1015 Volunteer Blvd.) is a 350,000 square-foot facility housing collections in all subject areas. The Hodges Library has comfortable study space for more than 2,000 people, 308 graduate student carrels, and 192 faculty studies. The Hodges Library’s research holdings are augmented by Reference Services and by Interlibrary Services. Reference Services provides research assistance and access to commercially available databases. Within the library, users may also search a number of CD-ROM databases at no charge. Interlibrary Services borrows monographs and obtains copies of other material from libraries around the world.

Library holdings are accessible via a sophisticated online catalog which can be searched in the Hodges Library, the branch libraries, and from home and office computers. The Online Library Information System (OLIS) also provides access to a wide range of information resources available over the Internet.

The services and facilities of the University Libraries are accessible to persons with disabilities. Adaptive equipment such as a Kurzweil Personal Reader and TDD are available at the Hodges Library.

The Agriculture-Veterinary Medicine Library (Room A-113, Veterinary Teaching Hospital) has a strong collection in agriculture; veterinary, comparative and human medicine; and related biological sciences. It has a wide-ranging audiovisual collection and an extensive reference collection.

The Cartographic Information Center (Room 15, basement of the Hoskins Library, Cumberland Ave. & 15th St.) contains a worldwide collection of over 300,000 maps covering all subjects. Maps are received from the U.S. Geological Survey, Defense Mapping Agency, and the National Ocean Survey. Maps, atlases, globes, and books relating to cartography may be borrowed for reference, research, and teaching.

The Music Library (301 Music Bldg.) has a comprehensive collection of music and music literature, including books, scores, audio and video recordings, microforms, and microfilm. All materials in the Library of Congress "M" classification are located here.

The Special Collections Library (2nd floor, west wing, of the Hoskins Library) is a repository of regional and local materials, Tennesseeana, and other specialties, including legislative papers and mementoes of many Tennessee political figures. Special Collections materials are of particular interest to scholars in the fields of history, political science, social sciences, biological sciences, and the arts.

The University Archives (Room 2, Hoskins Library) contains official records of the University; items published officially and unofficially by its units, departments, and agencies; and other materials that document University of Tennessee life.

The Social Work Library (1720 West End Ave., Nashville) serves College of Social Work students in field practice across the state. The library has a working collection of materials in social work and related disciplines.

The Law Library on the Knoxville campus and the libraries located on the campuses in Chattanooga, Martin, Memphis, and Tullahoma are individually administered. Each library at the University of Tennessee is accessible to all students and faculty in the system.

*Data excludes Law Library faculty and statistics.

Management Development Center
(College of Business Administration)
John E. Riblett, Director

The College of Business Administration’s executive/management education efforts are facilitated through the Management Development Center, 709 Stokely Management Center.

The mission of the Center is to promote the learning and dissemination of an integrated framework of managerial excellence. The Center defines excellence in terms of competitive world standards of quality, efficiency, and service to the recognized concerns of all constituencies (including customers, employees, suppliers, owners, students, and society in general). The mission statement reflects a broadened view of the Center to include the...
accepted responsibility for (1) developing close strategic partnerships with a selected set of companies to better facilitate learning and development of the knowledge which is truly externally valued and (2) acting as a facilitator in driving this knowledge into the credit curriculum of the College.

The Center has prided itself on the development of long-term relationships with organizations that provide a living laboratory to test and validate the new knowledge of the Center that is disseminated in a variety of forms. Executive and Management Education Programs are one form of dissemination. A staff of 20 designs, develops, and markets fifty yearly offerings for 1500 participants. The Center emphasizes consistent, high-quality programming, small class sizes, outstanding faculty, a highly participatory 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 and one-week Senior Executive Institute for Productivity Through Quality.

Measurement and Control Engineering Center
(College of Engineering)

Arlene Garrison, Acting Director

The Measurement and Control Engineering Center, 102 Estabrook Hall, is sponsored by the College of Engineering, the Instrumentation and Controls Division of Oak Ridge National Laboratory, and the National Science Foundation. The Center's program combines education, research, and technology transfer. Graduate assistants are available for qualified students. The research is funded by major U.S. industrial companies and focuses on theoretical and practical developments in measurement and control, concentrating on areas that will significantly improve the productivity, reliability, and safety of industrial systems and processes.

Center sponsored research is carried out in the fields of process control, pattern recognition, signal and image processing, process diagnostics, and sensor development. Research in process control concentrates in the areas of process analysis, process modeling, control system design, and real-time expert systems. Pattern recognition research deals with the development of techniques for the automatic detection of flaws in both continuous and piecepart produced products. Process diagnostics research involves the application of signal validation and sensor fault monitoring techniques to modern process control systems.

Finally, fiber optic sensor systems development is underway for monitoring and control of chemical processes.

Nutrition Institute
(College of Human Ecology)

Dileep Sachan, Director

The Nutrition Institute is a system wide, multidisciplinary consortium of faculty who are engaged in clinical and experimental nutrition research, teaching and service. Its expertise and resources are multifaceted including tools and techniques used in cell biology, epidemiology, metabolism and clinical training.

The multidisciplinary nature of nutrition has created a situation where nutrition research and teaching is dispersed among a number of academic units, including the Department of Nutrition in the College of Human Ecology as well as in several departments in the colleges of Agricultural Sciences and Natural Resources, Liberal Arts, 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.

Oak Ridge Associated Universities

The University of Tennessee is a sponsoring institution of Oak Ridge Associated Universities (ORAU), a not-for-profit consortium of 62 colleges and universities and a management and operating contractor for the U.S. Department of Energy (DOE) with principal offices located in Oak Ridge, Tennessee. Founded in 1946, ORAU identifies and helps solve problems in science, engineering, technology, medicine, and human resources, and assists its member universities to focus their collective strengths in science and technology research on issues of national significance.

ORAU manages the Oak Ridge Institute for Science and Education (ORISE) for DOE. ORISE is responsible for national and international programs in science and engineering education, training and management systems, energy and environment systems, and medical sciences. ORISE's competitive programs bring students at all levels, pre-college through postgraduate, and university faculty members into federal and private laboratories.

ORAU's office for University, Industry, and Government Alliances (UIGA) seeks out opportunities for collaborative alliances among its member universities, private industry, and federal laboratories. Current alliances include the Southern Association for High Energy Physics (SAHEP) and the Center for Bio-Electromagnetic Interaction Research (CBEIR). Other UIGA activities include the sponsorship of conferences and workshops, the Visit Scholars program, and the Junior Faculty enhancement Awards.

Contact Dr. Lee Riedinger, Acting Associate Vice Chancellor for Research, for more information about ORAU programs.

Off-Campus Graduate Centers

KINGSPORT GRADUATE PROGRAM

UT Knoxville offers at Kingsport resident graduate programs in science and engineering 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 Kingsport University Center, The University of Tennessee, 1501 University Boulevard, Kingsport, Tennessee 37660.

OAK RIDGE GRADUATE PROGRAM

UT Knoxville offers graduate programs at Oak Ridge leading to Master's and doctoral degrees in engineering and supporting fields. Courses are offered in the evenings with research facilities provided by and used in cooperation with the Oak Ridge Associated Universities (ORAU).

This program is supported under a sub-contract with ORAU with principal support coming from the Martin Marietta Corporation. UT is one of the sixty-two colleges and universities which sponsor ORAU, a nonprofit education and research management corporation.

Students who enroll in these programs must be admitted to The Graduate School at UT Knoxville. Information and application forms may be obtained from the UT-Oak Ridge Graduate Program, Post Office Box 117, TMSD Building, Oak Ridge, Tennessee 37631-0117.

NASHVILLE ENGINEERING GRADUATE PROGRAM

UT Knoxville offers graduate programs leading to the Master of Science with majors in Civil Engineering, Industrial Engineering, and other disciplines, as the need and resources permit.

Students who enroll in these programs must be admitted to The Graduate School of UT Knoxville. Information and application forms may be obtained from the Nashville Engineering Graduate Program, 1720 West End Avenue, Suite 401, Nashville, Tennessee 37203.

CHATTANOOGA GRADUATE EDUCATION PROGRAM

UT Knoxville offers a graduate program in education leading to the Specialist in Education and the Doctor of Education degrees with a major in Educational Administration and Supervision.

Students who enroll in this program must be admitted to The Graduate School of UT Knoxville. Information and application forms may be obtained from the UTK/UTC Graduate Program, 1720 West End Avenue, Suite 401, Nashville, Tennessee 37203.

THE UNIVERSITY OF TENNESSEE-OAK RIDGE GRADUATE SCHOOL OF BIOMEDICAL SCIENCES

UT Knoxville offers a program leading to the M.S. and Ph.D. degrees with a major in Biomedical Sciences. Graduate students have the opportunity to study and do research in conjunction with the Biology Division of the Oak Ridge National Laboratory.

For complete information concerning the program, see Biomedical Sciences under Fields of Instruction.

COLLEGE OF SOCIAL WORK

UT Knoxville offers a fully accredited two-year program leading to the Master of Science in Social Work through the College of Social...
Work, with programs in Knoxville, Nashville, and Memphis.

The UT Knoxville College of Social Work also offers a Doctor of Philosophy with a major in Social Work.

For complete information concerning the programs, see Social Work under Fields of Instruction.

Psychological Clinic
(College of Liberal Arts)

Leonard Handler, Director

The Psychological Clinic supports graduate research and training in clinical psychology. Psychological assessment and psychotherapy are offered on an outpatient basis to the general public as well as to University students and staff.

Statistical Consulting Center

The goal of the Statistical Consulting Center (SCC) is to help students, faculty and staff enhance the quality of their research by working together to effectively apply statistical methodology. SCC is co-sponsored by the University of Tennessee Computing Center and the Department of Statistics.

Services offered are assistance in design of study; management of data, analysis and interpretation of results; aid in choice and creation of the most effective statistical graphics; review of journal article, grant proposal, thesis or dissertation; writing of programs using statistical packages; teaching short courses on how to use statistical software.

There are five full-time Master's level statisticians, two half-time graduate research assistants, and a quarter-time faculty associate with the Department of Statistics. In addition, access is provided to faculty consultants.

A UT Computing Center account can provide access to many popular computers and statistics packages. Software is also available for use on personal computers through various site-licensing agreements.

Contact the Computing Help Desk, at 974-8200 and ask to speak to a statistical consultant. Charges for our services are billed through a UT Computing Center project code. Consultants are located at 200 Stokely Management Center.

Textiles and Nonwovens Development Center
(College of Human Ecology)

Larry C. Wadsworth, Director

The Textiles and Nonwovens Development Center (TANDEC) was officially dedicated in October 1990. TANDEC was made possible through a grant from Exxon Chemical Company.

Nonwovens products loom large in a number of markets and TANDEC looms large in both basic research and nonwoven product development. Nonwovens research programs at UT Knoxville include structure-property-process relationships in melt blowing polyolefins, polyesters, nylon, elastomeric polymer, engineering thermoplastics and recycled plastics; mechanism of melt blown web formation; modeling of the melt blowing and spunbonding processes; development of outline 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.

Transportation Center

(Office of Associate Vice Chancellor)

Stephen H. Richards, Director

The Transportation Center was created in 1970 to foster and facilitate interdisciplinary research and public service in the field of transportation at The University of Tennessee. It began operating full-time in 1972 and since then has contributed greatly to the overall research program of The University.

The Center, 357 South Stadium Hall, is a University-level organization administratively positioned within the Office of the Associate Vice Chancellor for Research at UT Knoxville. The Center's multidisciplinary staff includes over 100 full-time researchers and technicians augmented with numerous faculty and students. The Center is presently organized into four major divisions: Logistics and Systems Analysis; Infrastructure and Environment; Safety and Traffic Operations; and Mobility Services and Policy.

The Center has three goals. The first is to conduct a program of research in transportation that is recognized for its excellence, comprehensiveness, innovation, productivity, and national leadership. The second is to develop and sustain the technical expertise for high quality transportation research by the faculty and students within the various departments and colleges of UT. The third goal is to serve the transportation research, service, and training needs of state and local government, business, and industry in Tennessee, the southeast region, and the nation.

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. UTI was established in 1964 and has evolved into an internationally recognized institution for graduate study and research in engineering, physics, mathematics, and computer science. The accredited academic programs and educational policies of the Space Institute have their origins in appropriate departments of The University of Tennessee, Knoxville. The more than 45 faculty members of the Institute carry out these accredited academic programs through classroom teaching, informal seminars, active research, and directing the research of their students in an environment of creative work and advanced study. Programs are available to students devoting full-time or part-time effort toward M.S. and Ph.D. degrees, those interested in continuing education for updating and broadening knowledge, and those who wish to pursue post-doctoral research.

Graduate degree programs are available with majors in Aerospace Engineering, Aviation Systems, Chemical Engineering, Computer Science, Electrical Engineering, Engineering Science, Industrial Engineering, (engineering management concentration), Mathematics, Mechanical Engineering, and Physics. In addition to the fundamental studies characteristic of each discipline, research opportunities are available in many areas including aerodynamics, atmospheric science, fluid mechanics, advanced space propulsion, neural networks, energy conversion processes, thermal sciences, coal combustion, magnetohydrodynamics, plasma physics, space systems, propulsion, computational fluid dynamics, and other aspects of atmospheric and space flight.

The Institute has an established Center of Excellence in Laser Applications and offers graduate studies and research opportunities in laser diagnostics, laser materials interactions, picosecond processes, and coherent and nonlinear optics.

The Institute was established in part to increase the research and engineering resources of Tennessee through education and practice in relevant scientific and technical areas and in part to interface University faculty and student research with the Air Force Arnold Engineering Development Center. The faculty, research activities, and facilities of the Institute, and those available at Arnold Center through appropriate contractual arrangements, provide students an unusual opportunity for significant research in these areas. Students who enroll at UTI are admitted to The Graduate School, The University of Tennessee, Knoxville. Graduate Research Assistantships are available for qualified students. Further information may be obtained from the Dean for Academic Affairs, The University of Tennessee Space Institute, Tullahoma, Tennessee 37388.
Water Resources Research Center
(Office of Associate Vice Chancellor)

Bruce A. Tschantz, Acting Director

The Water Resources Research Center, 422 South Stadium Hall, is a federally designated institute for sponsoring and coordinating water research for the state. The purposes of the Center are: (1) to assist and support all the academic institutions of the state, public and private, in pursuing water resources research which addresses a wide range of problems of interest to the state, region, and nation; (2) to provide for information dissemination and technology transfer services to state and local government bodies, academic institutions, professional groups, environmental organizations, and others, including the general public, who have an interest in water resources matters; (3) to promote education and training in fields relating to water resources and to encourage the entry of promising students into careers in these fields. The Center maintains a technical library which includes numerous water resources-related databases on CD-ROM.
Agricultural Sciences and Natural Resources, 35
Agricultural Sciences and Natural Resources, College of, 35
Agriculture, 48
Agricultural Experiment Station, 184
Agricultural Extension Service, 184
Agriculture, Institute of, 184
Agriculture, Plant and Soil Science, 35, 149
Agriculture, Veterinary Medicine, 39
Animal Science, 35, 48
Animal Science-Veterinary Medicine, 39, 50
Anthropology, 38, 50
Apartment, 31
Appeal, 12
Application, 12
Application, College of, 184
Application, College of, 184
Application, Department of, 184
Application, Graduate School, 184
Application, 12
Application Fee, 12, 13, 24
Application Procedure, 17
Applied and Professional Ethics, 38
Applied Microbiology, Institute of, 38
Architecture, 35
Architecture and Planning, College of, 35
Architecture, School of, 35
Architecture, School of, 35
Art, 38, 53
Art Education, 38
Asian Languages, 155
Assistants, 26
Assistants, Policy for the Administration of, 27
Astronomy, 146
Audiology, 55
Audiology and Speech Pathology, 38, 55
Auditors and Audited Courses, 14, 25
Automobile Registration, 32
Average, Required, 16
Biology, 38, 58
Biomedical Sciences, 35, 186
Biotechnology, 122
Black Cultural Center, 30
Board of Trustees, 5
Botany, 38, 60
Broadcasting, 36, 61
Bureau of Educational Research and Service, 37, 181
Business Administration, 38, 43, 62, 81, 97, 123, 125, 166
Business Administration, College of, 36
Accounting and Business Law, 35, 43
Economics, 35, 81
Finance, 36, 97
Management, 36, 123
Management Science, 36, 123
Marketing, Logistics and Transportation, 36, 125
Statistics, 36, 166
Business and Economic Research, Center for, 36, 181
Business Law, 43
Calendar for 1994-95, 4
Campus Map, 200
Campus Security, 27
Career Services, 30
Catalog, 1
Cellular, Molecular and Developmental Biology, 133
Center for Applied and Professional Ethics, 38
center for Business and Economic Research, 36, 181
Center for Environmental Biotechnology, 38
Center for Environmental/Energy/Science Education, 37
Center for Information Studies, 181
Center for International Education, 1, 30
Center for Laser Applications, 181
Center for Livestock Diseases and Human Health, 182
Center for Materials Processing, 37, 182
Center for Measurement and Control Engineering, 37, 186
Center for Nursing Practice, 39
Center for Nursing Research, 39
Center for Physical Activity and Health, 37
Center for Psychoanalysis and the Humanities, 38
Center for Quaternary Studies of the Southeastern U.S., 38
Center for Research, Service and Inquiry, 35
Center for the Study of War and Society, 38
Centers of Excellence, 181
Change (Revision) of Program, 12
Change of Registration, 16
Challenge of Registration, 12
Chattanooga Graduate Education Program, 186
Chemical Engineering, 35, 66
Chemistry, 38, 67
Child and Family Studies, 37, 68
Child Behavior Institute, 38
Child Care, 31
Child Development Laboratories, 31, 37, 182
Civil Engineering, 37, 70
Civil and Environmental Engineering, 37, 70
Classics, 38, 73
Classifications
Admission, 12
Residency, 23
Classified Employment, 18
Cognate, Definition of, 17
College Student Personnel, 85
Colleges, 35
Agricultural Sciences and Natural Resources, 35
Architecture and Planning, 35
Business Administration, 36
Communications, 36
Education, 36
Engineering, 37
Human Ecology, 37
Law, 38
Liberal Arts, 38
Nursing, 39
Social Work, 39
Vernier Medicine, 39
Committees
Doctoral, 19
Master's, 18
Specialist in Education, 19
Communications, 36, 44, 61, 73, 115
Communications, College of, 36
Advertising, 36, 44
Broadcasting, 36, 61
Journalism, 38, 115
Communications Research Center, 36, 182
Comparative and Experimental Medicine, 75, 134, 174
Comparative Literature, 115
Comprehensive Examination, 18, 19, 20
Computer Engineering, 87
Computer Science, 38, 75
Computing Center, 182
Concentration, Definition of, 17
Conditional Registration, 15
Conferences, Department of, 183
Confidentiality of Information, 26
Consumer Environments, 110, 142, 170
Contacts, 1
Content, Table of, 2-3
Continuing Education and Public Service, 183
Continuous Registration, 20
Correspondence Directory, 1
Correspondence Study, 14, 184
Council, Graduate, 6, 9
Counseling Psychology, 83
Counseling, Rehabilitation, 163
Counseling Services Center, 31
Course Description, 15
Course, Drop, Add, 16
Course Loads, 16
Course Numbers, 15
Course Requirements, 18, 19
Curriculum Instruction, 36, 76
Dance, 112
Dates of Registration, 4
Defense of Dissertation, 20
Deferred Payment Service Fee, 25
Definition of Graduate Terms, 17
Degree Program Admission, 12
Transcripts, 12, 13
Textile Science, 170
Test of English as a Foreign Language, 12, 13
Theatre, 37, 172
Textile, 170
Termination, 19, 20
Thesis, 18, 19, 21
Theses and Dissertations, 18, 21, 22
Thesis Registration, 19
Time Limit, 19, 20
Timetable of Classes, iv
Title IX/Section 504 Statement/EOO, 27
Tool, Definition of, 17
Track, Definition of, 17
Traffic Rules, 32
Transfer Credits, 17
Transit Admission, 13
Transportation and Logistics, 125
Transportation Center, 187
Trustees, Board of, 5
Tuition, 24
Tuition Payment Plans, 24
U
Undergraduate and Professional Students, 14
University Administration, 5
University Apartments, 31
University Calendar, 4
University Computing Center, 182
University Evening School, 1, 183
University Fees, 23-26
University Libraries, 185
University Policies, 26-30
University Programs and Services Fee, 24
Urban Practice, 39, 173
Urban Studies, 115
Use of Facilities Registration, 15
Use of Social Security Number, 26
UT, Knoxville Administration, 5
V
Vehicle Operation and Parking, 32
Venture Analysis, 63
Veterans Benefits, 26
Veterinary Medicine, 39, 48, 96, 135, 145, 158, 173, 174
Veterinary Medicine, College of, 39
Animal Science-Veterinary Medicine, 39, 50
Environmental Practice, 39, 96
Microbiology-Veterinary Medicine, 39, 135
Pathology, 39, 145
Rural Practice, 39, 159
Urban Practice, 39, 173
Veterinary Medicine Students, 14
Vocational-Technical Education, 168
W
Waiver of Fees, 25
Waste Management Research and Education Institute, 182
Water Resources Research Center, 188
Wildlife and Fisheries Science, 98
Withdrawal, 16, 25
Women's Center, 32
Women's Studies, 115
Work-Study, 1, 26
Workshops, 14, 183
Written Examination, 18, 19
Z
Zoology, 38, 175